

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Mr. William Arkoosh

Project No. 14154-001-Idaho

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(October 25, 2012)

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 Little Wood River Ranch II Hydropower Project, and has prepared an environmental assessment (EA). The proposed 1.23-megawatt project would be located on the Little Wood River, six miles west of the Town of Shoshone, in Lincoln County, Idaho. The project would be located on 119.1 acres of private land and would occupy 3.3 acres of federal lands managed by the U.S. Bureau of Land Management.

The EA includes staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate environmental 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. Please contact Jennifer Harper by telephone at (202) 502-6136, or by e-mail at Jennifer.Harper@FERC.gov, if you have any questions.

Kimberly D. Bose,
Secretary.

ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE

Little Wood River Ranch II Hydropower Project

FERC Project No. 14154-001

Idaho

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
APLIC	Avian Power Line Interaction Committee
applicant	William Arkoosh
BLM	Bureau of Land Management
BPMs	best management practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
EA	environmental assessment
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
FWS	U.S. Department of the Interior, Fish and Wildlife Service
HIP	Habitat Improvement Plan
Idaho DEQ	Idaho Department of Environmental Quality
Idaho DFG	Idaho Department of Fish and Wildlife
Idaho SHPO	Idaho State Historic Preservation Officer
Interior	U.S. Department of the Interior
Little Wood River Project	Little Wood River Ranch Hydropower Project II
Mr. Arkoosh	William Arkoosh
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act
Program	Columbia River Basin Fish and Wildlife Program
Project	Little Wood River Ranch Hydropower Project II
RECR	Renewable Energy Credit Revenue
SWSI	U.S. Department of Agriculture Surface Water Supply Index
USGS	U.S. Geological Survey
WECC	Western Electric Coordinating Council
WQC	state of Idaho 401 water quality certification
§	section

EXECUTIVE SUMMARY

Proposed Action

On November 15, 2011, Mr. William Arkoosh (Mr. Arkoosh or applicant) filed an application for an original, minor license to construct, operate, and maintain the proposed Little Wood River Ranch II Hydropower Project. The proposed 1.23-megawatt (MW) project would be located on the Little Wood River, six miles west of the Town of Shoshone, in Lincoln County, Idaho. The project would be located on 119.1 acres of private land and 3.3 acres of federal lands managed by the U.S. Bureau of Land Management.

Project Description and Operation

The Little Wood River Ranch II Project would consist of the following new facilities: (1) a 220-foot-long, 12-foot-high rock-rubble diversion dam, impounding a 9.1-acre reservoir on the Little Wood River; (2) a 3,900-foot-long canal to convey water from the diversion to the intake structure; (3) a concrete intake structure having two parallel 5-foot-diameter, 120-foot-long steel penstocks; (4) a 60-foot-long, 20-foot-wide powerhouse containing two Francis turbines with a total installed capacity of 1.23 MW; (5) a 1,600-foot-long tailrace canal; (6) a 2.2-mile-long, 12.5-kilovolt transmission line; and (7) appurtenant facilities. The project would operate in a run-of-river mode and generate an estimated average of 5,323 megawatt-hours (MWh) annually.

Proposed Environmental Measures

Mr. Arkoosh proposes the following environmental measures to protect or enhance geology and soils, aquatic, and terrestrial resources:

- an Operational Compliance and Monitoring Plan with provisions for: (1) constructing a minimum flow release structure on the diversion dam to provide monthly minimum flows ranging from 10 to 55 cubic feet per second (cfs) to the bypassed reach; (2) installing a continuous flow monitoring gage downstream of the project diversion to monitor minimum flow releases; and (3) recording forebay water elevations to verify run-of-river operation.
- an Environmental Features Design Plan with provisions for: (1) constructing the feeder and tailrace canals to have a flow velocity of less than 2 feet per second (fps) so that these features would act as sediment settling ponds; (2) constructing a plunge pool below the new diversion dam to ensure compatibility with any future fish passage facilities; (3) constructing a log boom and ramp in the feeder canal to prevent big game entrapment; and

- (4) constructing the transmission line to protect raptors and monitoring the effects on raptors post-construction.
- a Riparian Habitat Improvement Plan (RHIP) with provisions for:
 - (1) removing non-native plant species along the bypassed reach of the Little Wood River to enhance native species growth; (2) planting native riparian vegetation along the bypassed reach to reduce solar heating and minimize erosion; and (3) installing fences with wildlife passage/water access gaps on applicant-owned lands along the bypassed reach to protect riparian vegetation. Mr. Arkoosh would consult with Idaho DFG to develop a Habitat Improvement Plan agreement (HIP agreement), which would provide specifications and the schedule for implementing the measures defined in the RHIP.
 - an Environmental Monitoring Plan with provisions for: (1) long-term monitoring of noxious and invasive plant species; and (2) monitoring the results of the revegetation efforts for five years.
 - disposing of excess soil material away from water to minimize sedimentation.

