

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Whitman River Dam, Inc.

Project No. 13237-003-MA

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(July 2, 2012)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission's) regulations, 18 CFR Part 380 (Order No. 486, 52 FR 47897), the Office of Energy Projects has reviewed the application for an original license for the Crocker Dam Hydroelectric Project, to be located on the Whitman River, within the Township of Westminster, Worcester County, Massachusetts, and has prepared an Environmental Assessment (EA).

The EA contains the staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the EA is on file with the Commission and is available for public inspection. The EA may also be viewed on the Commission's website at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access documents. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659. You may also register online at <http://www.ferc.gov/docs-filing/esubscription.asp> to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

Any comments on the EA should be filed within 30 days from the date of this notice. Comments may be filed electronically via the Internet. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's website <http://www.ferc.gov/docs-filing/efiling.asp>. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/eComment.asp>. You must include your name and contact information at the end of your comments.

For assistance, please contact FERC Online Support. Although the Commission strongly encourages electronic filing, documents may also be paper-filed. To paper-file, mail an original and seven copies to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, Washington, DC 20426. Please affix “Crocker Dam Hydroelectric Project No. 13237-003” to all comments.

For further information, contact Jeff Browning at (202) 502-8677.

Kimberly D. Bose,
Secretary.

**ENVIRONMENTAL ASSESSMENT
FOR
HYDROPOWER LICENSE**

Crocker Dam Hydroelectric Project

FERC Project No. 13237-003

Massachusetts

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, D.C. 20426

July 2012

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ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
BMP	best management practices
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Crocker Project	Crocker Dam Hydroelectric Project
CWA	Clean Water Act
DO	dissolved oxygen
EA	environmental assessment
ESA	Endangered Species Act
°F	degrees Fahrenheit
FPA	Federal Power Act
fps	feet per second
FWS	U.S. Fish and Wildlife Service
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
kW	kilowatt
Massachusetts DFW	Massachusetts Department of Fisheries and Wildlife
Massachusetts DEP	Massachusetts Department of Environmental Protection
Massachusetts SHPO	Massachusetts Historical Commission
mg/L	milligrams per liter
msl	mean sea level
MWh	megawatt-hour
National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NPCC	Northeast Power Coordinating Council
V	volt
Whitman	Whitman River Dam, LLC
WQC	401 Water Quality Certification

EXECUTIVE SUMMARY

Proposed Action

On August 29, 2011, Whitman River Dam, Inc. (Whitman) filed an application for an original license with the Federal Energy Regulatory Commission (Commission) to construct, operate, and maintain the Crocker Dam Hydroelectric Project. The 145-kilowatt (kW) project would be located at the existing Crocker Pond dam, on the Whitman River, in Worcester County, Massachusetts. The project would not utilize federal lands.

Project Description

The proposed project would consist of: (1) the existing 520-foot-long, 38.5-foot-high earthen embankment and masonry Crocker Pond dam with a 120-foot-long arched spillway section topped with existing 26-inch-high wooden flashboards; (2) an existing 102.9-acre impoundment with a normal water surface elevation of 752.66 feet above mean sea level (msl); (3) an existing 8-foot-wide, 12-foot-high floodgate; (4) an existing 3-foot-wide, 3-foot-high mud gate; (5) an existing gate house equipped with a 47-foot-long, 42-inch-diameter penstock, including an 18-foot-wide, 6.5-foot-high metal trashrack with 2-inch-wide bar spacing at the penstock intake; (6) a new 6-foot-long, 42-inch-diameter penstock extension; (7) a new powerhouse containing one 145-kW turbine generating unit; (8) a new 20-foot-wide, 6-foot-deep tailrace; and (9) a new 240-foot-long, 480-volt (V) transmission line including a 40-foot-long, buried section from the powerhouse to an existing power pole and a 200-foot-long, above-ground section from the power pole to the existing regional grid. The proposed project would bypass approximately 80 feet of the Whitman River and would have an estimated annual generation of 887.45 megawatt-hours (MWh).

Proposed Environmental Measures

Whitman proposes several environmental measures to protect or enhance aquatic, terrestrial, recreational, and cultural resources.

- Maintain aquatic habitat in the impoundment and downstream by operating the project in a run-of-river mode at a normal pool elevation of 752.66 feet above msl.
- Use a coffer dam and best management practices to control soil erosion and sedimentation during construction of the new powerhouse, tailrace, and transmission line.
- Maintain an existing 18-foot-wide, 6.5-foot-high metal trashrack with 2-

inch-wide bar spacing at the penstock intake to protect resident fish from being entrained by the project and passing through the proposed project's turbines.

- Allow existing leakage through the flashboards to continue which would provide year-round aesthetic flows over the crest of the dam and into the 80-foot bypassed reach.

Public Involvement and Areas of Concern

Before filing its license application, Whitman conducted pre-filing consultation under the traditional licensing process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission.

On September 12, 2001, the Commission issued a public notice tendering the application, stating its intent to waive scoping, stating that the application is ready for environmental analysis, and requesting comments, terms and conditions, recommendations, and prescriptions.

The primary issue associated with licensing the proposed project is the effect of construction and operation on aquatic resources.

Alternatives Considered

This environmental assessment (EA) considers the following alternatives: (1) Whitman's proposal, as outlined above; (2) Whitman's proposal including the water quality certification conditions issued by the Massachusetts Department of Environmental Protection, section 10(j) recommendations made by the Massachusetts Division of Fisheries and Wildlife, and additional staff modifications (staff alternative); and (3) no action, meaning that the project would not be constructed.

In addition to Whitman's proposed measures the staff alternative includes: (1) a soil erosion and sediment control plan that describes measures to control erosion and procedures for removal and disposal of accumulated debris and sediment in the impoundment; (2) installing trashracks with 1-inch clear bar spacing, an approach velocity of 2 feet per second or less, and extending to the full depth of the intake opening to minimize fish entrainment; (3) post-operation water quality monitoring to ensure that the water quality of the Whitman River is not adversely affected by project operation; (4) impoundment refill procedures to protect aquatic resources in the Whitman River downstream of the dam; (5) an operation compliance monitoring plan to ensure the project is operated in a run of river mode; (6) notifying the Commission and the

Massachusetts Historic Commission (Massachusetts SHPO) immediately if previously unidentified archaeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities; and (7) consulting with the Massachusetts SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operations or facilities that do not require Commission approval. Below we briefly discuss the anticipated environmental effects of issuing an original license for the proposed project under the staff alternative.

Staff Alternative

Geology and Soils Resources – Developing and implementing the staff-recommended soil erosion and sediment control plan that includes measures to remove debris and sediment from the impoundment would reduce the likelihood of soils and sediments entering the river during project construction, and would reduce the potential that water quality would be impaired during project construction and operation.

Aquatic Resources – Operating the project in the proposed instantaneous run-of-river mode and implementing the staff-recommended impoundment refill procedures would protect aquatic habitat and fisheries in the impoundment and in the Whitman River downstream of the proposed project. Installing the staff-recommended trashrack that extends to the full depth of the intake opening and has a 1-inch clear bar spacing and an approach velocity equal to or less than 2.0 foot per second (fps) would protect fish from entrainment, impingement, and potential turbine injury and mortality. Conducting the staff-recommended post-operation water quality monitoring would ensure that any adverse project effects on water quality are identified.

Terrestrial Resources – Operating the project in the proposed run-of-river mode would maintain stable impoundment levels, and minimize effects on wetland and riparian habitat. Additionally, any adverse effects of project construction on terrestrial habitat would be short-term and minor.

Threatened and Endangered Species – No federally listed endangered or threatened species are known to exist in the project area; therefore, construction and operation of the project would have no effect on federally-listed species.

Recreation Resources - The proposed project would have no effect on existing recreational use because there would be no change in recreational opportunities or access.

Cultural Resources – Constructing the new powerhouse would not alter the historic character of the existing structure because it would not be likely to disturb any archaeological resources.

Notifying the Commission and the Massachusetts SHPO immediately if previously unidentified archaeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities would ensure proper treatment of those resources. Consulting with the Massachusetts SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities that do not require Commission approval would ensure protection of cultural resources in the project area.

No Action Alternative

Under the no-action alternative (license denial), the project would not be constructed and would not generate an estimated average annual generation of 887.45 MWh. Environmental conditions at the project site would remain the same.

Conclusion

Based on our analysis, we recommend licensing the project as proposed by Whitman, with staff modifications and additional measures.

In section 4.2 of the EA, we estimate the likely cost of alternative power for each of the three alternatives identified above. Our analysis shows that during the first year of operation under the proposed action alternative, project power would cost \$166,710 or \$187.85 per MWh more than the likely alternative cost of power. Under the staff alternative, project power would cost \$169,010 or \$190.44 per MWh more than the likely alternative cost of power. There are no costs associated with the no-action alternative other than Whitman's cost to prepare the license application.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (887.45 MWh annually); (2) the 145 kW of electric capacity would come from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by Whitman, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

We conclude that issuing a license for the project, with the environmental measures we recommend, would not be a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

**Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, D.C.**

CROCKER DAM HYDROELECTRIC PROJECT Project No. 13237-003 – Massachusetts

1.0 INTRODUCTION

1.1 APPLICATION

On August 29, 2011, Whitman River Dam, Inc. (Whitman) filed an application with the Federal Energy Regulatory Commission (Commission) for an original license for the proposed Crocker Dam Hydroelectric Project (Crocker Project). The 145-kilowatt (kW) project would be located at the existing Crocker Pond dam, on the Whitman River, in Worcester County, Massachusetts (figures 1, 2, and 3). The project would not occupy any federal land.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Crocker Project is to provide a new source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to Whitman for the Crocker Project and what conditions should be placed on any license issued. In deciding where to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation and water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing a license for the Crocker Project would allow Whitman to generate electricity at the project for the term of an original license, making electric power from a renewable resource available to the regional grid.

