[BILLING CODE 6717-01-P]

DEPARTMENT OF ENERGY
Federal Energy Regulatory Commission

Western Technical College Project No. 13417-002-WI

Notice of Availability of Environmental Assessment

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's regulations, 18 CFR Part 380 (Order No. 486, 52 FR 47,897), the Office of Energy Projects has reviewed the application for an original license to construct the Angelo Dam Hydropower Project, and has prepared an environmental assessment (EA). The proposed 205-kilowatt project would be located on the La Crosse River in the Township of Angelo, Monroe County, Wisconsin at an existing dam owned by Monroe County. The project would not occupy federal lands.

The EA includes staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate 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 available for review at the Commission in the Public Reference Room or may be viewed on the Commission's web site 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 the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov, or toll-free at (866) 208-3676, or for TTY, (202) 502-8659.

You may also register online at http://www.ferc.gov/esubscribenow.htm to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659.

Any comments 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/doc-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 Commission 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, NE, Washington, DC 20426. Please affix Angelo Dam Hydropower Project, P-13417-002 to all comments.

Please contact Isis Johnson by telephone at (202) 502-6346, or by e-mail at isis.johnson@ferc.gov, if you have any questions.

Dated: August 22, 2012

Kimberly D. Bose,
Secretary.

ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE

Angelo Dam Hydropower Project

FERC Project No. 13417-002

Wisconsin

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

August 2012

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ACRONYMS AND ABBREVIATIONS

APE	area of potential effects
basin	Bad Axe - La Crosse River Basin
BMP	best management practice
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DO	dissolved oxygen
EA	environmental assessment
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
fps	feet per second
HCP	Wisconsin Habitat Conservation Plan
HPMP	historic properties management plan
Interior	U.S. Department of the Interior
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
msl	mean sea level
MW	megawatt
MWh	megawatt-hour
Michigan SHPO	Michigan State Historic Preservation Officer
MRO	Midwest Reliability Organization
MISO	Midwest Independent System Operator
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Council
NHPA	National Historic Preservation Act
PA	Programmatic Agreement
project	Angelo Dam Hydroelectric Project
SCADA	Supervisory Control and Data Acquisition
watershed	Upper La Crosse River Watershed
Western	Western Technical College
Wisconsin CMP	Wisconsin Coastal Management Program Office
Wisconsin DNR	Wisconsin Department of Natural Resources
Wisconsin SHPO	Wisconsin State Historic Preservation Officer

WQC	water quality certificate

EXECUTIVE SUMMARY

On October 21, 2011, Western Technical College (Western) filed an application with the Federal Energy Regulatory Commission (Commission) for an original, minor license to construct, operate, and maintain the proposed 205-kilowatt (kW) Angelo Dam Hydropower Project No. 13417-002 (project). The project would be located on the La Crosse River in the Township of Angelo, Monroe County, Wisconsin at the existing Angelo dam owned by Monroe County. The project would not occupy federal lands.

Existing Facilities and Operation

The Angelo dam was built by Northern States Power in the 1920's. Northern States Power generated electricity at the Angelo dam until 1969 and then removed the generating equipment and transferred the dam and associated reservoir (Angelo Pond) to Monroe County. In 1998, Monroe County rehabilitated the dam.

The Angelo dam has a total length of 615.5 feet and is composed of a left earthen embankment, a concrete spillway and non-overflow structure, and a right earthen embankment. The left earthen embankment has a length of 400 feet and a maximum height of approximately 14 feet. The right earthen embankment has a length of 124 feet and a maximum height of approximately 12 feet. The spillway and non-overflow section are constructed of reinforced concrete and have a total length of 91.5 feet. The spillway is 72.42 feet long and 9.6 feet high from the foundation level to its crest. The spillway has four, 13.5-foot-wide by 11.4-foot-high bays each with 13.5-foot-wide by 6.9-foot-high steel tainter gates. The non-overflow section is 19.08 feet long, 20 feet high, and 19.7 feet wide.

The reservoir has a surface area of 52 acres at elevation 793 feet mean sea level (msl). The reservoir's storage capacity is 450 acre-feet at the dam's crest elevation of 795 feet msl.

The dam and reservoir currently provide recreational benefits to the project area. There is no hydroelectric generation at the dam. The dam is operated manually in a run-of-river mode (i.e., an operating mode where outflows from the dam and reservoir approximate inflows to the reservoir).

Proposed Facilities and Operation

Western proposes to acquire the rights to and utilize the Angelo dam and reservoir for power generation. Western would convert the dam's non-overflow section to serve as the project's intake. The conversion would involve removing a concrete cap and plug that was poured in 1998 when the dam was rehabilitated. Western would also construct, operate, and maintain the following facilities at the dam and reservoir: (1) a

22.84-foot-long by 16.08-foot-wide trashrack with 2-inch-clear bar spacing installed at the intake in the non-overflow section; (2) a 20-foot by 20-foot by 20-foot reinforced concrete box forebay; (3) a 26-foot-long by 24.5-foot-wide by 40-foot-high powerhouse located at the right abutment of the dam and containing a 205-kW vertical, double-regulated Kaplan turbine; (4) a 30-foot-long, 480-volt overhead transmission line connecting the powerhouse generator to a step-up transformer that would be located on a pole which is part of Northern States Power's 2.7-kilovolt (kV) distribution line; and (5) appurtenant facilities.

The project would be operated in a run-of-river mode using the natural flow of the La Crosse River. The estimated average annual project generation is about 950 megawatt-hours (MWh).

Proposed Environmental Measures

Western proposes the following environmental measures to protect or enhance resources in the vicinity of the proposed project:

- an erosion and sediment control plan with provisions for using best management practices, including installing a temporary inflatable cofferdam, and placing hay bales and siltation fabric at locations where sediment-laden runoff could otherwise enter project waters or adjacent non-project lands;

- operating the project in a run-of-the-river mode to protect water quality and quantity, and fish and aquatic resources; and

- implementing the Commission's statewide programmatic agreement (PA) for projects in Wisconsin, and implementing a Historic Properties Management Plan (HPMP) for the project.

Western also proposes to comply with all state water quality standards while operating the project. In this environmental assessment (EA), we consider Western's proposal to comply with state water quality standards (i.e., state law) to be a general legal matter rather than a specific environmental measure.

Alternatives Considered

In addition to Western's proposed action, this EA considers Western's proposed action with staff's modifications (staff alternative), and a no–action alternative. Under the staff alternative, the project would be constructed, operated, and maintained as proposed by Western. The staff alternative also includes a recommendation for Western to develop and implement an operation compliance monitoring plan for proposed run-of-

river operations at the project. Under the no-action alternative, a license would be denied and Western would not construct and operate the project.

Public Involvement

Before filing its license application, Western 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.

Western filed its license application on October 21, 2011. On April 24, 2012, the Commission issued a notice accepting the license application; soliciting motions to intervene, protests, comments, terms and conditions, recommendations, and prescriptions; stating that the application was ready for environmental analysis; stating staff's intent to waive scoping; and establishing an expedited schedule for processing. The notice explained that staff intended to waive scoping due to the project's use of an existing dam, the limited scope of proposed construction at the project site, the applicant's close coordination with federal and state agencies during the preparation of the application, and the completion of studies during pre-filing consultation. The United States Department of the Interior (Interior) was the only entity that filed a written response to the notice. Interior stated that it had no comments.

The primary issues associated with licensing the project are the potential for project effects on soil erosion and sedimentation, water quality and fish entrainment.

Project Effects

Geology and soils

Project construction would require the excavation of approximately 135 cubic yards of bedrock during the construction of the proposed powerhouse and forebay. To minimize the potential for erosion and sedimentation related to the excavation, under the applicant's proposal and staff alternative, Western would develop and implement an erosion and sediment control plan.

Aquatic Resources

Under the proposed action and the staff alternative, developing and implementing an erosion and sediment control plan would limit erosion, sedimentation, and increases in river turbidity.

Under the proposed action and staff alternative, fish could be entrained through the project's trashrack and intake, and therefore, be subjected to turbine mortality during operation of the project. However, the amount of entrainment and turbine mortality would likely be small and result in an overall minimal adverse effect on the project reservoir's (Angelo Pond's) fish community.

Under both the proposed action and staff alternative, run-of-river operation would maintain current aquatic resource habitats in Angelo Pond and in the La Crosse River downstream of the Angelo dam.

Terrestrial Resources

While some grassy areas may be temporarily disturbed and soils slightly compacted by the movement of equipment and personnel during construction, no long-term adverse effects to terrestrial resources are anticipated, as the construction area would be relatively small, and occur in an area that has been previously disturbed. Also, the project site is fairly developed and lacks quality habitat for wildlife.

Two federally listed species are known to occur in Monroe County, namely the Karner blue butterfly (*Lycaeides melissa samuelis* or Karners) and northern wild monkshood (*Aconitum noveboracense*). However, both species have specialized habitat requirements that do not exist in the immediate vicinity of the project. Therefore, project construction and operation would have no effect on federally listed threatened or endangered species.

Cultural

Western conducted cultural resource surveys, covering about 83 percent of the land within the project's area of potential effects (APE). During the surveys, Western found no archaeological resources that would be eligible for the National Register of Historic Places (National Register). For the unsurveyed areas, an executed PA and HPMP contain protocols that would be implemented if there are any unanticipated discoveries. The HPMP also contains provisions to lessen, avoid, or mitigate for any adverse effects if the discovered resources are eligible for the National Register.

No-Action Alternative

Under the no-action alternative, a license would be denied, the project would not be constructed, environmental resources in the project area would not be affected, and the renewable energy that would be produced by the project would not be developed.

Conclusion

Based on our analysis, we recommend licensing the project under the staff alternative.