Alternatives Considered

This environmental assessment (EA) considers the following alternatives: (1) Mr. Arkoosh's proposal, as outlined above; (2) Mr. Arkoosh's proposal with staff modifications (staff alternative); (3) Mr. Arkoosh's proposal with staff modifications and mandatory conditions; and (4) no action, meaning that project would not be built.

Staff Alternative

Under the staff alternative, the project would be constructed, operated, and maintained as proposed by Mr. Arkoosh with the modifications and additions described below. Our recommended modifications and additional environmental measures include, or are based on, recommendations made by federal and state agencies.

Under the staff alternative, the project would include all of Mr. Arkoosh's proposed measures, as outlined above, with the exception that a more detailed RHIP would be filed for Commission approval instead of the HIP agreement. The RHIP filed by Mr. Arkoosh outlines the minimum provisions required to improve riparian habitat in the bypassed reach, but lacks sufficient detail. The RHIP also describes the source of funding for the riparian improvements, which includes federal funds and cost-sharing agreements with Idaho DFG. While the Commission does not oppose such funding arrangements, implementation of the plan can not be contingent on acquiring these funds. Therefore, we recommend that a final RHIP be filed for Commission approval that contains a detailed description and specifications of the riparian habitat improvement measures (species, location, and amount of native plantings, fencing specifications, etc.) and a schedule for implementing the measures.

In addition, the staff alternative includes: (1) developing and implementing an erosion and sediment control plan (ESCP) that incorporates the specific requirements of the Idaho Department of Environmental Quality (Idaho DEQ) water quality certification for controlling erosion and sedimentation; (2) the Idaho DEQ water quality certification conditions for controlling and monitoring turbidity levels during construction, scheduling and minimizing in-water work, relocating stranded fish, limiting the use of chemicals during construction and operation, minimizing disturbance of existing wetlands and native vegetation and restoring any such disturbed areas, and implementing measures to manage and reduce the risk of spills of hazardous materials; and (3) notifying the Commission, Idaho State Historic Preservation Office (Idaho SHPO), and Indian Tribes of any unanticipated artifact discovery to protect any previously undiscovered cultural resources. The staff alternative does not include the WQC provision to screen the project intake to prevent fish entrainment.

Staff Alternative with Mandatory Conditions

Under the staff alternative with mandatory conditions, the project would be constructed, operated, and maintained as proposed with all of the WQC conditions and the additional staff measures.

No Action Alternative

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

Public Involvement and Areas of Concern

Before filing his license application, Mr. Arkoosh 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 April 4, 2012, the Commission issued a public notice of its intent to waive scoping, stating the application was ready for environmental analysis, and requesting comments, terms and conditions, and recommendations. This notice also stated our intention to waive additional study requests, waive three-stage consultation, and establish an expedited schedule for processing.

Staff received comments and recommendations from the State of Idaho on behalf of Idaho DEQ, Idaho DFG, Idaho Water Resource Board, and Idaho State Board of Land Commissioners. We also received a letter from the U.S. Department of the Interior,

noting that they received and reviewed the license application and had no comments to offer.

The primary issues associated with licensing the project are erosion and sedimentation, minimum flows, fish entrainment, invasive species control, and avian protection.

Staff Alternative

Geological and Soil Resources

The proposed project would result in a temporary increase in sedimentation and turbidity during soil-disturbing construction activities and initial project operation. The applicant's proposed plans include revegetating disturbed areas and disposing of excess soil material away from water to minimize erosion and sedimentation; however, additional requirements to control stormwater, designating the times and types of in-water work, and removing accumulated sediments would further protect geologic and soil resources. The additional measures to reduce erosion and sedimentation during project construction and operation (such as requirements to control stormwater, designating the times and types of in-water work, and implementing specific best management practices for controlling erosion) included in the WQC would further protect geologic and soil resources and minimize adverse effects on aquatic communities. Therefore, Commission staff recommends that the applicant develop and implement an ESCP. This plan would be developed in consultation with Idaho DFG, Idaho DEQ, and FWS. The ESCP would include the applicant's proposed measures, the measures proposed by the Commission, and the additional measures required by the WQC.

Aquatic Resources

Mr. Arkoosh has proposed to design and construct the feeder and tailrace canals (Environmental Features Design Plan) to have a velocity of less than 2 fps, which would remove sediments from the sediment-laden water in the basin. The implementation of such design measures would slightly improve water quality and fish habitat in the bypassed reach and downstream of the project.

Implementing Mr. Arkoosh's proposal to operate the project in run-of-river mode, with minimum flows provided to the bypassed reach of the Little Wood River (Operational Compliance Plan), would ensure that the bypassed reach would continue to provide habitat for aquatic species and that the flow regime of the Little Wood River is not altered below the tailrace canal. The measures Mr. Arkoosh has proposed to verify that the minimum flows are being provided would ensure that the bypassed reach has the required flow for aquatic habitat.