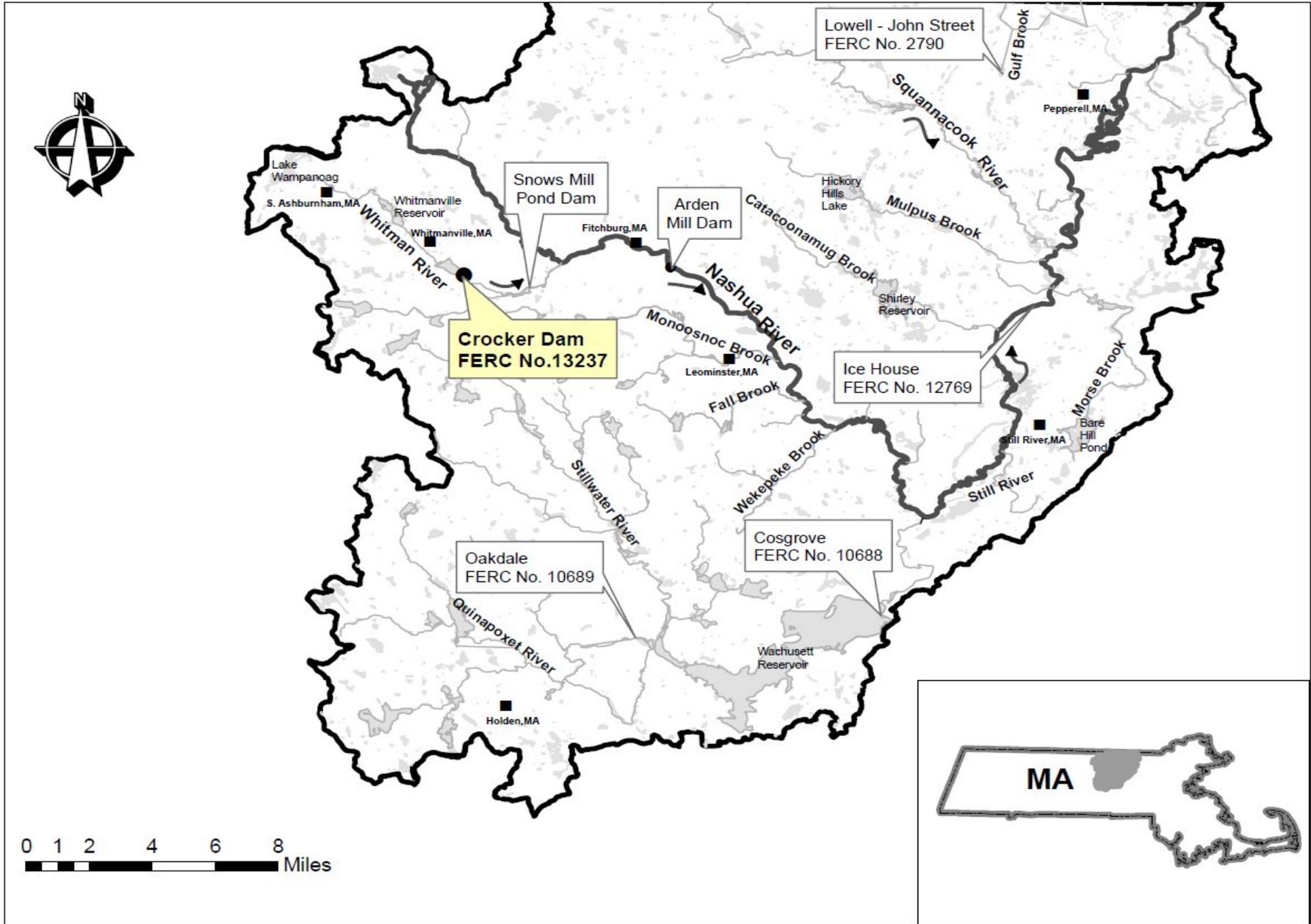


Figure 1. Whitman River Basin Map. Source: staff

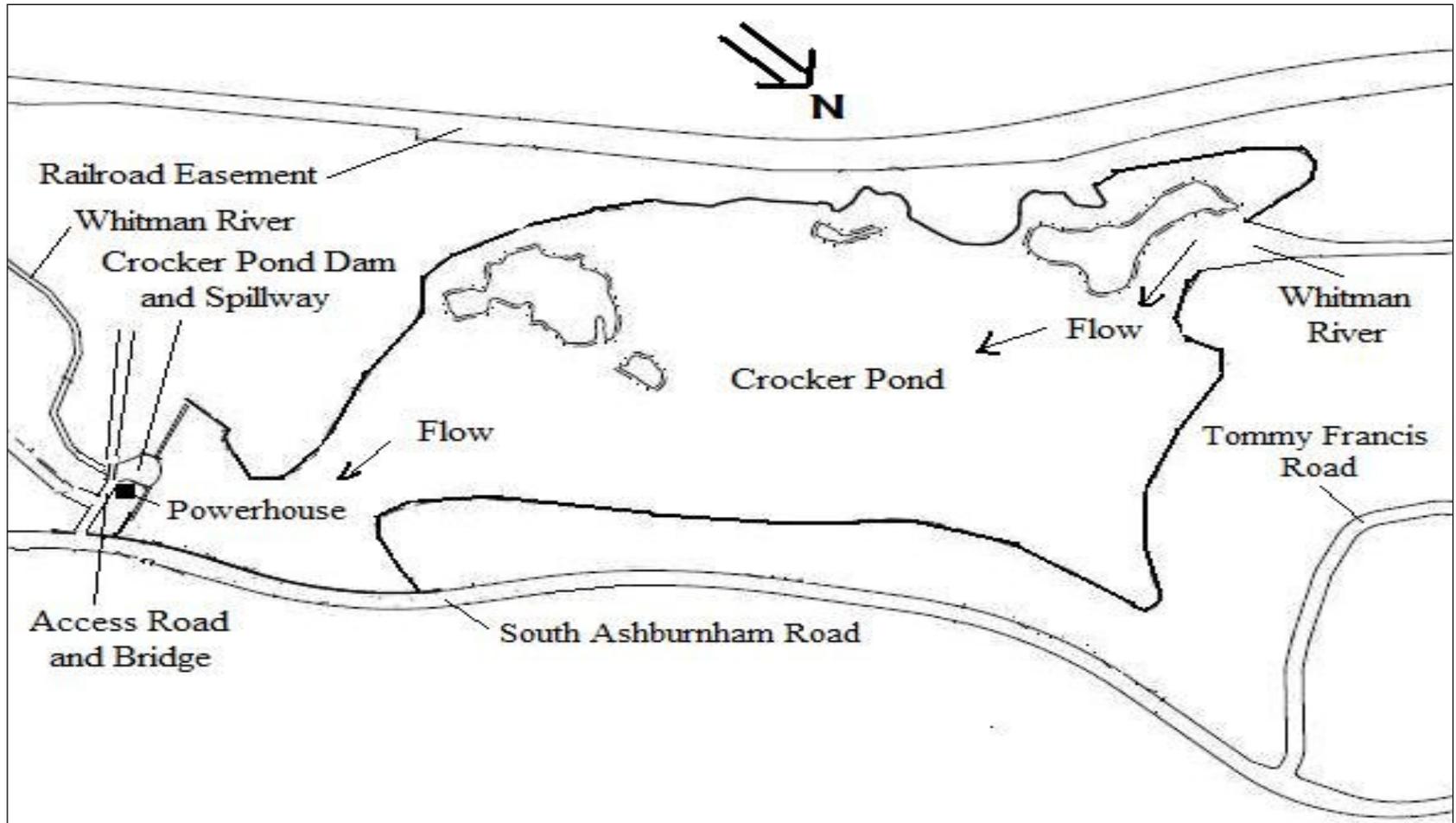


Figure 2. Crocker Project Location Map. Source: staff

This environmental assessment (EA) assesses the effects associated with construction and operation of the project, alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a license, and if so, recommends terms and conditions to become a part of any license issued.

In this EA, we assess the environmental and economic effects of constructing, operating, and maintaining the project: (1) as proposed by Whitman; and (2) with our recommended measures. We also considered the effects of the no-action alternative. Important issues that are addressed include effects of construction and operation of the proposed project on aquatic resources and protection of historic resources.

1.2.2 Need for Power

The Crocker Project would provide hydroelectric generation to meet part of Massachusetts' power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 145 kW and generate approximately 887.45 megawatt-hour (MWh) per year.

The North American Electric Reliability Council (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The proposed Crocker Project would be located in the Northeast Power Coordinating Council, Inc. (NPCC) region of the NERC. According to NERC's 2011 forecast (NERC, 2011), summer peak demand in the NPCC region is projected to grow at an annual rate of 1.4 percent from 2011 through 2020.

We conclude that power from the proposed Crocker Project would help meet a need for power in the NPCC region in both the short- and long-term. The project would provide power that would displace generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A licensee for the Crocker Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are summarized in table 1 and describe below.

Table 1. Major Statutory and Regulatory Requirements for the Crocker Project
(Source: staff).

Requirement	Agency	Status
Section 18 of the FPA (fishway prescriptions)	U.S. Department of the Interior (Interior) or U.S. Department of Commerce	No prescriptions or requests for a reservation of authority to prescribe fishways under section 18 have been filed.
Section 10(j) of the FPA	Interior and Massachusetts Department of Fisheries and Wildlife (Massachusetts DFW)	On November 10, 2011, Interior filed a letter indicating they had no 10(j) recommendations. On November 14, 2011 Massachusetts DFW filed section 10(j) recommendations. ¹
Clean Water Act—water quality certification	Massachusetts Department of Environmental Protection (Massachusetts DEP)	Massachusetts DEP issued a water quality certification on February 4, 2011.
Endangered Species Act (ESA) Consultation	U.S. Fish and Wildlife Service (FWS)	On April 17, 2011, the FWS filed a letter stating there are no known federally listed threatened or endangered species or critical habitat within the project area, and further action under section 7 is not needed.
Section 106 of the National Historic Preservation Act (NHPA)	Massachusetts Historical Commission (Massachusetts SHPO)	The Massachusetts SHPO, in a letter filed on September 29, 2009, made a determination of “no historic properties affected.”