In section 4.0 of the EA, we estimate the likely cost of alternative power for the two action alternatives identified above. Our analysis shows that during the first year of operation under the proposed action alternative, project power would cost $81,589 or $86.20/MWh less than the likely alternative cost of power. Under the staff alternative, project power would cost $81,297 or $85.47/MWh less than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (about 950 MWh annually); (2) the 205 kW of electric capacity available comes from a renewable resource which does not contribute to atmospheric pollution; and (3) the recommended environmental measures proposed by Western, 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 an original license for the project, with the environmental measures we recommend, would not constitute 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.

Angelo Dam Hydropower Project
FERC Project No. 13417-002

1.0 INTRODUCTION

1.1 APPLICATION

On October 21, 2011, Western Technical College (Western) filed an application with the Federal Energy Regulatory Commission (Commission) for an original, minor license to construct, operate, and maintain the proposed 205-kilowatt (kW) Angelo Dam Hydropower Project No. 13417-002 (Angelo Dam Project or project). The project would be located on the La Crosse River in the Township of Angelo, Monroe County, Wisconsin at an existing dam (the Angelo dam) owned by Monroe County and regulated by the Wisconsin Department of Natural Resources (Wisconsin DNR). The estimated average annual project generation is 948.5 megawatt-hours (MWh). The proposed project would not occupy federal lands.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Angelo Dam 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 Western for the Angelo Dam Project and what conditions should be placed on any license issued. In deciding whether 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, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, 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 an original license for the Angelo Dam Project would allow Western to generate electricity for the term of an original license, making electric power from a

renewable resource available to its customers.

This environmental assessment (EA) assesses the effects associated with Western's proposed operation of the project and alternatives to the proposed project. The EA also makes recommendations to the Commission on whether to issue an original license, and if so, what terms and conditions should become a part of any license issued.

In this EA, we assess the environmental and economic effects associated with the construction and operation of the project: (1) as proposed by Western; and (2) with staff's additional recommended measures. We also consider the effects of the no-action alternative. Important issues that are addressed include the potential for project effects on geology and soils, and aquatic, terrestrial, and cultural resources.

1.2.2 Need for Power

The proposed Angelo Dam Project would provide hydroelectric generation to meet part of Wisconsin's power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 205 kW and generate about 950 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 Angelo Dam Project is located in the Midwest Independent System Operator (MISO) sub region of the Midwest Reliability Organization (MRO) region of the NERC. According to NERC's 2011 forecast, average annual demand requirements for the MISO sub region are projected to grow at a rate of 2.9 percent from 2011 through 2021. MISO projects that resource capacity margins (generating capacity in excess of demand) will range between 15.2 percent and 23.2 percent of firm peak demand during the 10-year forecast period, including estimated new capacity additions. Over the next 10 years, MRO estimates that about 4,894 megawatts (MW) of additional capacity will be brought on line.

We conclude that power from the Angelo Dam Project would help meet a need for power in the MISO sub-region in both the short and long-term. The project would provide low-cost power that displaces 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 license for the proposed project is subject to numerous requirements under the Federal Power Act (FPA) and other applicable statues. The major statutory and regulatory requirements are summarized in table 1 and described below.

Table 1. Major statutory and regulatory requirements for the Angelo Dam Project.

Requirement	Agency	Status
Section 18 of the FPA – fishway prescriptions	U.S. Department of Interior (Interior)	No prescriptions were filed.
Section 10(j) of the FPA	U.S. Fish and Wildlife Service (FWS) Wisconsin Department of Natural Resources (Wisconsin DNR)	No recommendations were filed.
Clean Water Act (CWA) – section 401 water quality certification (WQC)	Wisconsin DNR	Application for certification was received on January 24, 2011; action on application was due by January 24, 2012; Wisconsin DNR did not act on the request.
Endangered Species Act (ESA)	FWS	On August 18, 2009, Interior stated that no federally-listed threatened or endangered species, or critical habitat, are present in the immediate vicinity of the proposed project. In the EA, staff makes a "no effect" finding with regard to federally listed species; therefore, no ESA consultation with FWS is necessary.
Coastal Zone Management Act (CZMA)	Wisconsin Department of Intergovernmental Relations, Coastal Management Program Office (Wisconsin CMP)	On April 12, 2012, the Wisconsin CMP determined that no federal coastal consistency certification is required.

Section 106 of the National Historic Preservation Act (NHPA)	Wisconsin State Historic Preservation Officer (Wisconsin SHPO)	A programmatic agreement (PA) with the Wisconsin SHPO and Michigan State Historic Preservation Officer (Michigan SHPO) is in effect that encompasses all hydroelectric project licensing actions in Wisconsin and adjacent portions of Michigan.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 U.S.C § 811, 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 fishway prescriptions, or requests for reservation of authority to prescribe fishways under section 18 of the FPA, have been filed.

1.3.1.2 Section 10(j) Recommendations

Under section 10(j) of the FPA, 16 U.S.C § 803(j), 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.

No federal or state fish and wildlife agency filed recommendations pursuant to section 10(j) of the FPA.

1.3.2 Clean Water Act

Under section 401(a) of the Clean Water Act (CWA), 33 U.S.C. § 1341(a)(1)a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On January 20, 2011, Western applied to the Wisconsin DNR for 401 WQC for the Angelo Dam Project. The Wisconsin DNR

received this request on January 24, 2011. Because Wisconsin DNR has not acted on the request within one year from receipt of the request, the WQC is considered waived.

1.3.3 Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA), 16 U.S.C § 1536(a), requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of their designated critical habitat. There are no federally listed threatened and endangered species or designated critical habitat in the immediate project area that would be affected by the construction and operation of the proposed project. Therefore, the proposed project would have no effect on federally listed species.

1.3.4 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires review of the project's consistency with a state's Coastal Management Program for projects within or that would affect the coastal zone. Under section 307(c)(3)(A) of the CZMA, 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state's coastal zone management agency concurs with the license applicant's certification of consistency with the state's Coastal Management Program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The project is not located within the state-designated coastal management zone, and the project would not affect Wisconsin's coastal resources. Therefore, the project is not subject to Wisconsin's coastal zone program review and no consistency certification is needed for the action. By correspondence dated April 12, 2012 (filed on April 13, 2012), Wisconsin's Department of Intergovernmental Relations, Coastal Management Program Office, concurred with this determination.

1.3.5 National Historic Preservation Act

Section 106 of the NHPA, 16 U.S.C. § 470, requires that every federal agency "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).

To meet the requirements of section 106 of the NHPA, on December 16, 1993, Commission staff executed a Programmatic Agreement (PA) with the Wisconsin SHPO

and Michigan SHPO. The PA contains principals and procedures for the protection of historic properties from the effects of the proposed construction and operation of hydroelectric projects in the state of Wisconsin and adjacent portions of the Upper Peninsula of Michigan. The terms of the PA ensure that Western addresses and treats all historic properties identified within the project's area of potential effects (APE) through implementation of the historic properties management plan (HPMP) entitled, *Cultural Resource Management Plan for the Proposed Licensing of the Angelo Dam Hydroelectric Facility in Angelo Township, Monroe County, Wisconsin, FERC Project 13417, Report of Investigations, No. 1865, June 2011* filed on October 21, 2011, and amended by letter filed on June 14, 2012.

1.4 PUBLIC REVIEW AND CONSULTATION

The Commission's regulations, 18 CFR 4.38 and 16.8, require that applicants consult with appropriate resource agencies 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, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Due to the location of the proposed project, the minor nature of environmental effects, and the lack of response to our public notice regarding the project,[1] we waived formal scoping.

1.4.2 Interventions and Comments

On April 24, 2012, the Commission issued a notice accepting Western's license application and asking for motions to intervene and protests. The U.S. Department of the Interior (Interior) was the only entity that filed a written response to the notice. Interior filed a letter with the Commission on June 20, 2012, stating that it had no comments. No motions to intervene were filed.

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 built, environmental resources in the project area would not be

[1] The Commission issued a notice on April 24, 2012, stating that it intended to waive scoping for this project.

affected, and the renewable energy that would be produced by the project would not be developed.

2.2 PROPOSED ACTION

2.2.1 Project Facilities

The proposed hydropower project would generate electricity using the head created by the existing Angelo dam which is currently owned by Monroe County.

The Angelo dam is an earthen embankment with a maximum height of 14 feet and a spillway with a short non-overflow section. The dam has a total length of 615.5 feet. The spillway and a short non-overflow section are constructed of reinforced concrete and have a total length of 91.5 feet. The spillway is 72.42 feet long, 9.6 feet high from the foundation level to its crest, and contains four, 13.5-foot-wide by 11.4-foot-high bays each with 13.5-foot-wide by 6.9-foot-high steel tainter gates. The non-overflow section is 19.08 feet long, 20 feet high, and 19.7 feet wide and would be converted to serve as the project's intake after removing the concrete cap and plug that was poured in 1998 when the dam was rehabilitated.

In addition to the dam, the proposed project would consist of the following new elements: (1) a 22.84-foot-long by 16.08-foot-wide trashrack with 2-inch-clear bar spacing installed at the intake in the non-overflow section; (2) a 20-foot by 20-foot by 20-foot reinforced concrete box forebay; (3) a 26-foot-long by 24.5-foot-wide by 40-foot-high powerhouse located at the right abutment of the dam containing a 205-kW vertical, double-regulated Kaplan turbine; (4) a 30-foot-long, 480-volt overhead transmission line connecting the powerhouse generator to a step-up transformer that would be located on a pole which is part of Northern States Power's 2.7-kilovolt distribution line; and (5) appurtenant facilities. The estimated annual project generation is about 950 MWh.

The reservoir, referred to locally as Angelo Pond, has a surface area of 52 acres and a gross storage of 450 acre-feet at normal water elevation 793-feet mean sea level (msl). The project boundary, with a total area of 79.38 acres, includes the pond up to elevation 795.0 msl[2], the existing dam, the new forebay, powerhouse, and the 30-foot-long project transmission line. The applicant and Monroe County Board have a signed agreement for the sale of the dam and transfer of the necessary water rights by Monroe County to the applicant. There are no federal or tribal lands within the project boundary.

[2] *See* email communication record between staff and the applicant filed on July 19, 2012.