Implementing Mr. Arkoosh's proposal to design and construct a plunge pool below the project diversion structure (Environmental Features Design Plan) would minimize fish mortality resulting from project operation. Implementing the WQC condition to relocate stranded fish from the bypassed reach to downstream of the diversion would protect resident fishes during project start-up.

Implementing Mr. Arkoosh's proposal to plant riparian vegetation along the riverbed and protect that vegetation with fencing (RHIP) would reduce solar heating of the bypassed reach of the Little Wood River, which would minimize temperature effects resulting from reduced flow through the bypassed reach.

Terrestrial Resources

Constructing the project would result in the temporary disturbance of approximately 13.5 acres of vegetation. Implementing the RHIP would minimize adverse impacts of construction on wildlife, enhance the recovery of native vegetation, minimize the potential for introduction and establishment of non-native vegetation and noxious weeds, and ensure wildlife access to habitats along the bypassed reach. Mr. Arkoosh's proposal to design and construct a log boom and ramp across the intake canal would prevent big game entrapment.

Mr. Arkoosh's proposal to design the transmission lines according to Avian Power Line Interaction Committee's current guidelines, to monitor avian mortality for the first three years after the transmission line is erected, and to consult with FWS to develop additional mitigation measures, if needed, would minimize potential adverse interactions between the project's transmission line and raptors.

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.

Cultural Resources

Constructing the proposed project would not affect any known cultural resources. Notifying the Commission, the Idaho SHPO, and Indian tribes if previously unidentified archeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities at the project would help protect previously-undiscovered cultural resources in the project area.

Staff Alternative with Mandatory Conditions

The Staff Alternative with Mandatory Conditions includes staff-recommended measures along with the mandatory condition requiring Mr. Arkoosh to screen the project intake to prevent fish entrainment.

No-Action Alternative

Under the no-action alternative, the project would not be built, 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.

Conclusions

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

In section 4.2 of the EA, we estimate the likely cost of alternative power for the four alternatives identified above. Our analysis shows that during the first year of operation under the proposed action alternative, project power would cost \$4,100, or \$0.77/MWh more than the likely alternative cost of power. Under the staff alternative and the staff alternative with mandatory conditions, project power would cost \$4,370, or \$0.82/MWh more 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 (5,323 MWh annually); (2) the 1.23-MW of electric capacity available comes from a renewable resource which does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by Mr. Arkoosh, 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 be a major federal action affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

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

Little Wood River Ranch II Hydropower Project FERC Project No. 14154-001—Idaho

1.0 INTRODUCTION

1.1 APPLICATION

On November 15, 2011, Mr. William Arkoosh (Mr. Arkoosh or the applicant) filed an application for an original minor license for the construction, operation, and maintenance of the proposed Little Wood River Ranch II Hydropower Project (the Little Wood River Project or the project). The 1.23-megawatt (MW) project would be located on the Little Wood River, six miles west of the Town of Shoshone, in Lincoln County, Idaho. The project would be located on 119.1 acres of private land and 3.3 acres of federal lands managed by the U.S. Bureau of Land Management. The project would generate an average of about 5,323 megawatt-hours (MWh) of energy annually.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Little Wood River 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 Mr. Arkoosh for the Little Wood River Project and what conditions should be placed in 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 the 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 Little Wood River Project would allow Mr. Arkoosh to generate electricity at the project for the term of a license, making electric power from a renewable resource available for use and sale.

This environmental assessment (EA) assesses the effects associated with the construction and operation of the proposed project and alternatives to the proposed project, and makes recommendations to the Commission on whether to issue an original license, and, if so, what terms and conditions should be included in any license issued.

In this EA, we assess the environmental and economic effects of constructing and operating the project: (1) as proposed by Mr. Arkoosh; (2) with our recommended measures; and (3) with our recommended measures and mandatory conditions. We also consider the effects of the no-action alternative. Important issues that are addressed include erosion and sedimentation, minimum flows in the bypassed reach of the Little Wood River, fish entrainment, invasive species control, and avian protection.

1.2.2 Need for Power

The Little Wood River Project would provide hydroelectric generation to meet part of Idaho's power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 1.23 MW and generate approximately 5,323 MWh per year. The electricity generated by the project in excess of Mr. Arkoosh's needs would be sold to Idaho Power.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Little Wood River Project is located in the Basin subregion¹ of the Western Electricity Coordinating Council (WECC) region of the NERC. According to NERC's 2011 forecast, average annual demand requirements for the WECC region are projected to grow at a rate of 1.54 percent from 2011 through 2021. NERC projects resource capacity margins (generating capacity in excess of demand) will remain above the target reserve margins of 14.2 percent for summer and 14.5 percent for winter during the 10-year forecast period, including estimated new capacity additions. Over the next 10 years, WECC estimates that about 54,400 MW of future planned capacity will be brought on line.