¹ Massachusetts DEP filed their recommendations under section 30(c) of the FPA. However, section 30(c) does not apply to licenses and only applies to exemptions from licensing; therefore, these measures are being treated as recommendations made under section 10(j) of the FPA.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Interior. No prescriptions or requests for a reservation of authority to prescribe fishways under section 18 have been filed.

1.3.1.2 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

On November 10, 2011, Interior filed a letter indicating they had no recommendations under section 10(j). On November 14, 2011, the Massachusetts DFW filed ten recommendations under section 10(j), as summarized in table 6, and discussed in section 5.4, *Recommendations of Fish and Wildlife Agencies*. In section 5.4, we also discuss how we address the agency recommendations and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On August 2, 2010, Whitman applied to the Massachusetts DEP for 401 water quality certification (WQC or certification) for the Crocker Project. The Massachusetts DEP timely issued the section 401 WQC on February 4, 2011, (letter from David Ferris, Wastewater Management Program Director, Massachusetts DEP, February 4, 2011). The conditions of the certification are described under section 2.2.5, *Modifications to Applicant's Proposal – Mandatory Conditions*.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act 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 filed on April 17, 2011, the FWS indicated there are no known federally listed threatened or endangered species or critical habitat for such species within the project area, and further action under section 7 is not needed.

1.3.4 National Historic Preservation Act

Section 106 of the NHPA requires that federal agencies “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

In a letter filed on September 29, 2009, the Massachusetts SHPO stated that the proposed project is unlikely to affect any significant historic properties and made a determination of “no historic properties affected.”

1.4 PUBLIC REVIEW AND COMMENT

The Commission’s regulations (18 CFR § 4.38) requires that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, ESA, the NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission’s regulations

1.4.1 Scoping

On September 12, 2011, the Commission issued a notice of its intent to waive scoping due to the limited scope of proposed construction activities the project site, and Whitman’s close coordination with federal and state agencies during the preparation of the application.

1.4.2 Interventions

On September 12, 2011, the Commission issued a notice that Whitman had filed an application to license the Crocker Project. This notice set November 14, 2011, as the deadline for filing protests and motions to intervene. No protests or motions to intervene were filed.

1.4.3 Comments on the Application

A notice requesting conditions and recommendations was issued September 12, 2011. The following entities commented:

<u>Commenting agency</u>	<u>Date filed²</u>
Massachusetts DFW	November 14, 2011

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is license denial. Under the no-action alternative, the project would not be constructed and environmental resources in the project area would not be affected.

2.2 APPLICANT'S PROPOSAL

2.2.1 Project Facilities

The proposed project would consist of: (1) the existing 520-foot-long, 38.5-foot-high earthen embankment and masonry Crocker Pond dam with a 120-foot-long arched spillway section topped with existing 26-inch-high wooden flashboards; (2) an existing 102.9-acre impoundment with a normal water surface elevation of 752.66 feet above mean sea level (msl); (3) an existing 8-foot-wide, 12-foot-high floodgate; (4) an existing 3-foot-wide, 3-foot-high mud gate; (5) an existing gate house equipped with a 47-foot-long, 42-inch-diameter penstock, including an 18-foot-wide, 6.5-foot-high metal trashrack with 2-inch-wide bar spacing at the penstock intake; (6) a new 6-foot-long, 42-inch-diameter penstock extension; (7) a new powerhouse containing one 145-kW turbine generating unit; (8) a new 20-foot-wide, 6-foot-deep tailrace; and (9) a new 240-foot-long, 480-volt (V) transmission line including a 40-foot-long, buried section from the powerhouse to an existing power pole and a 200-foot-long, above-ground section from the power pole to the existing regional grid. The proposed project would bypass approximately 80 feet of the Whitman River. The project boundary encloses all the existing and proposed project facilities described above.

² On November 12, 2011, Interior filed a letter indicating they had no comments on the application.

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with terms of the license, and proper maintenance. In addition, any license issued would require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant's safety report for Commission review.

2.2.3 Project Operation

Whitman proposes to operate the project in a run-of-river mode, and provide water over the crest of the dam and ensure the existing lake level does not fluctuate as a result of project operations and to ensure water flow through the 80-foot bypassed reach.³ The project would generate electricity using flows from 13 cubic feet per second (cfs) (the minimum hydraulic capacity) to 60 cfs (the maximum hydraulic capacity) from the Whitman River. Flows less than 13 cfs or greater than 60 cfs would be released over the dam and discharged into the 80-foot-long bypassed reach, which consists of bedrock and large boulders. Water from the powerhouse would discharge into large pools at the base of the dam and maintain a wetted bypassed reach. The proposed project would include a control system that allows operation of the turbines to be controlled by head pond elevation. Therefore, the hydropower project is not expected to modify the existing water surface elevation of the impoundment.

The proposed project would have an estimated annual generation of 887.45 MWh.

³ Whitman notes that as owners of Crocker Pond dam it is subject to a flow agreement dated September 25, 1972. This flow agreement was between Weyerhaeuser Company (predecessor of Whitman), Nashua River Reservoir Company, the City of Fitchburg and the United States Environmental Protection Agency. The flow agreement was put into place to ensure adequate flow in the Nashua River for Fitchburg's West Sewage Treatment Plant. The treatment plant is no longer operational and the flow agreement expires on September 25, 2012. Whitman also has water supply obligations as outlined in a deed dated August 15, 1994, which must be read with the Water Rights and Access Easement as amended by the First Amendment to Water Rights and Access Agreement dated May 16, 2002. Whitman's deeded flow obligations are inconsistent with operating the project in a run-of-river mode as would be required by Massachusetts DEP's certification.

2.2.4 Proposed Environmental Measures

Whitman proposes to: (1) maintain aquatic habitat in the impoundment and downstream by operating the project in a run-of-river mode at a normal pool elevation at 752.66 feet above msl; (2) use a coffer dam and best management practices to control soil erosion and sedimentation during construction of the new powerhouse, tailrace, and transmission line; (3) maintain an existing 18-foot-wide, 6.5-foot-high metal trashrack with 2-inch-wide bar spacing at the penstock intake to protect resident fish from being entrained by the project and passing through the proposed project's turbines; (4) allow existing leakage through the flashboards to continue which would provide year-round aesthetic flows over the crest of the dam and into the 80-foot bypassed reach.

2.2.5 Modifications to Applicant's Proposal – Mandatory Conditions

The following project-specific mandatory conditions have been provided and are evaluated as part of Whitman's proposal.

Water Quality Certification Conditions

The conditions of the WQC are listed below:

- 1) This Water Quality Certification shall become a condition of the FERC license issued to the project owner.
- 2) This certification shall become effective on the date that the license issued for the project by FERC becomes effective.
- 3) The state and federal resource agencies referred to in this certification include the Massachusetts DEP, the Massachusetts DFW, Interior, and FWS.
- 4) The project shall be operated by the project owner in accordance with the conditions contained in this certification and information included in the FERC license application. Any modification made to the FERC application during the licensing process that would have a significant effect on the conclusion or conditions contained in this certification, as determined by Massachusetts DEP, must be submitted to Massachusetts DEP for prior review and approval.
- 5) The project shall be operated to maintain the existing and designated uses of the Whitman River as outlined in the Standards at 314 CMR 4.00, and to maintain and integrated and diverse biological community within the Whitman River.
- 6) 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.
- 7) All activities shall be conducted in compliance with the Massachusetts Wetlands Protection Act, including the Rivers Restoration Act, G.L. Chapter 131, Section

40, and the implementing regulations at 310 CMR 10.00. A water quality certification shall be obtained from Massachusetts DEP 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 GL e. 91, and the implementing regulation at 310 CMR 9.00.

- 8) 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 of such waters. The project owner shall implement the plan as approved by Massachusetts DEP.
- 9) 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.
- 10) Massachusetts DEP may request, at any time during which this certification is in effect, that FERC reopen the license to make modifications Massachusetts DEP deems necessary to maintain compliance with the Standards at 314 CMR 4.00, or other appropriate requirements of state law.
- 11) Massachusetts DEP 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 designated uses of the waters of the Commonwealth.
- 12) The project owner shall operate the project in run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuation of the head pond water level are minimized. This operating regime may be temporarily modified by approved maintenance activities, agreement between 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.
- 13) “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.
- 14) “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.
- 15) During refilling of the project reservoir after dam maintenance or emergency

- drawdown, the project owner shall operate the project such that 90% of the inflow to the project is released below the project and the impoundment is refilled on the remaining 10% of inflow.
- 16) Within three months of completion of turbine installation at the dam, or upon such other schedule established by FERC, the project owner shall, submit a plan for monitoring run-of-river operation including pond level and flow release from the project to Massachusetts DEP for approval. The plan shall include: a description and design of the mechanisms and structures that will be used; a description of periodic maintenance and/or calibration that will be conducted to ensure these mechanisms and structures work properly; a description of the method used to record project operation data for verification of proper operations and minimum flow releases; and a description of the manner in which data will be maintained for inspection by Massachusetts DEP and the state and federal resource agencies in developing these plans, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to Massachusetts DEP for approval. The project owner shall provide state and federal resource agencies with at least thirty days to respond to a draft plan before it is submitted to Massachusetts DEP for approval. The project owner shall implement the plan as approved by Massachusetts DEP.
 - 17) Within three months of completion of turbine installation at the dam, the project owner shall submit a plan of operation to insure dissolved oxygen levels in the Whitman River remain above 6 mg/L at all times. Operations shall include at a minimum, monitoring dissolved oxygen and temperature at stations South 1 and South 2 (identified during summer 2010 sampling) upon turbine discharge and during any adjustments necessary to maintain the 6 mg/L standard. Adjustments could include providing continuous spill during the summer months (July-September) or improving aeration at the outlet, if needed. The project owner shall consult with the state and federal resource agencies in developing this plan, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to Massachusetts DEP for approval. The project owner shall provide state and federal resource agencies with at least thirty days to respond to a draft plan before it is submitted to Massachusetts DEP for approval. The project owner shall implement the plan as approved by Massachusetts DEP.
 - 18) Within one year of the effective date of this certification, or upon such other schedule established by FERC, the project owner shall install full-depth, one inch clear trashracks with velocities less than or equal to two feet per second (≤ 2 fps) at the intakes to reduce impingement and entrainment of fish at the project.
 - 19) Massachusetts DEP reserves the right to prescribe upstream and downstream eel passage facilities and operations when determined necessary by the Massachusetts DFW.
 - 20) Massachusetts DEP reserves the right to prescribe upstream and downstream anadromous fish passage facilities and operations when determined necessary by the Massachusetts DFW.