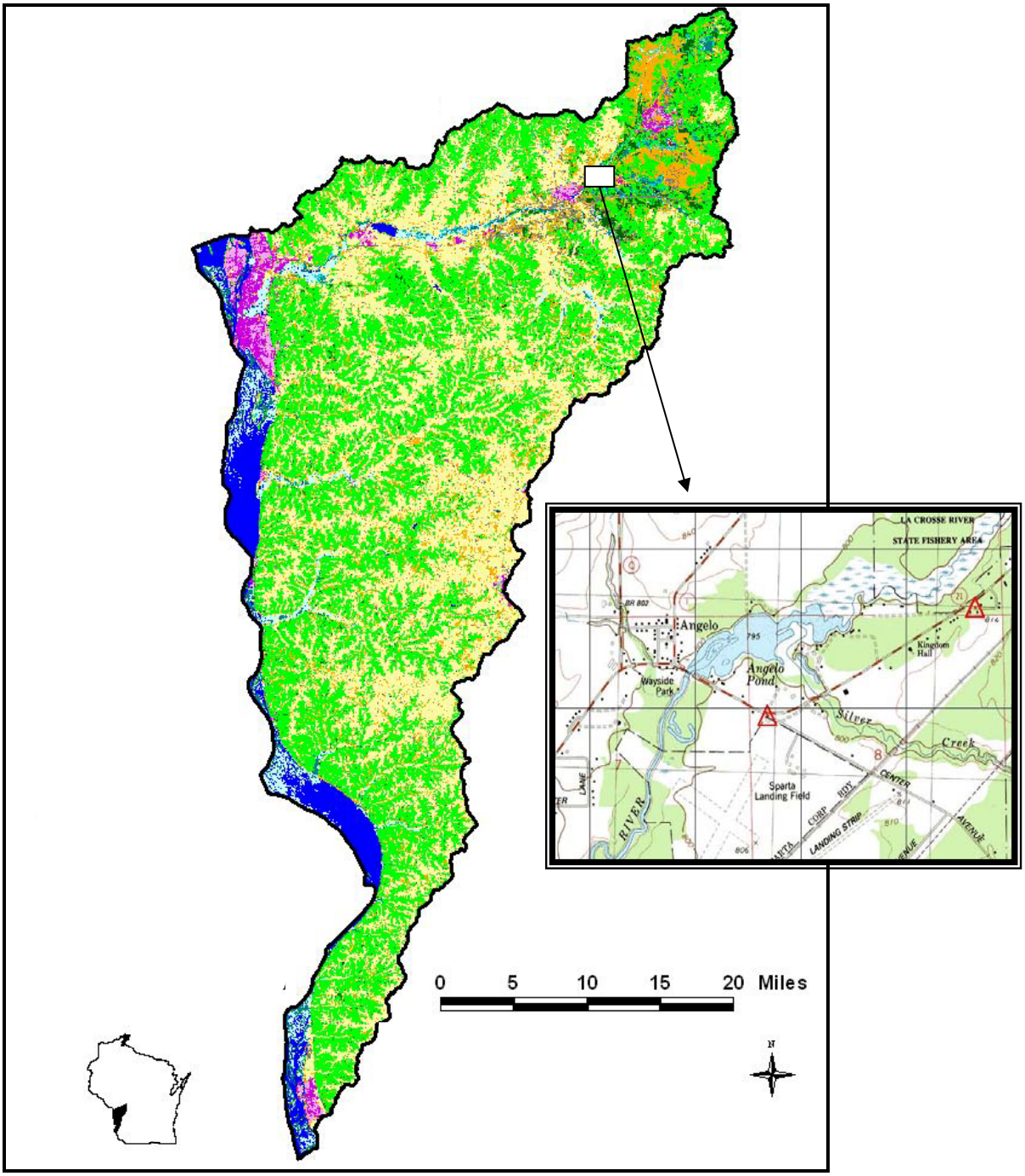

Figure 1. Map of Bad Axe – La Crosse River Basin, showing the location of the project. (Source: Wisconsin DNR, 2002a; as modified by staff)

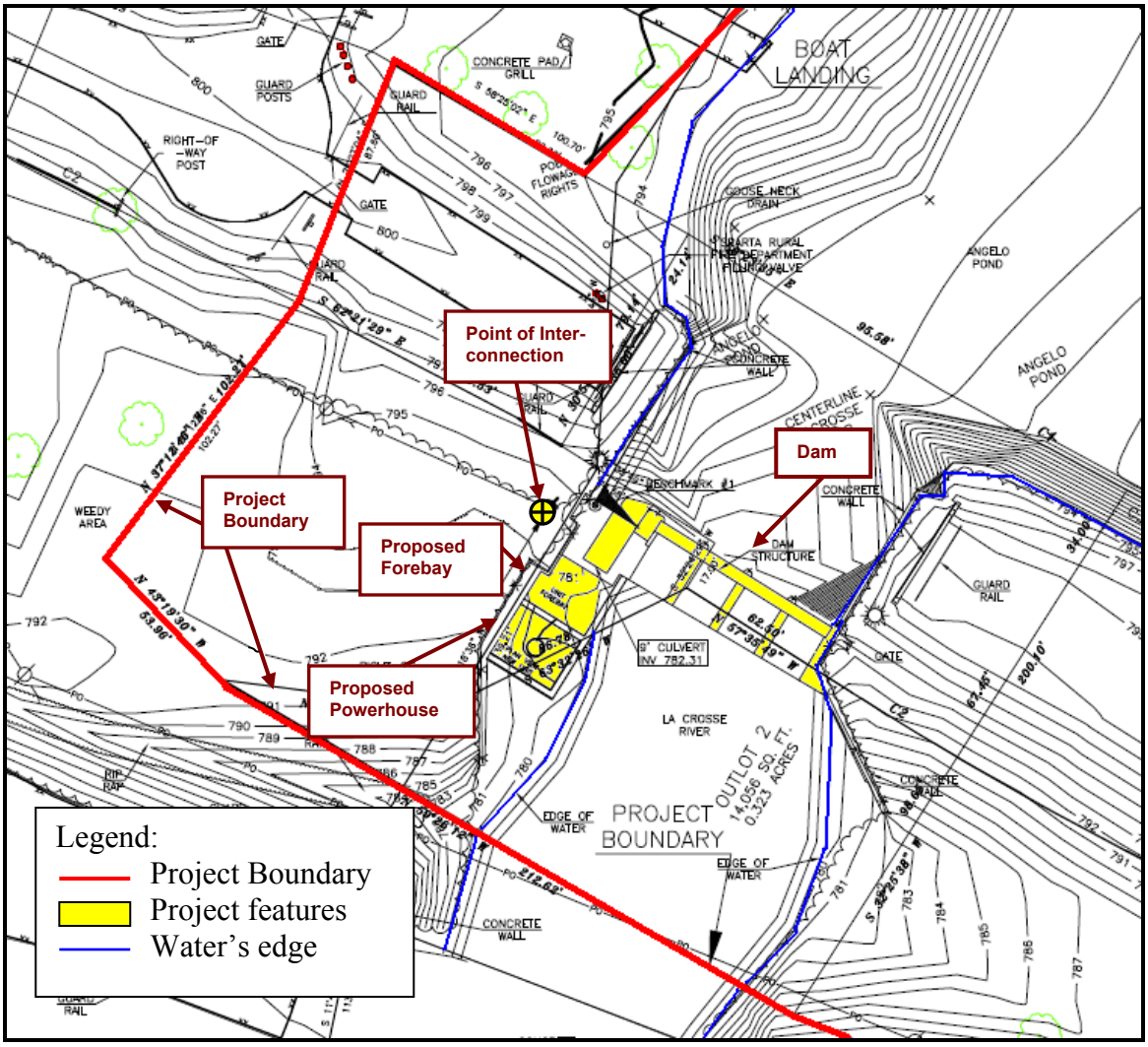

Figure 2. Project features for the Angelo Dam Project, FERC No. 13417-002 (Source: License application, as modified by staff).

2.2.2 Project Safety

As part of the licensing process, the Commission would prepare a Safety and Design Assessment covering the adequacy of the project facilities. Special articles would be included in any license issued, as appropriate. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety operations, compliance with the terms of the license, and proper maintenance.

2.2.3 Project Operation

The dam and reservoir currently provide recreational benefits to the project area. There is currently no hydroelectric generation at the dam. The dam is operated

manually in a run-of-river mode (i.e., an operating mode where outflows from the dam and reservoir approximate inflows to the reservoir).

The proposed project would be operated in an automatic, run-of-river mode using the 17 feet of head created by the existing Angelo dam. The automatic mode would be achieved by use of a head pond elevation gage that would allow the project to operate within a foot from the maximum pond elevation of 793.6 msl. When the reservoir elevation exceeds 793.6 msl, the tainter gates would be opened to release flow under the gates to maintain a target pond elevation between 793.0 and 793.6 msl, the normal operating elevation range for the project.

The headpond has a maximum storage capacity of 450 acre-feet at elevation 793.0 msl (top of the tainter gates). The estimated plant hydraulic capacity is 168 cubic feet per second (cfs) at full load and 32 cfs at minimum load. The water used for project generation would flow through the proposed trashracks and the new opening in the dam, continuing through an old penstock and the proposed forebay, into the powerhouse. The flow out of the powerhouse would discharge into the existing pool immediately downstream of the dam. Flows that exceed the project's maximum hydraulic capacity would be discharged over or under the dam spillway tainter gates. Currently, the spillway gates are opened manually, but the applicant would automate them to provide opening information as part of the proposed Supervisory Control and Data Acquisition (SCADA) system to be installed prior to project operation. SCADA would monitor and control the powerplant from a central location. The project would be run automatically with the help of water surface elevation controls. Maintenance staff would visit the facility regularly, as well as during alarm conditions based on the automated call-in alarm to be built into the station control system.