We conclude that power from the Little Wood River Project would help meet a need for power in the WECC region in both the short and long-term. The project would provide low-cost power that displaces generation from non-renewable sources.

¹ The Basin subregion is a summer-peaking subregion composed of all or major portions of the states of Idaho, Nevada, Utah, and Wyoming.

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 statutes. The major regulatory and statutory requirements are summarized in table 1 and described below.

Table 1. Major statutory and regulatory requirements for the Little Wood River Project (Source: staff).

Requirement	Agency	Status
Section 18 of the FPA	FWS	No fishway prescriptions or reservation of authority to prescribe fishways have been filed.
Section 10(j) of the FPA	Idaho DFG	The State of Idaho, on behalf of Idaho DFG, provided section 10(j) recommendations on May 3, 2012.
Clean Water Act – water quality certification	Idaho DEQ	Idaho DEQ provided certification on August 6, 2012.
Endangered Species Act Consultation	FWS	FWS, by letter filed on April 27, 2012, determined that there is insufficient habitat in the project area and the vicinity to support federal listed threatened, endangered, or sensitive species.
National Historic Preservation Act	Idaho SHPO	The Idaho SHPO determined on March 20, 2012, that no historic properties would be affected by the federal licensing action.
Pacific Northwest Power Planning and Conservation Act	Northwest Power and Conservation Council	Commission staff determined that the recommendations in the EA are consistent with the applicable provisions of the program.

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 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, 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 purpose and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

The U.S. Department of the Interior (Interior) filed a letter on May 4, 2012, stating that they had no comments on the project. On May 3, 2012, the state of Idaho, on behalf of Idaho DFG, timely filed, recommendations under section 10(j) as summarized in table 9 in section 5.4, *Fish and Wildlife Agency Recommendations*. 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 January 26, 2012, Mr. Arkoosh applied to the Idaho DEQ for 401 water quality certification (WQC) for the Little Wood River Project. Idaho DEQ received this request on the same day. The Idaho DEQ timely issued the section 401 WQC on August 6, 2012 (letter from Bill Allred, Regional Administrator, Idaho Department of Environmental Quality, Twin Falls, Idaho, July 31, 2012). 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 (ESA) 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.

According to the FWS, it is unlikely that the two candidate species present in Lincoln County, Idaho, the greater sage-grouse and wolverine, would be present in the project area based on the habitat requirements and life history of those two species (letter

from B. T. Kelly, State Supervisor, FWS, Idaho Fish and Wildlife Office, Boise, Idaho, to K. D. Bose, Secretary, FERC, Washington, D.C., April 27, 2012). No other federal listed, proposed, or candidate species are known to be present in the project area. Idaho DFG also determined that there is insufficient habitat in the project area and the vicinity to support federal and state listed threatened, endangered, and sensitive species. Therefore, we conclude that project construction and operation would not affect any federally listed species and no further consultation is required under the Endangered Species Act.

1.3.4 National Historic Preservation Act

Section 106 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).

Mr. Arkoosh consulted with the Idaho State Historic Preservation Officer (Idaho SHPO) to locate, determine National Register eligibility of, and assess potential adverse effects to historic properties associated with the project. The remains of a historic homestead was identified within the project’s area of potential effects; however, Mr. Arkoosh found that the project would have no effect on this historic property. On March 20, 2012, the SHPO concurred with Mr. Arkoosh’s findings and concluded that no historic properties would be affected by the federal licensing action. Consequently, a programmatic agreement to resolve adverse effects to historic properties will not be necessary.

1.3.5 Pacific Northwest Power Planning and Conservation Act

Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power and Conservation Council developed the Columbia River Basin Fish and Wildlife Program (Program) to protect, mitigate, and enhance the operation of the hydroelectric projects within the Columbia River Basin. Section 4(h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies shall take into account, to the fullest extent practicable, the Program adopted under the Pacific Northwest Power Planning and Conservation Act.

The Program directs agencies to consult with federal and state fish and wildlife agencies, appropriate Indian tribes, and the Council during the study, design, construction, and operation of any hydroelectric development in the basin. At the time the application was filed, our regulations required the applicant to consult with the

appropriate federal and state fish and wildlife agencies and tribes before filing, and after filing, to provide these groups with opportunities to review and comment on the application. Mr. Arkoosh has followed this consultation process, and the relevant federal and state fish and wildlife agencies and tribes have reviewed and commented on the application.

To mitigate harm to fish and wildlife resources, the Council has adopted specific provisions to be considered in the licensing or relicensing of non-federal hydropower projects (Appendix B of the Program). The specific provisions that apply to the proposed project call for: (1) consulting with fish and wildlife managers during study design, construction, and operation of the project; (2) specific plans for fish measures prior to construction; (3) assurance that the project will not degrade fish habitat or reduce numbers of fish; (4) assurance all fish protection measures are fully operational at the time the project begins operation; (5) ensuring that the project would not degrade water quality beyond the point necessary to sustain fish species; (6) implementation of best management practices to reduce or eliminate erosion and sedimentation; and (7) replacing vegetation if natural vegetation is disturbed.