- 21) The project owner shall maintain a minimum flow in the bypassed reach sufficient to maintain water quality standards at all times.
- 22) The project owner shall allow any employees, agent, consultant, contractor or authorized representative of Massachusetts DEP or Massachusetts DFW 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 Massachusetts DEP 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.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include Whitman's proposal to operate the project in run-of-river mode by maintaining a normal pool elevation at 752.66 feet msl and allow existing leakage through the flashboards to provide water over the crest of the dam year-round.

In addition, the staff alternative would include the WQC conditions specified by the Massachusetts DEP as mentioned above and include the following measures: (1) a soil erosion and sediment control plan that describes measures to control erosion and procedures for removal and disposal of accumulated debris and sediment in the impoundment; (2) installing a trashrack that extends to the full depth of the intake opening and has a 1-inch clear bar spacing and an approach velocity equal to or less than 2.0 fps to minimize fish entrainment; (3) implementing post-operation water quality monitoring to ensure that the water quality of the Whitman River is not adversely affected; (5) implementing impoundment refill procedures to protect the aquatic resources in the Whitman River downstream of the project; (6) implementing an operations compliance monitoring plan to ensure the project is operated in a run of river mode; (7) notifying the Commission and the Massachusetts Historic Commission

(Massachusetts SHPO) immediately if previously unidentified archaeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities; and (8) consulting with the Massachusetts SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operations or facilities that do not require Commission approval.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.). Under each resource area, historic and current conditions are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative* of the EA.⁴

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Crocker Pond dam is located on the Whitman River near the Town of Westminster, Massachusetts. The Whitman River at Crocker Pond has a drainage area of 21 square miles, and is a tributary of the North Nashua River. The North Nashua River flows into the Nashua River then into the Merrimack River that flows into the Atlantic Ocean. Major land uses in the area are mostly industrial or residential with some farming.

Currently there are three licensed hydropower projects on the Nashua River downstream of the Crocker Pond dam. The Ice House Power Project No. 12769 is located in Middlesex County, Massachusetts, and the Jackson Mill Project No. 7590 and the Mine Falls Project No. 3443 are both located in Hillsborough County, New Hampshire.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR § 1508.7), cumulative effect is the impact on the environment that results from the incremental impact of the

⁴ Unless otherwise indicated, our information is taken from the application for license filed by Whitman on August 29, 2011.

action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Through agency consultation and our independent analysis we've identified no resources that would be cumulatively affected by construction and operation of the Crocker Project. The project is located in a very small watershed with very little existing or proposed future development other than the proposed project.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific cumulative and site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that geology and soils, aquatic, terrestrial, land use and recreation, and cultural resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to socioeconomics or aesthetic resources associated with the proposed action, and therefore, this resource is not assessed in the EA. Land use is addressed in the recreation and terrestrial sections. We present our recommendations in Section 5.2, *Comprehensive Development and Recommended Alternative* section.

3.3.1 Geology and Soils Resources

Affected Environment

The bedrock in the project vicinity consists of argillite and mica slate, gneiss, and crystalline magnesium limestone. Soil types within the project area include glacial tills, sand, and gravel; these soil types are erodible.

Environmental Effects

To minimize sedimentation of the river during construction, Whitman proposes to install a temporary inflatable rubber cofferdam to dewater the Whitman River during construction of the new powerhouse and tailrace. To control erosion and sedimentation, Whitman proposes to employ best management practices (BMPs) such as hay bales, silt fencing, and sediment traps to receive water removed within the cofferdam and collect storm water during project construction. To prevent the potential for fuel spills from

entering wetland areas, Whitman proposes that all refueling and maintenance of equipment would be conducted outside of the 100-foot buffer zone, and oil absorbing pads and booms would be kept at the site in the event of any spills or leaks. In its license application, Whitman filed a drawing showing the general location of the sediment trap, dewatering hose, and hay bale protection.

Massachusetts DFW did not recommend any measures to address construction-related erosion or disposal of removal of sediment. Massachusetts DEP certification condition 8 would require Whitman to prepare a plan to monitor and control erosion during construction activities that would keep Whitman River free from turbidity, and certification condition 9 would require disposal of debris and sediment in the impoundment in a manner that would not impair water quality.

Staff Analysis

Constructing the project would include removing soil and rock primarily from the areas of the new powerhouse and tailrace. This could cause short-term bank erosion, river sedimentation, disturbance of riverbed material, and re-suspension of sediments. Further, constructing and operating the project would include removing debris and sediment from the existing gate house in the impoundment.

Implementing the measures proposed by Whitman would help to limit erosion and sedimentation in the project area during project construction; however, Whitman's proposal lacks detail regarding the actual site conditions, the location for refueling and maintenance, an implementation schedule, and any monitoring of turbidity that may be necessary during project construction. Development of a soil erosion and sediment control plan, in consultation with Massachusetts DEP, would include these additional details and implementing the measures would ensure that any adverse effects on soils and water resources from erosion and sedimentation and debris and sediment removal would be minimized during project construction and operation. Developing a soil erosion and sediment control plan that includes this information would be consistent with conditions 8 and condition 9 of Massachusetts DEP's certification.

3.3.2 Aquatic Resources

Affected Environment

Water Quantity

The Whitman River generally exhibits high flows during spring (March through May) and low flows during summer (July through September) (see flow table on page 14 in Exhibit E of the license application). Based on 74 years of flow records at the USGS gage no. 01094400 at Fitchburg, Massachusetts (as shown on the annual flow duration

curve, page 14 in Exhibit E of the license application), flows in the Whitman River near the project site exceed 60 cfs (the maximum project operating flow) about 16 percent of the time and exceed 13 cfs (the minimum operating flow) about 95 percent of the time. The mean annual flow at the Crocker Pond dam is approximately 40 cfs and the August mean flow is about 14 cfs.

Normal river flow results in discharge over the spillway or through a waste gate at the base of the dam.

Water Quality

At the proposed project site, the Whitman River is designated as Class B and provides warmwater fishery habitat. Designated warmwater fisheries have a minimum dissolved oxygen (DO) standard of 5 milligrams per liter (mg/L) and temperatures that exceed 68 degrees Fahrenheit (°F). However, Massachusetts DEP states recent fish sampling discovered reproducing trout downstream of Crocker Pond dam, and this section of the Whitman River will be designated a coldwater fishery in the future. Designated coldwater fisheries have a minimum DO standard of 6 mg/L and temperatures that do not exceed 68°F.

Generally, water quality of the Whitman River in the project area is very good and exceeds the DO, temperature, and turbidity standards for Class B waters. The results of a DO sampling conducted during July-September, 2010 at the project site, indicated average DO concentrations in Crocker Pond were between 0.9 mg/L to 8.5 mg/L and average DO concentrations in the river below Crocker Pond dam were between 5.2 mg/L and 9.4 mg/L. Water temperatures in the pond exceed 68°F.

Fishery Resources

The fishery in the Whitman River includes pumpkinseed, bluegill, largemouth bass, smallmouth bass, white sucker, chain pickerel, yellow perch, brown bullhead, fallfish, longnose dace, and various shiners and minnows. In addition, brook, brown, and rainbow trout are found in the vicinity of the proposed project site. As indicated above, Massachusetts DEP recently discovered reproducing trout downstream of Crocker Pond dam. Presently, there are no diadromous (migratory) fish in the vicinity of the project.

Environmental Effects

Mode of Operation

Whitman proposes to operate the proposed project in an instantaneous run-of-river mode, with inflow equaling outflow on an instantaneous basis, resulting in a stable impoundment water level. When the turbine is not generating, all flow would be spilled

over the dam and into the 80-foot-long bypassed reach.

Massachusetts DFW 10(j) recommendation 1 and Massachusetts DEP certification condition 12 would require Whitman to operate their proposed project in an instantaneous run-of-river mode. Massachusetts DFW and Massachusetts DEP also state that this operating regime may be temporarily modified by operating emergencies beyond the control of the licensee, extreme hydrologic conditions, or for short periods upon the mutual agreement between the licensee, the appropriate state and federal resource agencies.

Staff Analysis

Operating the proposed hydropower project in an instantaneous run-of-river mode would limit project impoundment fluctuations, and would result in no change in the amount, schedule, and duration of flow released to the mainstem of the Whitman River downstream of the project. During project operation, flow diverted to the powerhouse would be released into the main channel approximately 80 feet downstream of the Crocker Pond dam. These diverted flows and the leakage flow through the flashboards would keep the bypassed reach wetted during project operations. Operating the project in a run-of-river mode would minimize the time water is retained behind the Crocker Pond dam and would help avoid increasing the water temperatures of the upper levels of the impoundment from solar heating. Also, this measure would limit fluctuating water levels which are known to affect the reproduction of fish species that spawn in near-shore areas (Sammons and Bettoli, 2000). By operating the project in a run-of-river mode, habitat in the project impoundment and habitat in the Whitman River downstream of the project tailrace would be essentially unchanged compared to current conditions and aquatic organisms, including fish and benthic macroinvertebrates, would be unaffected.

Drawdown Management

Periodically, the project impoundment would be drawn down for maintenance and for any unscheduled emergencies. To maintain downstream flows, Massachusetts DFW 10(j) recommendation 5 and Massachusetts DEP certification condition 15 would require an impoundment refill procedure following maintenance or emergency drawdowns whereby 90 percent of project inflow would be passed downstream and 10 percent would be used to refill the impoundment. In their application, Whitman did not propose an impoundment refill procedure. However, in their letter filed on December 12, 2011, they agreed to implement this measure.