2.2.4 Environmental Measures

Western proposes to incorporate the following environmental measures into the design, operation, and maintenance of the proposed project:

- developing and implementing an erosion and sediment control plan with provisions for using best management practices (BMP), including installing a temporary inflatable cofferdam, and placing hay bales and siltation fabric at locations where sediment-laden runoff could otherwise enter project waters or adjacent non-project lands;

- operating the project in a run-of-the-river mode to minimize impacts on water quality and quantity, and fish and aquatic resources; and

- implementing the PA, executed on December 16, 1993, and the HPMP, filed on October 21, 2011, and amended by letter filed on June 14, 2012.

Western also proposes to comply with all state water quality standards while operating the project. We consider this proposal to comply with state law to be a general legal matter, rather than a specific environmental measure.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include Western's proposed environmental measures. Because Western's proposal to comply with state water quality laws is a general legal matter, we do not adopt it as an environmental measure under the staff alternative. We note, however, that below in section 3, we do assess the effects of proposed project construction and operation on water quality, including the need for specific environmental measures to mitigate any adverse water quality effects. The staff alternative also includes a condition to implement an operation compliance monitoring plan, to verify proposed run-of-river operations at the project.

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 Western's proposed actions and other recommended environmental measures. Sections are organized by resource area (e.g., aquatics, terrestrial, etc.). Under each resource area, historic conditions are first described. The existing condition is the baseline against which the environmental effects of Western's proposed actions and alternatives are compared, including an assessment of the effects of Western's proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of Western's proposed actions and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative* of the EA.[3]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Angelo Dam Project would be located on the La Crosse River, near Angelo Township, in Monroe County, Wisconsin. The La Crosse River flows from north central Monroe County in a southwesterly direction for approximately 64 miles before reaching the Mississippi River. The La Crosse River exists entirely within the Bad Axe - La Crosse River Basin (basin), and the project area is located more specifically, in the Upper La Crosse River Watershed (watershed) where Silver Creek enters the La Crosse River (figures 3 and 4). The watershed has a drainage area of approximately 126 square

[3] Unless noted otherwise, the sources of our information are the license application (Western, 2011a) and additional information filed by Western (2012).

miles, more than half of which is located in the Fort McCoy Military Reservation (Wisconsin DNR, 2002b).[4] The surrounding land area in this region is characterized by steep slopes, and narrow stream valleys.[5] Approximately 46 percent of the basin is forested, although agriculture is another major land use.

Several dams are located on the La Crosse River, including: (1) Hazel Dell dam, forming a 2-acre reservoir; (2) Alderwood dam, forming an 11-acre reservoir; (3) Angelo dam, the location of the proposed project, forming a 52-acre reservoir; (4) Perch Lake dam, forming a 33-acre reservoir; and (5) the Lake Neshonoc dam,[6] forming a 600-acre reservoir (Wisconsin DNR, 2002a).

[4] Fort McCoy is a used for military training and contains firing ranges, classrooms, and airborne drop zones.

[5] These characteristics are typical of the Driftless Area and Coulee Section ecoregions of Wisconsin (EPA, 2012).

[6] The Neshonoc dam and 600-acre reservoir are project facilities of the Neshonoc Water Power Project, FERC Project No. 6476.

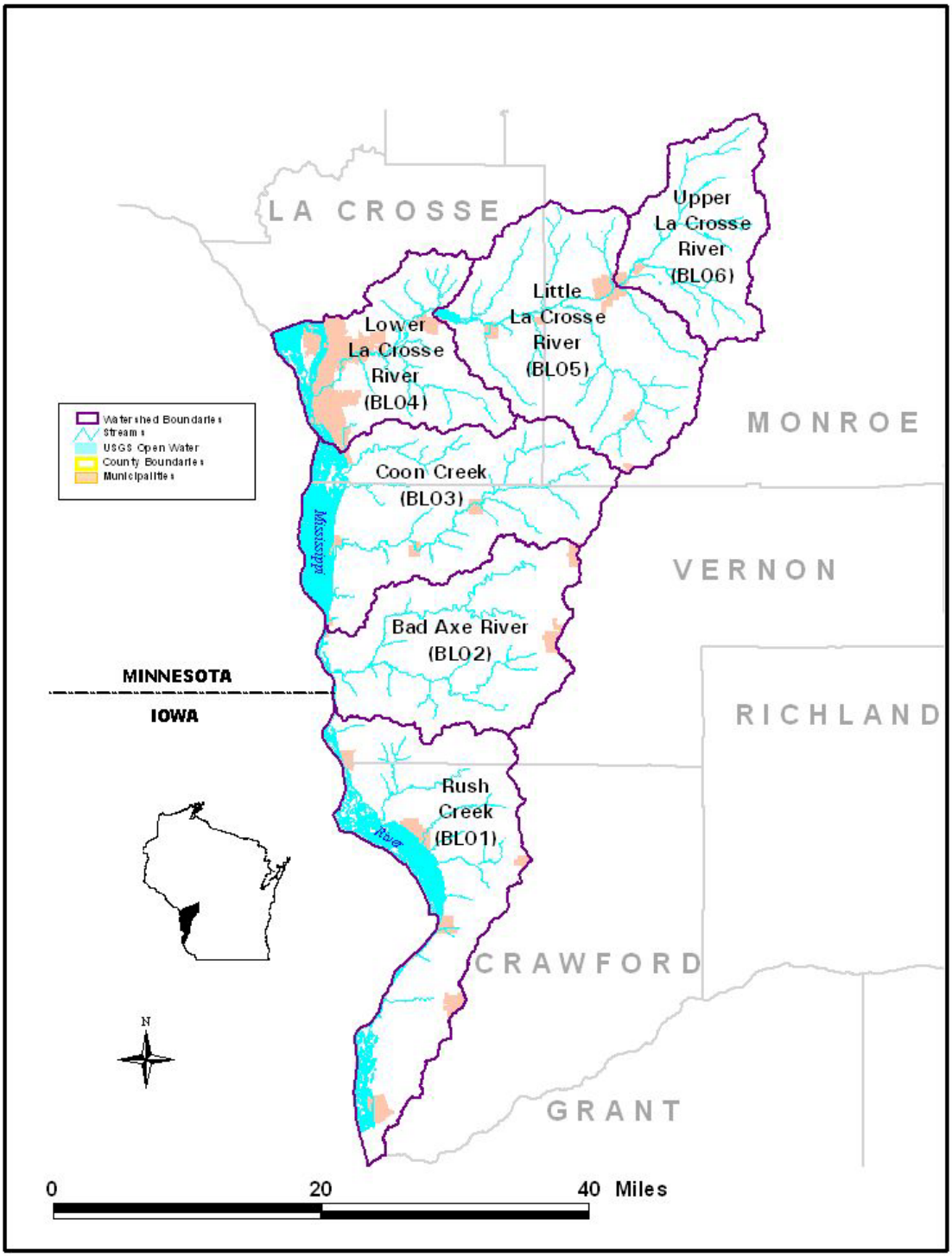

Figure 3. Map of the watersheds in the Bad Axe - La Crosse River Basin, divided by watershed boundaries (Source: Wisconsin DNR, 2002a; modified by Staff)

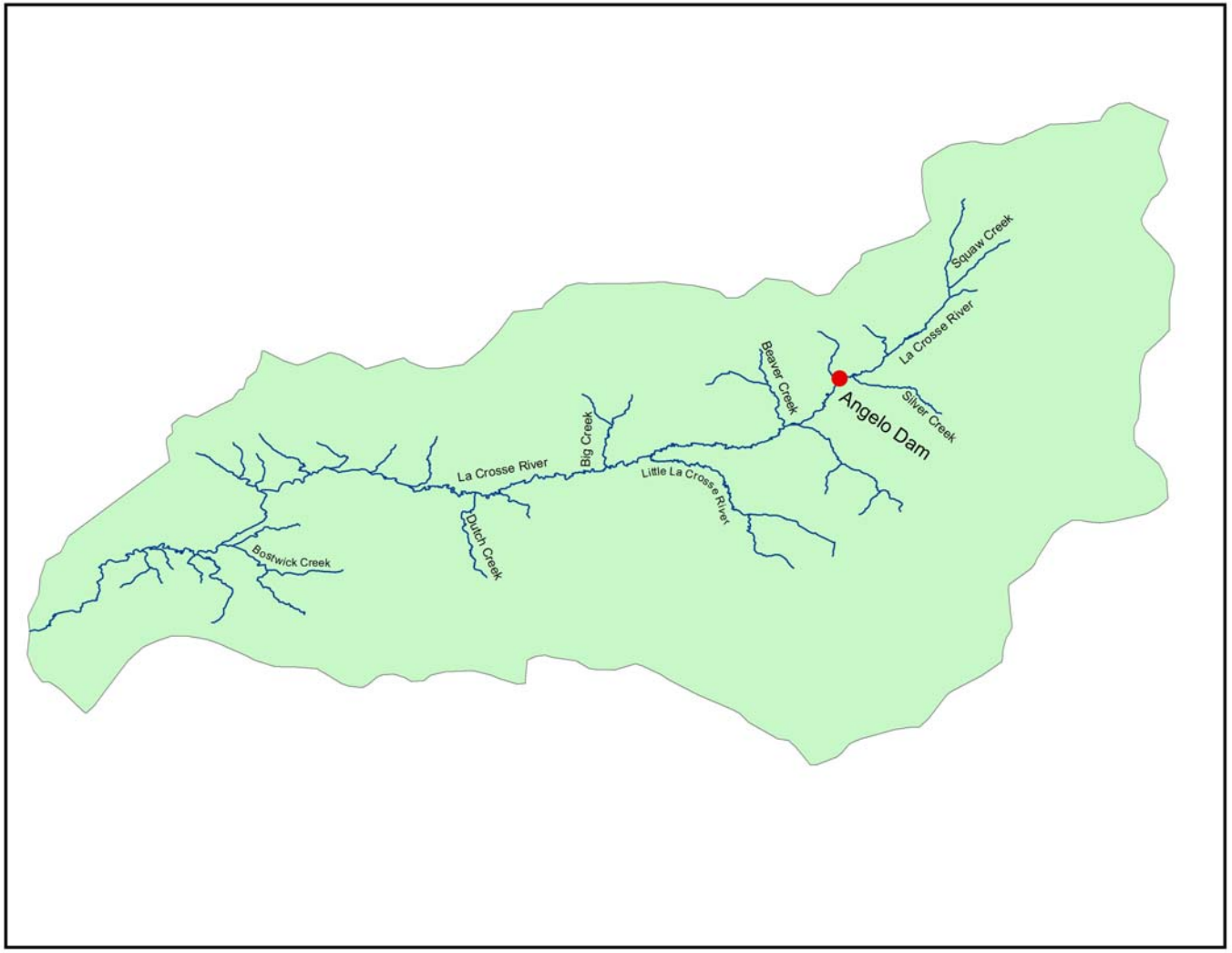

Figure 4. Map of the La Crosse River and tributaries within the Upper, Little, and Lower La Crosse River watersheds (Source: Staff).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), 40 CFR 1508.7, a cumulative effect is the effect on the environment which results from adding the effects of a proposed action to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects 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.