Our recommendations in this EA (sections 3.3.2 and 3.3.3) are consistent with the applicable provisions of the Program, listed above. Further, a condition of any license issued would reserve to the Commission the authority to require future alterations in project structures and operations to take into account, to the fullest extent practicable, the applicable provisions of the Program.

As part of the Program, the Council has designated over 40,000 miles of river in the Pacific Northwest region as not being suitable for hydroelectric development ("protected area"). The project is not located within a protected area.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR § 4.38) require 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, 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 small size and location of the proposed project primarily on private lands owned by the applicant, the close coordination with state and federal agencies

during the preparation of the application, and the public and agency review of the project under the previous license issued for this site, we waived public scoping.²

1.4.2 Interventions and Comments on the License Application

On April 4, 2012, the Commission issued a notice that Mr. Arkoosh had filed an application to license the Little Wood River Ranch Project. This notice set May 4, 2012, as the deadline for filing protests, motions to intervene, conditions and recommendations. On May 3, 2012, the State of Idaho filed a timely motion to intervene, not in opposition, and comments on behalf of the Idaho DEQ, the Idaho DFG, the Idaho Water Resource Board, and the Idaho State Board of Land Commissioners. On May 4, 2012, Interior filed a letter stating that it had no comments on the application.

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 and environmental resources in the project area would not be affected. The no-action alternative is the baseline from which we compare the proposed actions and action alternatives.

2.2 APPLICANT'S PROPOSAL

2.2.1 Project Facilities

The proposed Little Wood River Project would consist of: (1) a new 220-foot-long, 12-foot-high rock-rubble diversion dam that would impound a 9.1-acre reservoir on the Little Wood River; (2) a 3,900-foot-long feeder canal, which would convey the flows to a concrete intake structure having two parallel 5-foot-diameter, 120-foot-long steel penstocks; (3) a 60-foot-long, 20-foot-wide, 25-foot-high concrete and steel powerhouse containing two Francis turbines with a total installed capacity of 1.23 MW; (4) a 1,600-foot-long tailrace canal; (5) a 2.2-mile-long, 12.47-kilovolt transmission line; and (6) appurtenant facilities. The feeder canal, penstock, powerhouse, and tailrace would bypass an approximate 1.3-mile-long reach of the Little Wood River. Project facilities are shown in figure 1.

² The Commission issued a notice on April 4, 2012, stating that it intended to waive scoping for this project.