Staff Analysis

Releasing 90 percent of the project inflow during impoundment refilling would ensure that downstream flows are kept at near natural flow levels and the impoundment is

timely refilled. Minimizing the time that the impoundment is drawn down and that flows are reduced downstream would help maintain the existing aquatic habitat for fish and other aquatic species. Further, the proposed reservoir refill procedures would ensure that aquatic habitat downstream would quickly be returned to normal conditions with minimal impacts to aquatic resources.

Operation Compliance Monitoring Plan

Massachusetts DFW 10(j) recommendation 4 and Massachusetts DEP certification condition 16 would require an operation compliance monitoring plan that includes a description of the mechanisms and structures that would be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation and minimum flows, an implementation schedule, and a description of the data storage and inspection process.

In a letter filed on December 12, 2011, Whitman responded to Massachusetts DFW's 10(j) recommendation 4 and requested a practical operating range be assigned to the impoundment and the operation range set by elevation limits.

Staff Analysis

An operation compliance monitoring plan would help the agencies and Commission verify that the project is operating in a run-of-river mode. A detailed description of the equipment and procedures necessary to maintain, monitor, and report compliance would prevent possible misunderstandings of project operation and reduce the likelihood of complaints regarding project operation being filed with the Commission.

The operation range Whitman requested appears to be a request to establish impoundment elevation limits during run-of-river operations. These operating limits could be established through consultation and the development of the operation compliance monitoring plan.

DO Monitoring

Massachusetts DFW's 10(j) recommendation 3 and Massachusetts DEP certification condition 17 would require post-operation monitoring of DO and temperature within the project area, and would also require developing protocols for monitoring DO in consultation with the agencies. Massachusetts DFW and Massachusetts DEP indicate that if the monitoring results demonstrate that the project is causing depletion of DO, mitigation measures, such as releasing additional flow over the dam, may be required. In their application, Whitman did not propose a post-operation water quality monitoring survey. However, in their letter filed on December 12, 2011, they agreed to conduct this monitoring.

Staff Analysis

During project operation, some of the flow passing downstream from the project impoundment to downstream reaches would be diverted into the proposed project's intakes and released through the project's tailrace into the Whitman River. Consequently, flow spilling over the existing Crocker Pond Dam would be reduced from current conditions when the project is operating. Reducing the flow that spills over the dam and increasing the amount of water that passes through the project works could result in less aeration of water downstream of the dam. This could result in water with lower DO concentrations, especially during warmer months (July through September) when water temperature is higher and the assimilative capacity of the water is lower. Releasing water with low DO concentrations downstream could affect the quality of the aquatic habitat and could affect the survival and reproduction of aquatic species, including resident coldwater fish. Additionally, these waters could have concentrations below the state standard for coldwater fishery of 6 mg/L.

To address periods when water quality in the river downstream of the dam may be adversely affected by project operation, Massachusetts DFW, and Massachusetts DEP specify that the applicant conduct DO monitoring. If significant adverse changes to water quality (e.g., decreased DO) are caused by the project operation, then other measures could be implemented, such as reducing flows to the powerhouse and increasing flows over the dam. The proposed monitoring, reporting, and consideration of additional measures, would ensure that any project effect on DO would be addressed. Consulting with the agencies on the frequency and duration of DO monitoring would ensure that the data are collected in a manner that would be appropriate and useful for determining water quality compliance.

Trashrack Design

To limit entrainment of resident fish during project operation, Massachusetts DFW 10(j) recommendation 2 and Massachusetts DEP certification condition 18 would require the installation of trashracks that have an approach velocity less than or equal to 2.0 fps, have clear spacing between the trashrack's vertical bars of less than or equal to 1 inch, and extend to cover the full depth of the intake opening. In their application, Whitman proposed to maintain an existing 18-foot-wide, 6.5-foot-high metal trashrack which has 2-inch bar spacing for fish protection. However, in its letter filed on December 12, 2011, Whitman agreed to install the trashracks recommended by the agencies.

Staff Analysis

Fish species that reside in the project impoundment could be entrained at the proposed project's intake and consequently be injured or killed passing through the

proposed project's turbine during operation. Also, fish could be impinged on the project's trashracks during project start-up and operation, resulting in injury or death.

The existing trashrack with a 2-inch clear spacing would prevent some large resident fish from being entrained at the project; however, it is likely that the existing trashrack would not exclude juvenile or small adult resident fish from entrainment and these fish could become injured or killed while passing through the turbine. Additionally, the approach velocity at the existing trashrack is unknown; therefore, it is possible that project operation with the existing trashrack would create approach velocities exceeding the burst speed of some resident fish and result in impingement of fish on the trashrack and potential injury or mortality of those fish.

The trashrack design recommended by the agencies and agreed to by the applicant, would provide greater protection against entrainment and impingement of resident fish. Adult resident fish species, such as yellow perch, largemouth bass, smallmouth bass, and other sunfish would have sufficient swimming and burst speeds to escape an approach velocity of 2.0 fps at the surface of the trashrack. Additionally, the 1-inch clear-bar spacing would prevent most adult and some juvenile resident fish from passing through the trashracks, thereby preventing any mortalities or injuries that would occur during turbine passage.

Diadromous Fish Passage and Protection

Massachusetts DFW 10(j) recommendation 6 and Massachusetts DEP certification conditions 19 and 20 would require that Whitman construct, operate, maintain, and evaluate upstream and downstream fish passage facilities when notified by the agencies that such facilities are needed. As part of its 10(j) recommendation, Massachusetts DFW indicates that all plans and schedules associated with the design, construction, and evaluation of the fishways would be developed in consultation with the agencies. In their application, Whitman did not propose fish passage facilities. However, in their letter filed on December 12, 2011, they agreed to implement this measure.

Staff Analysis

Presently, there are no diadromous (i.e., migratory) fish in the vicinity of the project. However, if migratory fish gain access to the project site in the future, the existing dam would prevent upstream passage. Providing upstream passage facilities would allow fish to efficiently move upstream past the dam and project facilities and access any available spawning and rearing habitat upstream of the project. If migratory species are provided upstream passage at the project, their downstream movements and survival could be affected during outmigrations. During project operation, fish moving downstream would potentially be attracted to the spillways or the flows entering the project intakes. Because of the proposed trashracks described above, most fish would be

excluded from the project intakes and would need another route to pass downstream. Some may pass over the spillways; however, providing a safe and effective downstream passage route would be beneficial because it would likely attract fish away from the intake areas, potentially reduce entrainment and impingement of migratory fish at the trashracks, and increase the downstream passage survival of outmigrating fish passing through the project area. Providing both upstream and downstream passage for migratory fish if they gain access to the project area in the future would likely enhance the production of these species and aid in any restoration programs for these species.

3.3.3 Terrestrial Resources

Affected Environment

The proposed project would be located on the Whitman River near the Town of Westminister, Massachusetts. The area surrounding the project consists of forested habitat and limited residential development.

Project Vegetation

The vegetation at the project is limited to fringe riparian habitat of the impoundment, the area surrounding the dam, and the islands on Crocker Pond. The forested areas consist of white pine, eastern hemlock, red oak, hickory, red maple, and beech. The area near the dam consists of manicured landscape grass species that are maintained by mowing.

Upland Wildlife Resources

The upland habitat in the project boundary is limited to the small area surrounding the dam and the islands on Crocker Pond. Small mammals such as the gray squirrel, opossum, raccoon, eastern chipmunk, and striped skunk are likely present in this upland habitat. Transient mammal species, such as the coyote and white tailed deer, may also be present. A variety of passerine birds, such as various songbirds, blackbirds, raptors, and waterfowl, use the project area.

Riparian Resources and Wetlands

The majority of the riparian areas are forested and undeveloped. Some developed riparian areas exist near the dam, at the county recreation beach area adjacent to the dam, and in the section of the impoundment that runs along South Ashburnham Road and has rip-rap toe protection.

Forested and scrub-shrub wetlands are found in the upper limits of Crocker Pond and emergent wetlands are present along various portions of the impoundment shoreline,

but not over large areas. The relatively moderate to steep shoreline slopes limit wetland development.

A wetland buffer zone extends 100 feet from the project boundary along the Crocker Pond shoreline as well as along the east and west banks of the Whitman River downstream of the dam. This buffer zone area is subject to the jurisdiction of the Town of Westminster Conservation Commission (WCC).

Environmental Effects

Whitman proposes to construct a new powerhouse at the end of the existing penstock and an underground and above-ground transmission line to connect to the grid. Ground disturbance and vegetation clearing and maintenance would be necessary during project construction.

Whitman proposes to operate the project in run-of-river mode. The Massachusetts DFW 10(j) recommendation 1 and Massachusetts DEP certification condition 12 would require run-of-river operation. Massachusetts DFW 10(j) recommendation 4 and Massachusetts DEP certification condition 16 would require Whitman to develop a run-of-river maintenance and monitoring plan. Massachusetts DFW 10(j) recommendation 5 and Massachusetts DEP certification condition 15 would require Whitman to implement a impoundment refill procedure where 90 percent of inflow to the impoundment is released downstream after drawdowns.

On May 23, 2011, the WCC issued a final Order of Conditions (WCC order) approving the proposed construction activities for the Crocker Project and specifying conditions to protect the wetlands that are adjacent to the 100-foot buffer zone.

Staff Analysis

Less than 1.0 acre of land would be disturbed during project construction. Disturbed land would consist of manicured lawn, which likely supports little wildlife. Implementing erosion and sediment control measures during project construction would confine and minimize potential affects on wildlife and terrestrial habitat. Any effects of project construction would be limited to a small area of land and be short-term and temporary.