Based on our review of the license application, no environmental resources would be cumulatively affected by licensing the Angelo Dam Project. The project is located in a rural area, with very little existing or planned future developmental activity. While several other dams, both with and without hydropower facilities, are located on the La Crosse River, the run-of-river operating regime proposed by Western would maintain reservoir levels and flows consistent with existing conditions. As such, operation of the project would not affect reservoirs either upstream or downstream of Angelo dam.

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 site-specific environmental issues.

Only the resources that would be affected are addressed in this EA. Based on this, we have determined that geology and soils, and aquatic, terrestrial, and cultural resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to recreation, land use, aesthetics, or socio-economic resources. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

Affected Environment

The proposed project is located in an unglaciated region of Wisconsin characterized by an upper layer of limestone, eroded over time, followed by a layer of Potsdam sandstone surface rock. The Potsdam sandstone layer of this western upland region is about 800 to 900 feet thick, and is Cambrian to Lower Silurian-aged. Below this layer is Archaean-age basement rock, namely highly metamorphic gneiss, granite,

and schists. The basin is mostly composed of sand and clay deposits with a very shallow, gradual slope. Soils in the project area are poorly drained and level, classified as sands of the Dawson Peat and Newson sandy loam variety. These soil types are potentially erodible, although several areas along the river are protected by concrete retaining walls or rip rap.

Environmental Effects

Land-disturbing activities associated with construction of the proposed project primarily involve development of the powerhouse and forebay. The combined footprint of the powerhouse and forebay is approximately 740 square feet (20 feet by 37 feet), and would require about 135 cubic yards of excavation along the right (west) embankment. This area is usually dry and consists primarily of exposed bedrock with little to no soil. Western is not proposing to alter the slope or drainage patterns at the project.

To minimize the potential for erosion related to project construction, Western proposes to: (1) develop and implement an erosion and sediment control plan; (2) install an inflatable cofferdam; and (3) use hay bales and siltation fabric. Western would use excavated material as riprap along the river embankments. Western also states that Wisconsin DNR and Monroe County's shoreland zoning program both require approval of erosion control methods.

Heavy equipment would be limited to cranes sitting on the right embankment, and no access via the river bank is anticipated. The embankment in this area is also protected by a retaining wall. Less than 0.5 acre of land adjacent to the west side of the dam would be used as a staging area, as equipment and materials would generally be delivered on site from storage buildings on the Sparta Campus of the Technical College, which is located across the street from the construction area.

Our Analysis

Project construction would require some ground-disturbance, though most of this material would be rock, as opposed to soil. The area of disturbance is relatively small and the new powerhouse would occupy roughly the same footprint as the original one, which was removed in 1968. The staging area and heavy equipment use would be located on lands that are paved, or covered with grass, reducing the likelihood of significant soil movement. Further, the control measures and BMPs proposed by Western would minimize any potential erosion and sedimentation.

Consultation with the Wisconsin DNR and Monroe County would further ensure that proper control measures are used, and any project effects would be mitigated. As the project would be operated run-of-river, and the reservoir elevation would vary by less than 1 foot, it is unlikely that the project's operating regime would affect the

occurrence of erosion or sedimentation over the course of any license issued.

3.3.2. Aquatic Resources

Affected Environment

Water Quantity and Quality

The headwaters of the La Crosse River originate in Monroe County northeast of the proposed project near the Fort McCoy Military Reservation. The La Crosse River flows in a southwesterly direction for about 64 miles through Monroe and La Crosse counties before reaching the Mississippi River. Five dams on the La Crosse River create Lake Neshonoc in West Salem, Perch Lake in Sparta, Angelo Pond in the Town of Angelo, and Alderwood Lake and Hazel Dell Pond both of which lie within the Fort McCoy Military Reservation. The Angelo dam is located approximately 5 miles south of Fort McCoy's main post entrance. The drainage area of the dam site is about 115 square miles.

The Angelo dam forms a 52-acre reservoir known locally as Angelo Pond. Table 2 details the specific physical characteristics of Angelo Pond.

Table 2. Angelo Pond Specifications

Pond surface area	52 acres
Maximum volume	450 acre-ft
Maximum depth	8 ft
Mean depth	4 ft
Flushing rate	121 hours
Shoreline length	2.62 miles
Composition	Gravel, sand, and mud

Downstream of the Angelo dam, the La Crosse River flows south 2.5 miles to the city of Sparta, Wisconsin where the USGS gauge station #05382325 is located. The period of record for gauge 05382325 is from July 1992 to present. Table 3 shows the mean monthly discharge rate (cfs) for the La Crosse River for the period of record. The La Crosse River has a continuous, steady discharge flow of 100-200 cfs throughout the year, with the highest flows occurring in June and the lowest flows occurring in January.

Table 3. Mean Monthly discharge rates at USGS Gauge 05382325 from 1992-2011.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mean Monthly Discharge (cfs)	131	142	171	185	178	205	166	150	151	152	149	138

The La Crosse River in the area of the proposed project is relatively shallow. Figure 5 depicts the La Crosse River depth at gauge 05382325, located 2.5 miles downstream of the Angelo dam. River depths increase during periods of high discharge (April-June).

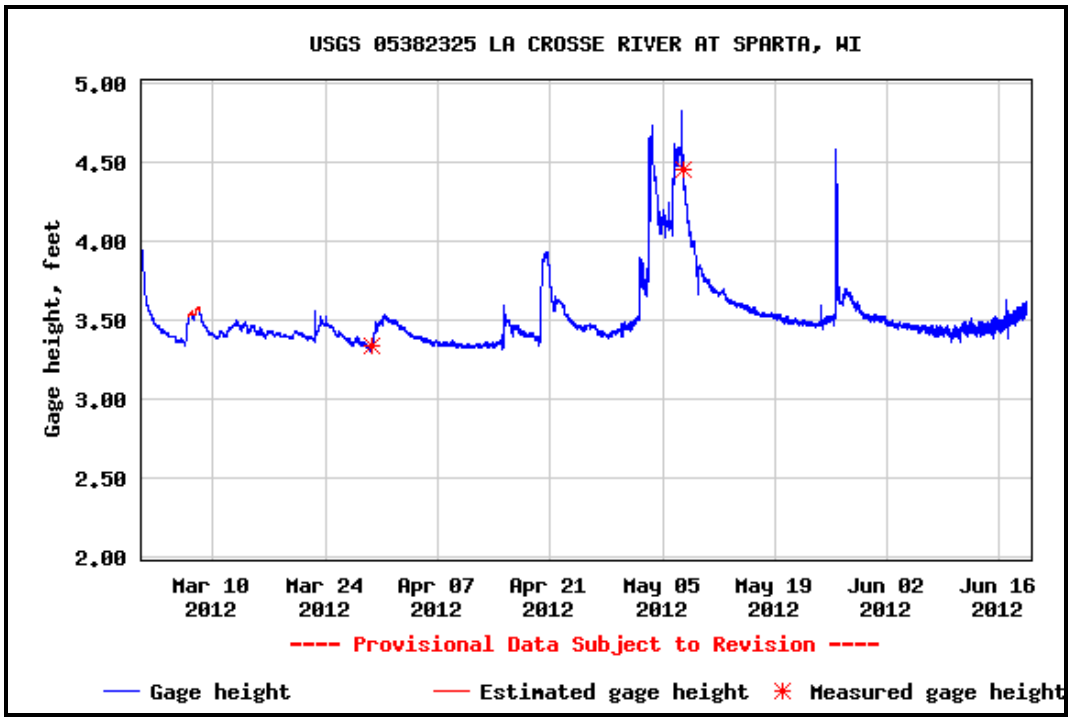

Figure 5. Spring and summer water depth of the La Crosse River at USGS Gauge 05382325.

The Wisconsin DNR has determined the La Crosse River at the Angelo dam to be a "Fish and Aquatic Life use of a Cold Water Community". The Wisconsin DNR further breaks down cold water communities, and recognizes the La Crosse River as a "Coldwater Category 5." This coldwater category includes inland trout waters with brook and brown trout, but no whitefish, cisco, or other trout or salmonid species. The water classification and standards for Wisconsin water quality parameters are as

follows:[7] (1) dissolved oxygen (DO) in classified trout streams shall not be artificially lowered to less than 6.0 milligrams per liter (mg/L) at any time, nor shall the DO be lowered to less than 7.0 mg/L during the spawning season; (2) pH shall be within a range of 6.0 to 9.0; and (3) water temperature may not exceed 86 degrees Fahrenheit (°F) while maintaining natural daily and seasonal temperature fluctuations. Additional water temperature criteria are shown in table 4. The primary use of water in Angelo Pond and around the Angelo dam is for recreation.

Table 4. Ambient Temperatures and Water Quality Criteria for cold water communities.