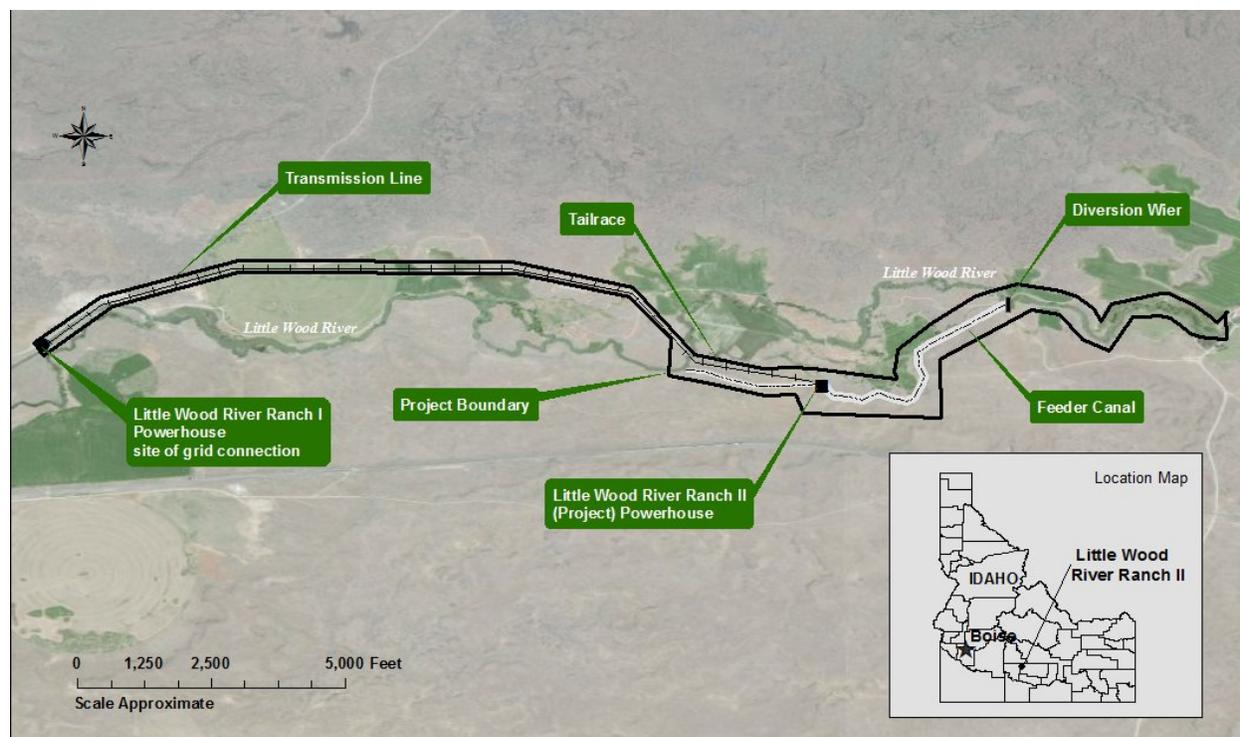


Figure 1. Location map and project features for the Little Wood River Ranch II Hydropower Project, FERC No. 14154-001 (Source: License application, as modified by staff).

Power from the project would interconnect with the existing Idaho Power grid at the powerhouse of the existing Little Wood River Ranch I project (P-7530), also owned by the applicant.³ The project would generate an estimated average of 5,323 megawatt-hours (MWh) annually.

The proposed project boundary encloses the project dam, the feeder canal, the powerhouse, the tailrace canal, an 80-foot corridor encompassing the transmission line, and 0.8 miles of the Little Wood River upstream of the project dam, which includes the project impoundment.

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

³ The Little Wood River Ranch I project received a 5-MW exemption from licensing on April 13, 1984.

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 the terms of the license, and proper maintenance.

2.2.3 Project Operation

The proposed project would operate run-of-river using the natural flow of Little Wood River. The project would divert up to 500 cubic feet per second (cfs) of flow from the river to a constructed open-channel feeder canal. Water would flow through this canal to an intake structure, which would channel the flow into two penstocks. These penstocks would direct flow to two Francis turbine/generator units. After passing through the turbines, the water would leave the powerhouse through a tailrace canal, which would return the water to the Little Wood River. The project would provide minimum flows of 10 to 55 cubic feet per second (cfs) to the approximately 1.3 miles of bypassed reach of the Little Wood River.

2.2.4 Proposed Environmental Measures

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

- Implement an Operational Compliance and Monitoring Plan that would include provisions for: (1) constructing a minimum flow release structure on the diversion to provide monthly minimum flows ranging from 10 to 55 cubic feet per second (cfs) to the 1.3-mile-long bypassed reach; (2) installing a continuous flow monitoring gage downstream of the project diversion in a location agreed upon by Idaho DFG to monitor minimum flow releases; and (3) recording forebay water elevations opportunistically to verify run-of-river operations.
- Implement an Environmental Features Design Plan with provisions for: (1) constructing the feeder and tailrace canals to have a velocity of 2 feet-per-second (fps) or less, to act as sediment settling ponds; (2) constructing a plunge pool below the project diversion structure, in consultation with Idaho DFG, to ensure compatibility with any future fish passage facilities; (3) constructing a log boom and ramp in the feeder canal to prevent big game entrapment; and (4) constructing the transmission line to protect raptors and monitoring the effectiveness of the design for three years after project construction.

- Implement a Riparian Habitat Improvement Plan (RHIP) with provisions for: (1) removing Russian olive trees and other non-native plant species along the bypassed reach of the Little Wood River to enhance native species growth; (2) planting native riparian vegetation along the bypassed reach to reduce solar heating and minimize erosion; and (3) installing fences with wildlife passage/water access gaps on applicant-owned lands along the bypassed reach to protect riparian vegetation from grazing cattle. Mr. Arkoosh would develop further details for implementing the RHIP, including a schedule, with Idaho DFG through a Habitat Improvement Plan agreement (HIP agreement).
- Implement an Environmental Monitoring Plan with provisions for: (1) long-term monitoring and control of noxious and invasive plant species; and (2) monitoring the results of the revegetation effort for five years.
- Properly dispose of excess soil material away from water to minimize sedimentation.

2.2.5 Modifications to Applicant’s Proposal –Mandatory Conditions

The following mandatory conditions have been provided by the Idaho DEQ and are evaluated as part of Mr. Arkoosh’s proposal.

Section 401 Water Quality Certification Conditions—Idaho DEQ

Idaho DEQ issued WQC for the proposed project on July 31, 2012. The WQC includes 8 general conditions that are standard, administrative, or legal in nature and not specific environmental measures. We therefore do not analyze these conditions in the EA. They include the following requirements: any modification of the permitted activity would be provided to Idaho DEQ for review to determine compliance with Idaho water quality standards; a reservation to modify, amend, or revoke the certification if Idaho DEQ determines that there is no longer reasonable assurance of compliance with water quality standards or other appropriate requirements of state law; notification of Idaho DEQ if ownership of the project changes; a copy of the 401 certification be kept on-site for review; project areas would be clearly identified in the field prior to initiating land-disturbing activities; access would be granted to Idaho DEQ personnel to all project and mitigation sites upon request; Mr. Arkoosh would be responsible for all work done by contractors and he must ensure they are aware of and follow all conditions of the certification; and, a Stormwater Construction General Permit must be obtained from the U.S. Environmental Protection Agency (EPA).