Operating the project in run-of-river mode would maintain downstream flows and protect existing riparian and wetland habitat downstream of the project. Run-of-river operation would also result in a relatively stable impoundment and maintain riparian and wetland vegetation associated with the impoundment, thereby protecting this form of wildlife habitat. A flow monitoring and operations plan would ensure run-of-river operation and a stable impoundment water level.

The impoundment refilling procedure recommended by the Massachusetts DFW and Massachusetts DEP would ensure continuity of flow in the Whitman River downstream of the project after drawdowns for maintenance or emergencies, which would protect riparian and wetland vegetation in downstream areas.

The WCC order includes a set of general and special conditions that are intended to prevent impacts to the wetlands adjacent to the 100-foot buffer zone before, during, and after construction of the proposed project. Therefore, any project construction within the 100-foot buffer zone would comply with these conditions and ensure that there would be no impacts to wetlands around Crocker Pond.

3.3.4 Land Use and Recreation Resources

Affected Environment

Land use in the project area is primarily industrial and residential, as well as some agricultural use. The project is located near the headwaters of the Whitman River in a rural area. Lands west of the project are heavily wooded while the area east of the project consists of intermittent wooded farmland.

The Town of Westminster owns and manages Crocker Pond Recreation Area, an 89-acre parcel located adjacent to the southwest shoreline of the project impoundment and along the Whitman River downstream of the dam (Figure 3). Crocker Pond Recreation Area is typically open for day use from Memorial Day to Labor Day and access is granted through a free permitting system. Crocker Pond Recreation Area includes picnic areas, hiking and biking trails, basketball and volleyball courts, horseshoes and barbeque pits, a playground, and designated areas for angling and boating access. An easement allows public access to Crocker Pond for recreational use from Crocker Pond Recreation Area. Small hand-launch boats and vessels equipped with electric motors up to 5 horsepower are allowed on Crocker Pond. Swimming is also allowed within the boundaries of a designated beach area, located west of the dam along a portion of the southwest shoreline of the project impoundment (Figure 3).

Environmental Effects

In a letter filed on November 14, 2011, Massachusetts DFW recommended that Whitman allow public access to project lands, where appropriate, for fishing and boating. They also recommended that Whitman investigate the need for a canoe portage take-out upstream the dam, as well as a portage route and put-in downstream of the dam.

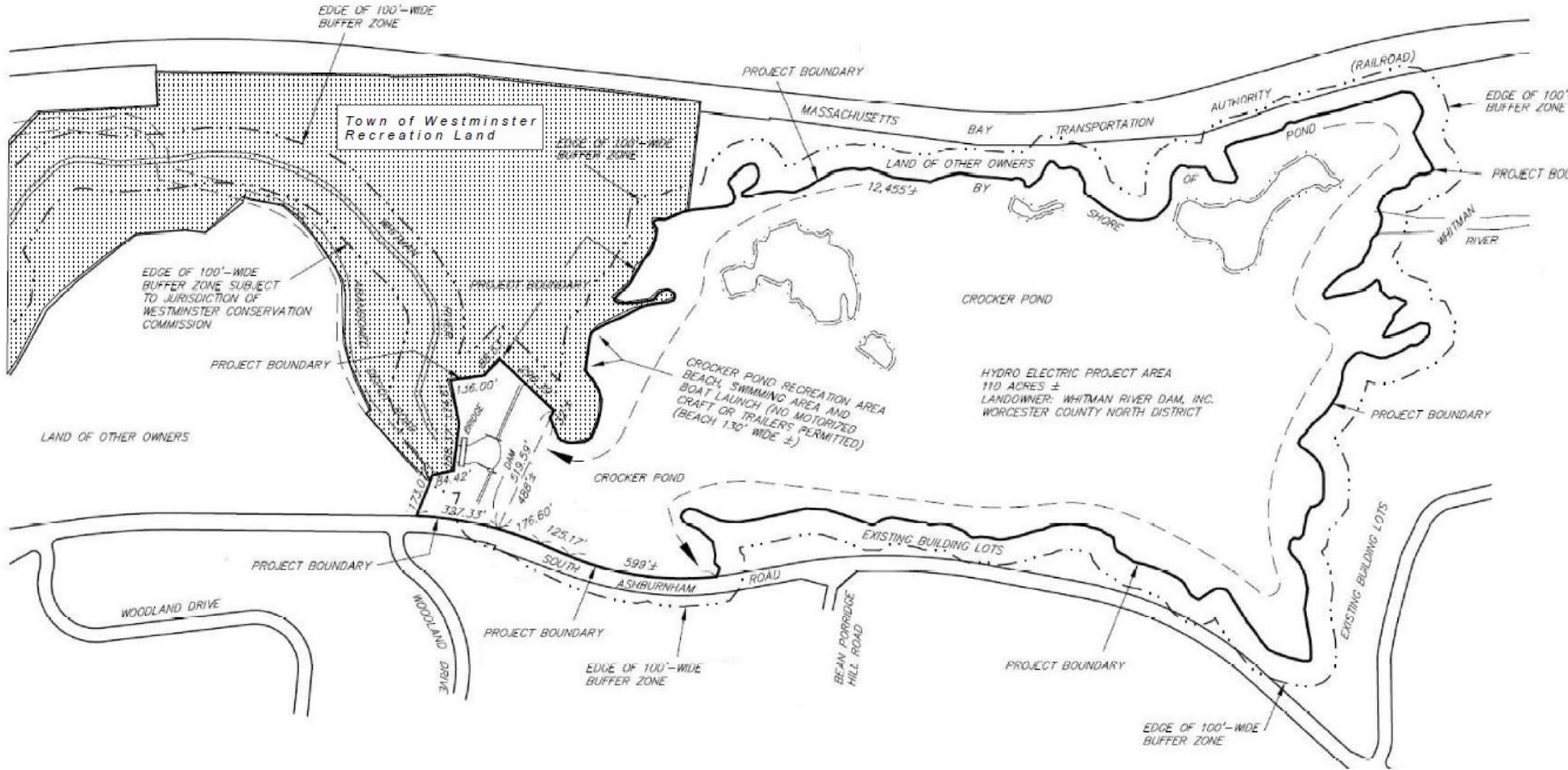


Figure 3. Town of Westminster Crocker Pond Recreation Area. Source: License Application, as modified by staff.

Whitman did not propose any land use or recreation measures.

Staff Analysis

The proposed project would not affect recreational access. Public access to Crocker Pond for recreational use, including fishing, boating, and swimming, is provided through an environmental easement associated with the Crocker Pond Recreation Area. Because Crocker Pond Recreation Area is owned and operated by the Town of Westminster, it is reasonable to assume the town would continue to operate the facilities and maintain public access to Crocker Pond throughout the term of any license issued for the project. However, if recreation needs or existing opportunities change, a standard condition could be included in any license issued for the project that would provide a mechanism for the Commission to reopen the license and require additional recreation measures, if necessary.

Under existing conditions, Crocker Pond Recreation Area provides several designated areas to launch and land boats along the southwest shoreline of the project impoundment. There is no significant history of through-boating in the project area and there are no comments in the record indicating a portage route around the dam is needed. Further, this segment of the Whitman River is not likely to be attractive to through-boaters because of the presence of eight dams located immediately downstream of the project. Because existing boating access to the project impoundment meets current use and demand and through-boating access does not appear to be needed, constructing portage facilities at Crocker Dam would provide limited, if any, benefit.

3.3.5 Cultural Resources

Affected Environment

Area of Potential Effect

The Advisory Council on Historic Preservation defines an area of potential effect (APE) as the geographic area or areas in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE for the Crocker Project includes: (a) lands enclosed by the project boundary; and (b) lands or properties outside the project boundary in which project operations or project-related actions may cause changes in the character or use of historic properties, if any exist.

Historical background

The Crocker Pond dam, originally built in 1933, is a restored earthen embankment and masonry dam, having a total crest length of 520 feet and a maximum structural height of approximately 38.5 feet. The existing dam would be the site used for the proposed project.

Historic Properties

The Crocker Pond dam is not included on the National Register and has not been evaluated for eligibility for the National Register.

Environmental Effects

Whitman proposes to construct a new powerhouse on the east side of the river downstream of the existing penstock, between the dam and the access bridge. Under Whitman's proposal, water would be supplied to the new powerhouse via an extension to the existing 42-inch diameter steel penstock. The proposed location for the new powerhouse was determined in consultation with the FWS and Massachusetts DEP.

On April 1, 2011, the Commission issued a letter to formally invite the participation of the Wampanoag Tribe of Gay Head (Aquinnah), Mashpee Wampanoag Tribal Council, and Stockbridge Munsee Tribe of Mohican Indians in the licensing proceeding for the Crocker Project. No responses were filed.

Staff Analysis

The Crocker Pond dam was originally built in 1933 and because of its age, it is a structure that could be eligible for listing on the National Register. In a letter dated September 24, 2009, the SHPO concluded that the proposed project would be unlikely to affect any significant historic properties. Based on this information and the information in the record for this proceeding, Commission staff find that no historic properties would be affected by the construction and operation of the proposed project. However, during the term of any license, Whitman would occasionally need to conduct maintenance activities in the project area or on project facilities. These could include activities such as replacement of broken windows, roof or siding repairs, or general landscaping and yard maintenance. These activities would not require prior Commission approval; however, they could affect historic resources in the project area. Consulting with the Massachusetts SHPO prior to conducting these activities would ensure that historic resources are not adversely affected.

The operation of the proposed project would not alter the historic character of the existing structures. Additionally, ground disturbing activities associated with

constructing a new powerhouse would not be likely to disturb any archaeological resources because no archaeological or cultural artifacts are known to occur at the site. However, it is possible that unknown archaeological or historic resources may be discovered in the future as a result of project construction, operation, or other project related activities that require land-disturbing activities. To ensure the proper treatment of any potential archaeological or cultural resources, a condition could be included in any license issued for the project requiring that Whitman notify the Commission and the Massachusetts SHPO if previously unidentified archaeological or cultural artifacts are encountered. In the event of any such discovery, Whitman would discontinue all exploratory or construction-related activities until the proper treatment of any potential archaeological or cultural resources is established.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative (denial of the application), the project would not be constructed and would not generate an estimated average annual generation of 887.45 MWh. Under this alternative, environmental resources in the project area would not be affected, including any enhancements that were proposed by the license applicant or recommended by the agencies or Commission staff.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Crocker Project's use of the Whitman River for hydropower purposes to see what effect various environmental measures would have on the projects' costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,⁵ the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and

⁵ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 2 summarizes the assumptions and economic information we use in our analysis. This information was either provided by Whitman in its license application or estimated by staff. We find that the values provided by Whitman are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; licensing costs; normal operation and maintenance cost; and Commission fees. Throughout this section all dollars are 2012 unless otherwise specified.