Month	Ambient Temperature (°F)	Sub-lethal Water Quality Criteria	Acute Water Quality Criteria (°F)
January	35	47	68
February	36	47	68
March	39	51	69
April	47	57	70
May	56	63	72
June	62	67	72
July	64	67	73
August	63	65	73
September	57	60	72
October	49	53	70
November	41	48	69
December	37	47	69

Fishery Resources

The existing fish and aquatic communities include coldwater, freshwater fish such as brook and rainbow trout throughout the La Crosse River. Trout are present in Angelo pond; however, no anadromous species inhabit the La Crosse River or Angelo Pond. Due to the size and shallow depth of Angelo Pond, it is seasonally a warm-water surface source, with warm-water fish species present during those times. Angelo Pond has regularly been stocked with largemouth bass and rainbow trout since 1984, and is listed as an impaired waterway on the Wisconsin Impaired Water List.

Based on the Wisconsin DNR Trout Stream Classification, the La Crosse River upstream of Angelo Pond is a Class II trout stream. A Class II trout stream is categorized as having some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery.

[7] All water quality criteria for Wisconsin are contained in four Administrative Code chapters, NR 102, 103, 104, and 105.

These streams have good survival and carryover of adult trout, often producing some fish larger than average size. Angelo Pond is upstream 5 miles from Perch Lake, and both surface water bodies are connected by the La Crosse River. The segment of the La Crosse River between Angelo Pond and Perch Lake is classified as a Class III trout stream. Class III trout streams are categorized by waters with marginal trout habitat, and no natural reproduction. Annual stocking of trout is required to provide for trout fishing, and there is generally no carryover of trout from one year to the next.

According to the Wisconsin DNR, Angelo Pond impounds the La Crosse River where Silver Creek enters the river. Both streams traverse Fort McCoy Military Installation, for a significant amount of their length. The La Crosse River contains a sand bottom, which is slowly filling Angelo Pond. This reservoir also slows the river's current down enough to allow fine sediment to settle out. These fine sediments in Angelo Pond maintain a robust aquatic plant community.

Environmental Effects

Water Quality

Western proposes to operate the proposed project in a run-of-river mode to minimize the impacts on water quality and quantity, and fish and aquatic resources. Western also proposes to operate the project to ensure discharges from the project meet state water quality standards during project operation, construction, and maintenance.

Our Analysis

DO, water temperature, and pH, 2.5 miles downstream of the proposed project, are at levels in the La Crosse River that are currently consistent with the levels specified by Wisconsin state water quality standards.[8] USGS data shows that DO concentrations were measured six times from May 2002-October 2002, and ranged from 8.9-11.9 mg/L. During the fall, when brown and brook trout typically spawn, DO concentrations never fell below 8.9 mg/L, which is well above the state water quality standard minimum concentration of 7.0 mg/L. The pH was also measured six times during the same time period with values ranging from 7.2-7.7. Temperature measurements were taken 29 times between July 1992 and October 2002. The temperatures ranged from 32.9 degrees Fahrenheit (°F) to 72.4 °F. November through March typically experienced the coldest water temperatures, with January 12, 1994 being the coldest day measured. June through August typically experienced the warmest water temperatures with July 17, 2002 being the warmest day measured. Of the 29 measured observations, none exceeded the state water quality standards.

[8] USGS Gauge 05382325 La Crosse River at Sparta, WI, water quality samples from July 29, 1992 – October 15, 2002.

The proposed project design and operation would not interfere with the flow of water downstream of the Angelo dam since the proposed project will operate run-of-river. Water will continue to be discharged at the foot of the dam or flow either over or under the existing tainter gates. The run-of-river operations proposed by Western should ensure that project operation would not change current DO, water temperature, or pH levels in the La Crosse River.

However, with the construction activities at the Angelo dam there is a potential to temporarily increase river turbidity, which would reduce water quality relative to existing conditions. Implementing a short-term erosion and sediment control plan that incorporates, at a minimum, the BMPs discussed in section 3.3.1, *Geology and Soil*s should ensure that any degradation of water quality would be temporary and minimal.

Operation Compliance Monitoring

Operation compliance monitoring is a standard requirement in all Commission-issued licenses. Development and implementation of an operation compliance monitoring plan and schedule would be beneficial in this instance in that it would document the procedures Western Technical College would employ to demonstrate compliance with its proposed project operations.

Entrainment and Impingement

Water intake structures at hydropower projects can injure or kill fish that are entrained through turbines. Typically, fish injury or mortality is caused by fish being struck by turbine blades, or being exposed to pressure changes, sheer forces in turbulent flows, and water velocity accelerations (Knapp et al., 1982). Fish vulnerability to entrainment relates to powerhouse and spillway operations, fish sizes, movement patterns, swimming speeds, approach velocities, trashrack bar spacing, and intake configurations. The survival rate of fish passing through turbines varies for different sizes of fish and for turbines with different design characteristics. For example, Winchell et. al. (2000) reports mean survival rate of fish less than 8 inches was 94.8 percent and 95.4 percent for fish less than 4 inches. Aside from fish size (with larger fish being more susceptible to injury), species type (some fish species are hardier than others and some species are more susceptible to entrainment), and behavior (migratory species are more likely to be entrained) along with the fish's burst swim speed could also influence percentages of fish subjected to potential injury or mortality from turbine entrainment.

Table 5. Fish swim speed information for fish species in the project area (Source: Normandeau Associates, Inc., 2002)

Species	Life Stage	Size (inches)	Burst swim speed (feet/sec or fps)
Largemouth bass	Juvenile	2-4	3.2
Largemouth bass	Juvenile	5.9-10.6	4.3
Crappie	Juvenile	3	1-2

Table 6. Sustained and burst swimming speeds of brook and brown trout (Sources: Bell, 1986 and Montana Water Center, 2007)

Species	Life Stage	Sustained swimming speed (fps)	Prolonged swimming speed (fps)	Burst swimming speed (fps)
Brook Trout	Juvenile	Not documented	2.0	Not documented
Brown Trout	Adult	7.0-7.8	Not documented	12.2-12.8

Tables 5 and 6 show typical sustained, prolonged, and burst swim speeds for fish species commonly found in the project area. Most juvenile and adult game fish burst speeds exceed the average approach velocity of 0.5 feet per second (fps) that would occur in front of the project's intake, suggesting that most life stages of most reservoir species would be able to escape from velocities near, and at, the intake face and thereby avoid entrainment.

For smaller reservoir fish that would pass through the intake, we expect turbine mortality to be relatively minor. We note that at Wisconsin hydroelectric projects where entrainment studies have been conducted, small fish (less than 4 inches long) accounted for 79 percent of fish entrained during the field studies (Electric Power Research Institute, or EPRI, 1997). Due to their small size, the vast majority of small fish from the study survived turbine passage into downstream aquatic habitats. The survival of these smaller fish was relatively high, because they were less prone to mechanical injury from turbine passage than larger fish. Smaller fish also are less prone to injury resulting from shear stresses and rapid pressure changes. Therefore, it is likely that the majority of the entrained fish would be composed of the poorest swimmers (i.e., very small fish), and most of these fish would survive turbine passage.

In addition to entrainment effects, fish can become impinged on the bars of a trashrack if they are not able to overcome the approach velocity and are not able to pass between the trashrack bars due to their larger body size. Lawler et. al. (1991) developed an equation to determine minimum fish length protected by a trashrack or screen. The equation is TL=10^[log(w/α)/β], where TL is total length, w is trashrack spacing, and alpha and beta are standard values.

Table 7. Minimum fish length protected by 1-inch trashrack spacing

Species	Trashrack spacing (w)	alpha (α)	beta(β)	Total Length (TL)
Black crappie	2.0	0.059347	1.166856	20.3
Brown trout	2.0	0.129648	1.000168	15.4
Rainbow trout	2.0	0.028369	1.287580	27.2
Trout-perch	2.0	0.032855	1.388542	19.2
White sucker	2.0	0.055538	1.187414	20.4
Yellow perch	2.0	0.034100	1.307944	22.4

Based on the results of the studies conducted by Lawler et. al (1991), we calculate that the trashrack's 2-inch spacing between the trashrack's bars would generally not allow passage of brown trout greater than 15.4 inches total length, black crappie greater than 20.3 inches total length, and yellow perch greater than 22.4 inches total length. The average velocity in front of the trashrack would be approximately 0.5 fps. Brown trout larger than 15.4 inches, black crappie larger than 20.3 inches, yellow perch larger than 22.4 inches are in the adult life stage. Table 5 shows that a juvenile black crappie is capable of a burst swim speed 1-2 fps. Table 6 shows that an adult brown trout is capable of a sustained swimming speed of 7.0-7.8 fps with a burst swim speed of 12.2-12.8 fps. Since burst speeds are typically short in duration (1-3 seconds), a brown trout could burst ahead of the trashrack's influence and swim at a sustained speed safely in front of the trashrack. Therefore, impingement at the project would not be likely as most of the fish that are large enough to be subject to impingement, such as adult brown trout, yellow perch, and black crappie, would easily be able to escape the intake's approach velocity.

To summarize, we conclude that the overall effect on the fishery due to entrainment and turbine mortality would be minimal. We also conclude that impingement of fish on the project's trashrack would be unlikely.

3.3.3. Terrestrial Resources

Affected Environment

The Bad Axe – La Crosse Basin is characterized by steep slopes and narrow river valleys, which is a distinctive attribute of the Coulee ecoregion. Much of the land in the basin is used for agriculture, particularly for beef and dairy farms. Outside of agricultural lands, vegetation in the basin consists of oak forest and savanna, grassland prairie, and bottom hardwoods (Wisconsin DNR, 2002a). Most of the forests in the basin are oak-hickory (56 percent), followed by elm-ash-cottonwood (16 percent), maple-ash-basswood (16 percent), aspen-birch (8 percent), and pine (4 percent). This habitat supports a wide variety of wildlife species including wild turkey, Cooper's hawk, ovenbird, blue jay, brown snake, bull snake, gray tree frog, white-tailed deer, gray squirrel, and gray fox. Avian species known to occur within the project site include: several species of songbirds, waterfowl (e.g., geese, herons, and ducks), birds of prey (i.e. hawks and owls), and other common species (e.g., crows and black birds).