Environmental conditions stipulated by Idaho DEQ that are analyzed in this EA include the following:

Fill Material

1. Fill material shall be free of organic and easily suspendable fine material. The fill material to be placed shall include clean earth fill, sand, and stone only.
2. Fill material shall not be placed in a location or in a manner that impairs surface or subsurface water flow into or out of any wetland areas.
3. Placement of fill material in existing vegetated wetlands shall be minimized to the greatest extent possible.
4. All temporary fills shall be removed in their entirety on or before construction completion.
5. Excavated or staged fill material must be placed so it is isolated from the water edge or wetlands and not placed where it could re-enter waters of the state uncontrolled.

Erosion and Sediment Control

1. Best Management Practices (BMPs) for sediment and erosion control suitable to prevent exceedances of state water quality standards shall be selected and installed before starting construction at the site.
2. One of the first construction activities shall be placing permanent and/or temporary erosion and sediment control measures around the perimeter of the project or initial work areas to protect the project water resources.
3. Permanent erosion and sediment control measures shall be installed in a manner that will provide long-term sediment and erosion control to prevent excess sediment from entering waters of the state.
4. Permanent erosion and sediment control measures shall be installed at the earliest practicable time consistent with good construction practices and shall be maintained as necessary throughout project operation.
5. Top elevations of bank stabilization shall be such that adequate freeboard is provided to protect from erosion at 100-year design flood elevation.
6. Structural fill or bank protection shall consist of materials that are placed and maintained to withstand predictable high flows in the waters of the state.

7. A BMP inspection and maintenance plan must be developed and implemented. At a minimum, BMPs must be inspected and maintained daily during project implementation.
8. BMP effectiveness shall be monitored during project implementation. BMPs shall be replaced or augmented if they are not effective.
9. All construction debris shall be properly disposed of so it cannot enter waters of the state or cause water quality degradation.
10. Disturbed areas suitable for vegetation shall be seeded or re-vegetated to prevent subsequent soil erosion.
11. Maximum fill slopes shall be such that material is structurally stable once placed and does not slough into stream channels during construction, during periods prior to revegetation, or after vegetation is established.
12. To the extent reasonable and cost-effective, the activity submitted for certification shall be designed to minimize subsequent maintenance.
13. Sediment from disturbed areas or able to be tracked by vehicles onto pavement must not be allowed to leave the site in amounts that would reasonably be expected to enter waters of the state. Placement of clean aggregate at all construction entrances or exits and other BMPs such as truck or wheel washes, if needed, must be used when earth-moving equipment will be leaving the site and traveling on paved surfaces.

Turbidity

1. Sediment resulting from project construction must be mitigated to prevent violations of the turbidity standard as stipulated under the Idaho water quality standards. Any violations of this standard must be reported to the Idaho DEQ office immediately.
2. All practical BMPs on disturbed banks and within the waters of the state must be implemented to minimize turbidity during in-water work.
3. Containment measures such as silt curtains, geotextile fabrics, and silt fences must be implemented and properly maintained to minimize in-stream sediment suspension and resulting turbidity.
4. Turbidity monitoring must be conducted, recorded, and reported as described below. Monitoring must occur each day during project implementation. A properly and regularly calibrated turbidimeter is required.

A sample must be taken every hour at a relatively undisturbed area approximately 100-feet up-current from in-water disturbance or discharge to establish background turbidity levels for each monitoring event. Background turbidity, location, date, and time must be recorded prior to monitoring down-current.

Monitoring must occur every hour approximately 100-feet down-current from the in-water disturbance or point of discharge and within any visible plume. The turbidity, location, date, and time must be recorded for each sample.

Results from the compliance point sampling must be compared to the background levels sampled during each monitoring event. If the downstream turbidity exceeds upstream turbidity by 50 nephelometric turbidity units (NTU) or more, or 25 NTU for 10 or more consecutive days, then the project is causing an exceedance of the water quality standard. If an exceedance occurs, or there is evidence that an exceedance may be occurring (i.e. a plume is observed), the applicant must inspect the condition of the project BMPs. If the BMPs appear to be functioning to their fullest capability, then the applicant must modify the activity (this may include modifying existing BMPs).

5. Copies of daily logs for turbidity monitoring must be available to Idaho DEQ upon request. The log must include background measurements (in NTUs); compliance point measurements; comparison of background and compliance point monitoring as a numeric value (in NTUs); and location, time, and date for each sampling event. The report must describe all exceedances and subsequent actions taken, monitoring, and the effectiveness of the action.