4.2 COMPARISON OF ALTERNATIVES

Table 3 summarizes the proposed installed capacity, annual generation, cost of alternative power, estimated total project cost, and difference between the cost of alternative power and total project cost for each of the alternatives considered in this EA.

4.2.1 No-Action Alternative

Under the no-action alternative, the project would not be constructed and no energy would be generated. There are no costs associated with this alternative, other than Whitman's cost for preparing the license application.

4.2.2 Whitman's Proposal

Whitman proposes to construct a new powerhouse and tailrace facility at Crocker Pond dam. The proposed alternative includes constructing and operating the project based on parameters in Table 4-1 and with Whitman's proposed environmental measures, as shown in Table 4-3. Upon completion of the construction, the proposed project would have a capacity of 145 kW and an average annual generation of 887.45 MWh. The average annual cost of alternative power would be \$47,240, or \$53.23/MWh. The average annual project cost would be \$213,950, or \$241.08/MWh. Overall, the project would produce power at a cost which is about \$166,710, or \$187.85/MWh, more than the cost of alternative power.

Table 2. Parameters for economic analysis of the Crocker Project (Source: staff and Whitman).

Parameter	Value	Source
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Inflation and escalation	0.0 percent	Staff
Interest/discount rate	10.0 percent	Whitman
Cost of capital	10.0 percent	Whitman
Net investment ^a	\$1,295,700	Whitman
Annual Operation and Maintenance ^b	\$75,970	Whitman
Energy & Capacity rate ^c	\$35.13/MWh \$159/kW-yr	Staff
Energy and capacity value	\$53.23/MWh	Staff

^a Net investment includes the cost to construct the project including the capital costs of generation and transmission equipment and the cost to prepare the license application (see license application filed on August 29, 2011).

^b Annual Operation and Maintenance cost includes insurance, taxes, and fees (see license application filed on August 29, 2011).

^c The energy and capacity rates are based on the Energy Information Administration's Annual Outlook for 2011 at <http://www.eis.doe.gov/oiaf/aeo/index.html>.

4.2.3 Staff Alternative

The staff alternative includes the same turbine generating unit and, therefore, would have the same capacity and average annual generation as Whitman's proposal (887.45 MWh of electricity annually). Based on the parameters in Table 4-1 and the cost of measures identified in Table 4-3, we estimate that the cost of alternative power would be \$47,240, or about \$53.23/ MWh. The average annual project cost would be \$216,250, or about \$243.67/MWh. Overall, the project would produce power at a cost which is about \$169,010, or \$190.44/MWh, more than the cost of alternative generation.

Table 3. Summary of the annual cost of alternative power and annual project cost for the alternatives for the Crocker Project (Source: staff).

	Whitman's Proposal	Staff Alternative
Installed capacity (kW)	145	145
Annual generation (MWh)	887.45	887.45
Annual cost of alternative power (\$/MWh)	\$47,240 53.23	\$47,240 53.23
Annual project cost (\$/MWh)	\$213,950 241.08	\$216,250 243.67
Difference between the cost of alternative power and project cost (\$/MWh)	(\$166,710) ^a (187.85) ^a	(\$169,010) ^a (190.44) ^a

^a A number in parenthesis denotes that the difference between the cost of alternative power and project cost is negative, thus the total project cost is greater than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4 gives the cost of each of the environmental enhancement measure considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects to construct and operate the Crocker Project (Source: Whitman and staff).

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Operate the project in an instantaneous run-of-river mode	Massachusetts DEP, Massachusetts DFW, Whitman, Staff	0	0	0
Implement a refill procedure after drawdown such that 90% of inflow passes downstream and 10% of inflow to the project ^a	Massachusetts DEP, Massachusetts DFW, Staff	0	0	0

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Install full depth trashracks with 1-inch clear bar spacing and 2 fps approach velocity	Massachusetts DEP, Massachusetts DFW, Staff	5,000	0	530
Construct, operate, maintain, and evaluate upstream and downstream fish passage when notified fishways are needed ^b	Massachusetts DFW, Staff	0	0	0
Develop and implement a project operation compliance monitoring plan	Massachusetts DEP, Massachusetts DFW, Staff	5,000	0	530
Conduct a post-operation water quality monitoring plan	Massachusetts DFW, Massachusetts DEP, Staff	5,000	0	530
Use best management practices to control soil erosion and sedimentation	Whitman, Staff	5,000	0	530
Develop and implement a soil erosion and sediment control plan including debris and sediment removal	Massachusetts DEP, Staff	2,000	500	710

^a The cost associated with run-of-river operation is included in the annual operation and maintenance cost.

^b No fish passage facilities are currently proposed by Whitman or recommended by the resources agencies; therefore, there is no cost associated with this potential future measure.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section we compare the development and non-developmental effects of Whitman's proposal, Whitman's proposal as modified by staff, agency alternative, and the no-action alternative.

We summarize the environmental effects of the different alternatives in Table 5.

Table 5. Comparison of Alternatives for the Crocker Project (Source: staff).

Resource	No-action Alternative	Proposed Action	Staff Recommended Alternative
Generation	0 MWh	887.45 MWh	887.45 MWh
Geology and Soils Resources	No changes.	Construction of the project would result in short-term erosion and potential increased sedimentation and turbidity in the river. The use of a coffer dam and BMPs would control soil erosion and reduce sedimentation and turbidity in the river.	Development and implementation of a soil erosion and sediment control plan that includes debris and sediment removal would provide additional details and ensure that the BMPs control erosion and sedimentation during project construction and operation.
Aquatic Resources	No changes.	<p>Operate the project in a run-of-river mode and maintain the normal maximum impoundment elevation of 752.66 feet msl (i.e., no changes), which would protect aquatic habitat and fisheries in the impoundment and the river downstream of the project.</p> <p>No changes, (i.e., continue to maintain an existing metal trashrack which prevents some entrainment and impingement of resident fish).</p>	<p>Same as proposed action except: Implement a 90/10 refill procedure which would protect aquatic habitat and fisheries in the river downstream of the project.</p> <p>Implement a water quality monitoring survey which would ensure that the water quality of the Whitman River is not adversely affected.</p> <p>Install full-depth trashracks, with 1-inch bar spacing and less than 2-fps approach velocity which would protect most adult and some juvenile resident fish from entrainment and impingement.</p> <p>Implement a flow monitoring and</p>

Resource	No-action Alternative	Proposed Action	Staff Recommended Alternative
		Continue to allow the existing leakage through the flashboards to provide water over the crest of the dam year-round and help maintain the aquatic habitat in the 80-foot-long bypassed reach.	operation plan to ensure the project is operated in a run of the river mode.
Terrestrial Resources	No changes.	No measures proposed. Possible short-term disturbance to vegetation and wildlife from construction of the project.	Same as proposed action.
Recreation and Land Use	No changes.	No measures proposed and there would be no change in land use or recreational access in the project area.	Same as proposed action.
Cultural Resources	No changes.	No measures proposed and no effect on cultural resources.	Same as proposed action.

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any licenses issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for licensing the Crocker Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency comments filed on these projects and our review the environmental and economic effects of the proposed project and economic effects of the project and its alternatives, we selected the Staff Alternative as the preferred alternative. We recommend the Staff Alternative in both cases because: (1) issuance of an original hydropower license by the Commission would allow Whitman to operate the project as a dependable source of electrical energy; (2) the 145 kW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the public benefits of the Staff Alternative in both cases would exceed those of the no-action alternative; and (4) the proposed measures would protect and enhance geologic and soils, aquatic, terrestrial, recreational, and cultural resources.

In the following sections, we make recommendations as to which environmental measures proposed by Whitman or recommended by agencies or other entities should be included in any licenses issued for the project. In addition to Whitman's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any license issued for the project.

5.2.1 Measures Proposed by Whitman

Based on our environmental analysis of Whitman's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by Whitman would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project.

- Maintain aquatic habitat in the impoundment and downstream by operating the project in a run-of-river mode at a normal pool elevation of 752.66 feet above msl.
- Allow existing leakage through the flashboards to continue which would provide year-round aesthetic flows over the crest of the dam and into the 80-foot

bypassed reach.

5.2.2 Additional Measures Recommended by Staff

We recommend the measure described above, and seven additional staff-recommended measures. The additional staff-recommended measures include the following: (1) a soil erosion and sediment control plan; (2) implement a operation compliance monitoring plan to ensure the project is operated in a run of the river mode; (3) implement impoundment refill procedures to protect the aquatic resources in the impoundment and Whitman River downstream; (4) implement post-operation water quality monitoring to ensure that the water quality of the Whitman River is not adversely affected; and (5) install trashracks that have 1-inch clear bar spacing, an approach velocity of 2 feet per second or less, and extend full depth of the intake opening to ensure that entrainment of fish at the intake is minimized; (6) notifying the Commission and the Massachusetts SHPO immediately if previously unidentified archaeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities; and (7) consulting with the Massachusetts SHPO prior to implementing any maintenance activities, land-clearing or land-disturbing activities, or changes to project operations or facilities that do not require Commission approval. Below, we discuss our additional staff-recommended measures.

Soil Erosion and Sediment Control Plan

Constructing a new powerhouse, excavating a new tailrace, installing a new transmission line could cause short-term bank erosion, river sedimentation, and disturbance of riverbed material and re-suspension of sediments. To keep Whitman River free from turbidity that would be aesthetically objectionable or would impair use of the river, Massachusetts DEP certification condition 8 would require a plan to monitor and control erosion during construction activities.