Wetlands in the basin account for approximately 2 percent of the total land area, with about 4,000 acres in the Upper La Crosse River watershed. While no wetlands appear to be present adjacent to the dam or project facilities, palustrine scrub-shrub and palustrine forested wetlands are located in the vicinity of the project (1) to the north and east of the upper half of the reservoir, as well as (2) downstream of the dam. Some freshwater emergent (marsh) habitat is also located near the northeastern section of Angelo Pond. Upland vegetation in the immediate vicinity of the proposed project includes mostly grasses, sedges, and shrubs. As several residential homes are located around the reservoir, some of the shoreline areas near and around Angelo Pond are maintained as lawns.

Several species of invasive plants are known to occur in Monroe County, including Canada thistle, garlic mustard, Japanese knotweed, common reed, and purple loosestrife, to name a few. The only species known to occur in Angelo Pond according to the Wisconsin DNR, is curly-leaf pondweed (*Potamogeton crispus)*, though the specific location and density of the population is unclear. Curly-leaf pondweed becomes invasive in some areas due to its tolerance for low light and low water temperatures, which allows for the species to grow and bloom earlier in the season and outcompete native plants in the spring. As the species begin to die off mid-summer, it can contribute to a critical loss of DO and increase nutrients to encourage algal blooms. Curly-leaf pondweed also forms surface mats that interfere with aquatic recreation (Wisconsin DNR, 2012a).

Staff review of the FWS (2012a) endangered species list found that the following threatened and endangered (T&E) species are known to occur in Monroe County: the Karner blue butterfly (*Lycaeides melissa samuelis* or Karners) and northern wild

monkshood (*Aconitum noveboracense*). The Karner blue butterfly is an endangered species found in the northern part of wild lupine's range, and is most widespread in Wisconsin. Habitat loss for the Karners is the result of land development, and lack of natural disturbances (i.e, wildfires and large mammal grazing) to discourage encroaching forests. In May of 2009, the Environmental Protection Agency (EPA) issued a bulletin for the Karners, noting that use of an insecticide called Intrepid (methoxyfenozide) could cause potential and actual harm to the species. As such, Western noted that it would not use Intrepid, for any reason, either during or after construction.

Northern monkshood is a threatened species found only in Iowa, Wisconsin, Ohio, and New York. Northern monkshood is often found on shaded to partially shaded cliffs, algific talus slopes,[9] or along cool streamsides, as it prefers cool soil, cold air drainage, and/or cold groundwater flowage. In a letter filed with the Commission on August 18, 2009, Interior stated that no threatened or endangered species exist in the project area.

Environment Effects

As discussed in section 3.3.1, *Geology and Soils*, the total area of disturbance is 875 square feet, including 135 square feet for excavation for the draft tube and 740 square feet for the powerhouse and forebay, which would only require surface cleaning and concrete bonding. The project would generate electricity using a 205-kW, 480-volt generator. The main power leads would leave the powerhouse overhead and connect to an existing distribution line less than 30 feet away. No land-disturbing activities are associated with the transmission line.

Access to the project works would be from the existing cul-de-sac near the west side of the dam and created during the realignment of the old Highway 21. The cul-de-sac is approximately 130 feet west of the project works. Limited staging of equipment during project construction would occur on 0.5 acre of land, with most of the necessary equipment stored off-site.

While some grassy areas may be temporarily disturbed and soils slightly compacted by the movement of equipment and personnel during the construction of the proposed project, no long-term adverse effects to terrestrial resources are anticipated. The construction area would be relatively small, and would occur over an area that has been previously disturbed, due to changes in land use over time (e.g., sawmill, installation and subsequent removal of the former powerhouse). The dam is located in an area with a fair amount of development, including Highway 21, the Sparta Campus

[9] Algific talus slopes are also called "cold air slopes."

of Western Technical College, some residential development, and the Fort McCoy Military Reservation. As such, the project site is lacking in high quality habitat for wildlife. While there may be some noise associated with the ground-disturbing activities that could temporarily deter some species, any impacts would be minor and short-term.

While curly-leaf pondweed was found in Angelo Pond in 2006, all ground-disturbing activities are happening in the dry, away from the impoundment. Further, the water levels in the reservoir will not change and as such project operations would likely have no effect on any existing pondweed populations. The wetlands in the vicinity of the project are also located well outside of the construction zone and would not be otherwise affected by project operation due to the proposed run-of-river operating regime.

Karners rely primarily on the presence of wild lupine (*Lupinus perennis*), a perennial wildflower that prefers sandy areas in open or partially shaded landscapes. In Wisconsin, this habitat is typically dry, sandy openings, including openings in oak savannas, jack pine stands, and dune or sandplain communities. Other areas with wild lupine may include utility, or road rights-of-way, abandoned agricultural fields, and military training areas and bombing ranges (FWS, 2012b), as wild lupine responds well to occasional ground-disturbance. While these species are known to occur in Monroe County, it is unlikely that either species are present in the area of disturbance. Although the soils in the proposed area of disturbance include sands and sandy loams, the soils are poorly drained, and therefore, unsuitable for wild lupine. In addition, most of the construction area is bedrock, with little to no soil.

The algific talus slopes required by northern monkshood are rare communities with steep, fractured limestone slopes that retain ice throughout the growing season. These slopes support mountain maple (*Acer spicatum*), extensive beds of bulbet fern (*Cystopteris bulbifera*) and mosses (Wisconsin DNR, 2012b). The project area is not located on an algific talus slope, which are more common further west toward the Mississippi River, and in Grant County Wisconsin. The project area is relatively level, and, where vegetation exists, is mainly composed of grasses.

To summarize, because there are no Karners, northern monkshood, nor habitat for either species within the project area, project construction and operation would have no effect on these species.

3.3.4. Cultural Resources

Affected Environment

Area of Potential Effects

Under section 106 of the NHPA, the Commission must take into account whether any historic property within the project's APE could be affected by the issuance of a license. The APE is defined as the geographic area in which an undertaking may directly or indirectly cause alterations in the character or use of a historic property, if any such property exists. In this case, the APE for the project is the proposed project boundary.

Regional History

The earliest evidence of Native American occupation in Wisconsin dates to the Paleo-Indian period (10,000-8500 B.C.). Occupation continued through the Archaic (8,000-1,000 B.C.), Woodland (1000-300 B.C.), and Mississippian periods (A.D. 900-1600). Upon European contact, much of Wisconsin, including the project area, was occupied by the Ho-Chunk. Beginning in 1840, there were a series of forcible relocations throughout the state, which resulted in the Ho-Chunk being moved to lands west of the Mississippi River. The forcible relocations continued until 1875, at which time a majority of the remaining Ho-Chunk were relocated to Monroe and Jackson counties, Wisconsin.

European settlement in Monroe County occurred in 1842. Between 1852 and 1854, Dr. Seth Angle built a dam and sawmill at the site of the current Angelo dam. The sawmill prospered, and the village of Athens was settled around the mill and dam in 1856. The village's name was later changed to Angelo. By the 1900's, the population of Angelo had declined because of the high price of land and because the railroad did not travel by the town.

In 1897, the sawmill was converted into the Sparta Electric Plant. The Wisconsin-Minnesota Light and Power Company purchased the plant, and in 1920, rebuilt the dam. In 1947, Northern States Power Company bought the facility, and in 1968 refurbished the dam and demolished the powerhouse. In 1969, Northern States Power Company ceased operation of the facility. In 1998, the refurbished dam was demolished, and Angelo dam was constructed in its place (Salkin, 2011).

Archaeological and Historic Resources

A phase I survey of the APE, conducted in 2010, revealed no surface or sub-surface archaeological resources, Euro-American artifacts, or buildings or structures that would be eligible for the National Register. The existing Angelo dam is not eligible for

the National Register, because it is less than 50 years old.

A portion of the APE to be surveyed was inaccessible during the initial survey; therefore, a second phase I survey was conducted in March and April of 2012. No surface or sub-surface archaeological resources were discovered during the second survey. In total, the two surveys covered about 87 percent of the APE. The Wisconsin SHPO, in letters filed on October 21, 2011, and June 14, 2012, concurred with the two surveys' findings.

Environmental Effects

Proposed project construction and operation may affect unknown historic properties within the APE. The executed PA requires that every proposed hydroelectric project in Wisconsin develop an HPMP to avoid, lessen, or mitigate for any adverse effects on both identified and unidentified historic properties within the APE. To address any potential adverse effects on unidentified historic properties,[10] Western proposes to implement its HPMP, filed on October 21, 2011 and amended by letter filed on June 14, 2012. The HPMP contains policies and procedures for: (1) the completion of a phase I survey of the unsurveyed areas within the APE; (2) treatment of unanticipated archaeological resource discoveries or human remains; (3) the determination of the National Register-eligibility of any discovered archaeological resource; (4) the treatment of any unknown historic property over the term of any license issued; and (5) the appointment of an HPMP coordinator. In letters filed on October 21, 2011 and June 14, 2012, the Wisconsin SHPO accepted the proposed HPMP with its amendments.[11]

Our Analysis

Western conducted two cultural resource surveys, but was unable to survey about 17 percent of the land within the project's APE. In these unsurveyed areas, project operations could adversely affect unknown archaeological resources that could be eligible for the National Register. Also during project construction or operation, unknown archaeological sites or human remains may be discovered. The proposed HPMP contains protocols and procedures to adequately address any unanticipated discoveries during future surveys or proposed project construction and operation. Also the proposed HPMP contains provisions to lessen, avoid, or mitigate for any adverse

[10] There are no known historic properties within the APE.

[11] Pursuant to section II.B., *Historic Resources Management Plan,* of the executed PA, if the Wisconsin SHPO agrees with the HPMP, then Western shall implement the HPMP, if a license is issued.

effects if the discovered properties are eligible for the National Register or if human remains are discovered.

We anticipate that any effects on unknown historic properties would be taken into account through the executed PA and the proposed HPMP. The documents would ensure that any adverse effects on historic properties within the APE would be resolved.

3.4 NO-ACTION ALTERNATIVE

Under the no action alternative, a license for the project would not be issued and the Angelo Dam Project would not be constructed. There would be no changes to the physical, biological, or cultural resources in the area, and there would be no hydroelectric generation at the dam to contribute to the regional need for power.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at Western's use of the La Crosse River for hydropower purposes to see what effects 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*.,[12] 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 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

[12] *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.

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 8 summarizes the assumptions and economic information we use in our analysis. This information was provided by Western in its license application and subsequent submittal. We find that the values provided by Western are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; estimated capital investment required to develop the project; licensing costs; normal operation and maintenance cost; and Commission fees.

Table 8. Parameters for the economic analysis of the Angelo Dam Project (Source: Staff)

Parameter	Value
Period of analysis (years)	30
Term of financing (years)	20[a]
Taxes (real estate, local, federal)	$0[b]
Project cost	$1,376,000
Licensing cost, $	$50,000
Operation and maintenance, $/year	$10,000
Energy value ($/MWh)	$90
Capacity value ($/MW-year)	$159,000
Interest rate	10 percent[c]
Discount rate	10 percent[c]

[a]Western was awarded $1,200,000 in public funding. Staff assumes that the remainder of the cost to develop the project would be financed.

[b] Western is a state entity, and therefore, does not pay taxes.

[c]*See* license application at 7.

The Angelo Dam Project would have an installed capacity of 205 kW and would generate an average of 948.5 MWh annually. Table 8 includes an energy value of $90/MWh which is the price at which Western would sell the project power to Northern States Power as agreed in a Power Purchase Agreement between the two entities.[13] The capacity value of $159,000/MW-year (table 8) is based on the amortization and fixed operation and maintenance cost for a simple-cycle combustion turbine.

[13] *See* license application at 9.

4.2 COMPARISON OF ALTERNATIVES

Table 9 summarizes the 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: no-action, the applicant's proposal, and the staff alternative.

Table 9. Summary of the annual cost of alternative power and annual project cost for three alternatives for the Angelo Dam Project (Source: Staff).

	No Action	**Western's Proposal**	**Staff Alternative**
Installed capacity (kW)	0	205	205
Annual generation MWh)	0	948.5	948.5
Dependable Capacity (kW)	0	205[a]	205
Annual cost of alternative power ($/MWh)	0	124.86	124.86
Annual project cost ($/MWh)	0	38.35	38.65
Difference between the cost of alternative power and project cost ($/MWh)	0	86.20	80.71

[a] *See* license application at 23.

4.2.1 No-Action Alternative

Under the no-action alternative, the Angelo Dam Project would not be constructed and there would be no hydropower generation, costs, or benefits at this site.

4.2.2 Applicant's Proposal

Western proposes to construct a new hydropower facility at the existing Angelo dam. Upon completion of the construction, the proposed project would have a total installed capacity of 205 kW, a dependable capacity of 205 kW, and an average annual generation of 948.5 MWh. Additionally, Western proposes to implement the executed PA and an associated HPMP at a capital cost of $27,000 and an annual cost of $1,500, which is included in the total project cost of $1,376,000. In addition, Western proposes to develop and implement an erosion and sediment control plan, use BMPs, and operate the project in run-of-river mode. The costs of these measures are included in the total

project costs. The average annual cost of alternative power would be $118,432, or $124.86/MWh. The capital cost of the project including protection, mitigation, and enhancement measures is estimated to be $1,376,000. In total, the average annual project cost would be $36,371, or $38.65/MWh. Overall, the project as proposed would produce power at a cost which is $81,589, or $86.20 MWh less than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative includes the same developmental and environmental measures as Western's proposal and, therefore, would have the same capacity and energy attributes. In addition to applicant's environmental measures, staff recommends that Western develop and implement an operation compliance monitoring plan and schedule, for Angelo dam at a cost of $2,500 in capital expenditure.

Based on a total installed capacity of 205 kW, a dependable capacity of 205 kW, and an average annual generation of 948.5 MWh, the cost of alternative power would be $118,432, or about $124.86/MWh. The average annual project cost would be $36,663, or about $38.65/MWh. Overall, the project would produce power at a cost which is $81,297, or $85.471/MWh, less than the cost of alternative generation.

4.3 COST OF ENVIRONMENTAL MEASURES

Western is proposing to implement the executed PA and associated HPMP at a capital cost of $27,000 and an annual cost of $1,500 which is included in the total project cost of $1,376,000. The costs associated with Western's proposal to develop and implement an erosion and sediment control plan, use BMPs, and operate the project in run-of-river mode, as stated above, are included in the total project costs. Staff is recommending that an operation compliance monitoring plan and schedule be developed at a capital cost of $2,500, to ensure compliance with the proposed run-of-river operating regime. 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. Staff's recommended operation compliance monitoring plan would add about $292 to the project cost, annually.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

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

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the annual generation would be 948.5 MWh for the proposed action, 948.5 MWh for the staff alternative, and 0 MWh for the no-action alternative.

Table 10. Comparison of effects for each alternative associated with the Angelo Dam Project (Source: Staff).

Resource	**No Action Alternative**	**Proposed Action**	**Staff Recommended Alternative**
Generation	No hydroelectric generation	948.5 MWh of electricity produced annually	948.5 MWh of electricity produced annually
Geologic and Soils Resources	No changes to geology or soils at or near the proposed project site.	Western would excavate approximately 135 cubic yards of bedrock to construct the proposed powerhouse and forebay. To ensure the protection of project resources from sedimentation and erosion, Western would develop, and implement (BMPs) during project construction as well as develop and implement an erosion and sediment control plan. There would, nonetheless, be the potential for temporary and minor erosion and sedimentation at the site.	Same as proposed action.

Aquatic Resources	No changes to current water quality conditions where DO, water temperature, and pH are at levels consistent with state water quality standards..	There would be temporary, minor increases in turbidity associated with construction. Run-of-river operation would maintain current water quality.	Same as proposed action.
Terrestrial	No changes to existing terrestrial resources.	Project construction would cause minor, short-term disturbance of grassy areas, compaction of soils, and generation of noise associated with excavation activities.	Same as proposed action.
Cultural Resources	No changes to the current conditions where there are no known historic properties. There would be no potential for unknown historic properties to be affected by the project.	Construction and operation of the proposed project could adversely affect unknown historic properties. Western proposes to implement the HPMP filed on October 21, 2011, and amended by letter filed on June 14, 2012, to mitigate for any adverse effects on newly discovered historic properties.	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 license 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 Angelo Dam Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of the environmental and economic effects of the proposed project and its alternatives, we selected Western's proposal with staff's modifications as the preferred alternative. We recommend this alternative because: (1) issuance of an original hydropower license by the Commission would allow the applicant to construct and operate the project as an economically beneficial and dependable source of electrical energy; (2) the 205 kW of electric capacity would come from a renewable resource which does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect, mitigate, and enhance environmental resources affected by building, operating, and maintaining the project.

5.2.1. Measures Proposed by Western

Based on our environmental analysis of Western's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by Western 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:

- developing and implementing an erosion and sediment control plan with provisions for using BMPs, including installing a temporary inflatable cofferdam, and placing hay bales and siltation fabric at locations where sediment-laden runoff could otherwise enter project waters or adjacent non-project lands;

- operating the project in a run-of-the-river mode to minimize impacts on water quality and quantity, and fish and aquatic resources; and

- implementing the PA, executed on December 16, 1993, and the HPMP, filed on October 21, 2011, and amended by letter filed on June 14, 2012.

5.2.2. Additional Measures Recommended By Staff

In addition to Western's proposed measures noted above, we recommend that Western develop and implement an operation compliance monitoring plan and schedule

to monitor compliance with run-of-river operations. In section 3.3.2, *Aquatic Resources*, we determined that such a plan would ensure that Western would be able to demonstrate compliance with its proposed run-of-river operating regime. In section 4, staff concluded that developing and implementing an operation compliance monitoring plan would have an annualized cost of $292. The benefits of the plan justify the annualized cost of $292.

As noted in section 2.2.4, Western also proposes to comply with all state water quality standards while operating the project. We consider this proposal to comply with state law to be a general legal matter rather than a specific environmental measure, and therefore, do not adopt it as an environmental measure under the staff alternative. Nevertheless, in section 3, we analyzed the effects of proposed project construction and operation on water quality in the La Crosse River and concluded that with the exception of the potential for short-term, minor increases in turbidity during construction, Western's proposal to operate the project in a run-of-river mode would ensure that there would be no long-term adverse effects on water quality.

5.3 UNAVOIDABLE ADVERSE EFFECTS

As discussed in section 3.3.1, *Geology and Soils Resources,* 135 cubic yards of rock would be permanently excavated. Also, any potential erosion or sedimentation that would occur during project construction would be minimized through the development and implementation of an erosion and sediment control plan.

As discussed in section 3.3.2, *Aquatic Resources*, construction activities may cause minor, short-term adverse effects on water turbidity, but developing and implementing an erosion and sediment control plan would limit the severity and scope of these effects. The operation of the proposed project would also result in some entrainment and mortality of resident fish. However, these effects would likely be minor as most large fish would be able to escape the intake's approach velocity, and the majority of small fish are more likely to survive passage through the project turbine. Therefore, any adverse effects would be minimal and are unlikely to negatively impact the project reservoir's (Angelo Pond's) fish community as a whole.

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under section 10(j) of the FPA, 16 USC 803(j), 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.

No federal or state fish and wildlife agency filed recommendations pursuant to section 10(j) of the FPA.

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 USC 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by a project. We reviewed three plans that are applicable to the project and found no inconsistencies.[14]

6.0 FINDING OF NO SIGNICANT IMPACT

On the basis of our independent analysis, the issuance of an original license for the Angelo Dam Project, as proposed, would not constitute a major federal action significantly affecting the quality of the human environment.

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