To address erosion and sedimentation associated with project construction and land-disturbing activities, Whitman proposes to use a coffer dam and implement BMPs during construction. However, Whitman's proposal lacks detail regarding the actual site conditions, the location for refueling and maintenance of equipment outside of the 100-foot buffer zone, and an implementation schedule. Additionally, Whitman's proposal does not address monitoring of turbidity during project construction. Therefore, we recommend that Whitman develop and implement a soil erosion and sediment control plan, in consultation with Massachusetts DEP, that includes descriptions of all control measures (including monitoring for turbidity), detailed drawings showing the locations of all control measures including the location for refueling and maintenance of equipment outside of the 100-foot buffer zone, and an implementation schedule. The plan would ensure that any adverse effects on soils and water resources from erosion and sedimentation would be minimized during project construction and operation.

Developing and implementing this plan would be worth the estimated annual cost of \$710.

Operation Compliance Monitoring Plan

Whitman proposes and Massachusetts DFW and Massachusetts DEP recommend that the proposed project operate in an instantaneous run-of-river mode. Also, Massachusetts DFW 10(j) recommendation 4 and Massachusetts DEP certification condition 16 would require an operation compliance monitoring plan that includes a description of the mechanisms and structures that would be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation and minimum flows, an implementation schedule, and a description of the data storage and inspection process.

An operation compliance monitoring plan would help the agencies and Commission verify that the project is operating in a run-of-river mode. A detailed description of the equipment and procedures necessary to maintain, monitor, and report compliance would prevent possible misunderstandings of project operation and reduce the likelihood of complaints regarding project operation being filed with the Commission. Therefore, to ensure the project is operated in a run-of-river mode, any license that is issued should require Whitman to develop an operation compliance monitoring plan that describes project operation and how it would be monitored. This measure would be worth the \$530 annual cost of the plan.

Drawdown Management

Periodically, the project impoundment would be drawn down for maintenance or unscheduled emergencies. To maintain downstream flows, Massachusetts DFW 10(j) recommendation 5 and Massachusetts DEP certification condition 15 would require an impoundment refill procedure, whereby 90 percent of project inflow would be passed downstream and 10 percent would be used to refill the impoundment. Releasing 90 percent of the project inflow during impoundment refilling would maintain downstream flows and aquatic habitat for fish and other aquatic species. This measure would have no additional cost and should be included in any license issued for the project.

DO Monitoring Plan

During project operation, flow spilling over the dam would be less than under current conditions and could result in less aeration of water downstream of the dam. Massachusetts DFW's 10(j) recommendation 3 and Massachusetts DEP certification condition 17 would require post-operation monitoring of DO and temperature to determine if project operation would adversely affect water quality downstream of the dam. If significant project-related adverse changes to water quality (e.g., decreased DO)

are discovered, then other measures, such as reducing flows to the powerhouse and increasing flows over the dam, could be implemented to improve water quality. This measure would be worth the \$530 annual cost of the plan and should be included in any license issued for the project.

Trashrack Design

Fish species that reside in the project impoundment could be injured or killed by becoming entrained or impinged at the proposed project's intake. While the existing trashrack with a 2-inch clear spacing would prevent some large resident fish from being entrained at the project, it is likely that it would not exclude juvenile or small adult resident fish from entrainment. Additionally, the approach velocities of the existing trashrack may exceed the swimming speed of the resident fish and result in impingement. To limit entrainment and impingement during project operation, Massachusetts DFW 10(j) recommendation 2 and Massachusetts DEP certification condition 18 would require the installation of a trashrack that covers the full depth of the intake opening, has a 1-inch or less clear spacing, and has an approach velocity less than or equal to 2.0 fps. In a letter filed on December 12, 2011, the applicant indicated it would install the trashrack recommended by the agencies if the project is licensed. A trashrack with a 1-inch clear spacing and an approach velocity 2.0 fps or less would provide greater protection for resident fish than the existing trashrack and would effectively limit entrainment and impingement of resident fish at the project. The agencies recommended trashrack would be worth the \$530 annual cost and should be included in any license issued for the project.

Cultural Resources

There are no known historical or archaeological properties within the project area listed or eligible for listing in the National Register. However, archaeological or historic sites could be discovered during land-disturbing activities associated with project construction or operation. Therefore, we recommended that Whitman notify the Commission and the Massachusetts SHPO if previously unidentified archaeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities at the project. In the event of any such discovery, Whitman would discontinue all exploratory or construction-related activities until the proper treatment of any potential archaeological or cultural resources is established.

The Crocker Pond dam was originally built in 1933. Because of its age, the Crocker Pond dam is a structure that could be eligible for listing on the National Register. During the term of any license issued for the project, Whitman would occasionally need to conduct maintenance activities in the project area or on project facilities. These could include activities such as replacement of broken windows, roof or siding repairs, or

general landscaping and yard maintenance. These activities would not require prior Commission approval; however, they could affect historic resources in the project area. Therefore, to ensure that historic resources are not adversely affected from maintenance activities, we recommend that Whitman consult with the Massachusetts SHPO prior to conducting any maintenance activities that do not require Commission approval but could affect cultural resources. There may be a future minimal cost associated with this measure.

5.2.3 Recommendations Not Adopted by Staff

Diadromous Fish Passage and Protection

Massachusetts DFW 10(j) recommendation 6 would require Whitman to construct, operate, maintain, and evaluate upstream and downstream fish passage facilities when notified by the agency that such facilities are needed. Massachusetts DEP certification conditions 19 and 20 reserve Massachusetts DEP's right to prescribe upstream and downstream passage facilities and operations for American eel and anadromous fish when Massachusetts DFW determines they are necessary. Presently, there are no American eels or anadromous fish in the vicinity of the project. Additionally, there is no information in the Commission's record to suggest that there are any ongoing fish passage programs in the Whitman River that will allow American eel or anadromous fish to access the project area during the term of any license. However, if migratory fish gain access to the project site in the future, conditions 19 and 20 of the certification reserve Massachusetts DEP's right to prescribe upstream and downstream passage facilities and operations for American eel and anadromous fish when Massachusetts DFW determines they are necessary; therefore, Massachusetts DFW's 10(j) recommendation 6 is unnecessary.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Implementation of a soil erosion and sediment control plan would limit erosion associated with construction; however, it is likely that some sediment would still enter the Whitman River and could result in short-term effects on water quality and resident fish. The proposed trashracks would limit fish entrainment and impingement; however, some entrainment of small fish would likely still occur. Leakage flows and discharge from the powerhouse would prevent the bypassed reach from being dewatered; however, the diversion of flows for power generation would reduce flows in the bypassed reach and would reduce available habitat and aesthetics under some flow conditions.

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by

federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission finds that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency. In response to our Ready for Environmental Analysis notice, Massachusetts DFW (letter filed on November 14, 2011) recommended ten fish and wildlife measures.⁶ Table 5-4 lists the 10(j) recommendations, and whether the recommendations are adopted under the Staff Alternative.

The Commission staff makes a preliminary determination that four recommendations by Massachusetts DFW (Recommendations 7, 8, 9 and 10) are outside the scope of 10(j). These recommendations are discussed in Table 6 below.

Table 6. Analysis of fish and wildlife agency recommendations for the Crocker Project.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
1) Operate the project in instantaneous run-of-river mode.	Massachusetts DFW	Yes	\$0	Yes
2) Install trashracks that: (1) have an approach velocity ≤ 2.0 fps; (2) have clear spacing of 1 inch or less; and (3) extend full depth.	Massachusetts DFW	Yes	\$530	Yes
3) Conduct a post-operation water quality monitoring survey.	Massachusetts DFW	Yes	\$530	Yes
4) Prepare a plan for maintaining	Massachusetts	Yes	\$1,030	Yes

⁶ Massachusetts DFW filed conditions pursuant to 18 C.F.R. 4.106(b) which are regulations that apply to small hydroelectric power project exemptions from license. Because the notice issued on September 12, 2012, solicited comments, terms, and conditions on an application for license (not an application for exemption from licensing), 18 C.F.R. 4.106(b) does not apply and we consider Massachusetts DFW's conditions as recommendations under section 10(j) of the FPA.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
and monitoring run-of-river operation at the project.	DFW			
5) 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.	Massachusetts DFW	Yes	\$0	Yes
6) Construct, operate, maintain, and evaluate upstream and downstream fish passage facilities at the project when notified by FWS and/or Massachusetts DFW that such fishways are needed.	Massachusetts DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. Any future fish and wildlife measures that may be needed could be addressed through the standard article 11 (Form L-14), if appropriate.
7) Notify the Massachusetts DFW and FWS in writing when the project commences operation.	Massachusetts DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
8) Allow the Massachusetts DFW and/or FWS to inspect the project area to monitor compliance with their terms and conditions.	Massachusetts DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	Yes
9) Massachusetts DFW reserves the right to add to and alter terms and conditions as appropriate.	Massachusetts DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. Any future fish and wildlife measures that may be needed could be addressed through the standard article 11 (Form L-14), if appropriate.
10) Incorporate these terms and conditions in any conveyance of Whitman's interests.	Massachusetts DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	No. All of the measures that are included in any license issued for the project would convey with the license.

Refer to section 5.2 for a discussion of the reasons we do not recommend adopting measures which we have determined are within the scope of Section 10(j).

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, or conserving waterways affected by the project. We reviewed five comprehensive plans that are applicable to the Crocker Project located in Massachusetts.⁷ No inconsistencies were found.

6.0 FINDING OF NO SIGNIFICANT IMPACT

If the Crocker Dam Hydroelectric Project is licensed with the additional staff recommended measures, the project would operate while providing protective measures to fish, wildlife, recreational access, and protecting any unidentified cultural or historic resources in the project area.

Based on our independent analysis, issuance of a license for the Crocker Dam Hydroelectric Project, as proposed with the additional staff-recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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