In-Water Work

1. Work in open water is to be kept to a minimum and only when necessary. Equipment shall work from an upland site to minimize disturbance of waters of the U.S. If this is not practicable, appropriate measures must be taken to ensure disturbance to the waters of the U.S. is minimized.

2. Construction affecting the bed or banks shall take place only during low flow periods.

3. Fording of the channel is not permitted. Temporary bridges or other structures shall be built if crossings are necessary. Temporary crossings must be perpendicular to channels and located in areas with the least impact. The temporary crossings must be supplemented with clean gravel or treated with other mitigation methods at least as effective in reducing impacts. Temporary crossings must be removed as soon as possible after the project is completed or the crossing is no longer needed.

4. Heavy equipment working in wetlands shall be placed on mats or suitably designed pads to prevent damage to the wetlands.

5. Activities in spawning areas must be avoided to the maximum extent practicable.
6. Work in waters of the state shall be restricted to areas specified in the application.
7. Measures shall be taken to prevent wet concrete from entering into waters of the state when placed in forms and/or from truck washing.
8. Activities that include constructing and maintaining intake structures must include adequate fish screening devices to prevent fish entrainment or capture.
9. Stranded fish found in dewatered segments should be moved to a location (preferably downstream) with water.
10. To minimize sediment transport, stream channel or stream bank stabilization must be completed prior to returning water to a dewatered segment.

Pollutants/Toxics

1. The use of chemicals such as soil stabilizers, dust palliatives, sterilants, growth inhibitors, fertilizers, and deicing salts during construction and operation should be limited to the best estimate of optimum application rates. All reasonable measures shall be taken to avoid excess application and introduction of chemicals into waters of the state.

Vegetation Protection and Restoration

1. Disturbance of existing wetlands and native vegetation shall be kept to a minimum.
2. To the maximum extent practical, staging areas and access points should be placed in open, upland areas.
3. Fencing and other barriers should be used to mark construction areas.
4. When possible, alternative equipment should be used (e.g. spider hoe or crane).
5. If authorized work results in unavoidable vegetative disturbance, riparian and wetland vegetation shall be successfully re-established.

Dredge Material Management

1. Upland disposal of dredged material must be done in a manner that prevents the material from re-entering waters of the state.

Management of Hazardous or Deleterious Materials

1. Petroleum products and hazardous, toxic, and/or deleterious materials shall not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of waters of the state. Adequate measures and controls must be in place to ensure that those materials will not enter waters of the state as a result of high water, precipitation runoff, wind, storage facility failure, accidents in operation, or un-authorized third-party activities.
2. Vegetable-based hydraulic fluid should be used on equipment operating in or directly adjacent to the channel if this fluid is available.
3. Daily inspections of all fluid systems on equipment to be used in or near waters of the state shall be done to ensure no leaks or potential leaks exist prior to equipment use. A log book of these inspections shall be kept on-site and provided to Idaho DEQ upon request.
4. Equipment and machinery must be removed from the vicinity of the waters of the state prior to refueling, repair, and/or maintenance.
5. Equipment and machinery shall be steam cleaned of oils and grease in an upland location or staging area with appropriate wastewater controls and treatment prior to entering a water of the state. Any wastewater or wash water must not be allowed to enter a water of the state.
6. Emergency spill procedures shall be in place and may include a spill response kit (e.g. oil absorbent booms or other equipment).
7. Any spill less than 25 gallons must be cleaned up within 24 hours of the release but does not need to be reported to Idaho DEQ; any such not cleaned up within 24 hours needs to be reported.
8. Any spill greater than or equal to 25 gallons must be cleaned up within 24 hours of the release and reported to Idaho DEQ immediately.
9. Any release that causes sheen (of any size) in waters of the state must be reported immediately to the National Response Center and the Idaho State Communication Center.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include all of Mr. Arkoosh's proposed measures for the following: (1) controlling erosion and sedimentation; (2) operating the project as run-of-river; (3) implementing the Operational Compliance Monitoring Plan filed with the license application; (4) implementing the Environmental Features Design Plan filed with the application; and (5) implementing the Environmental

Monitoring Plan. Our alternative would not include Mr. Arkoosh's proposal to file the HIP agreement for Commission approval.

The staff alternative would include a provision for Mr. Arkoosh to file a more detailed RHIP for Commission approval instead of the HIP agreement. The RHIP filed by Mr. Arkoosh outlines the minimum provisions required to improve riparian habitat in the bypassed reach, but lacks sufficient details to implement the plan. The RHIP also describes the source of funding for the riparian improvements, which includes federal funds and cost-sharing agreements with Idaho DFG. While the Commission does not oppose such funding arrangements, implementation of the plan can not be contingent on acquiring these funds. Therefore, we recommend that a final RHIP be filed for Commission approval that contains a detailed description and specifications of the riparian habitat improvement measures (species, location, and amount of native plantings, fencing specification, etc.) and a schedule for implementing the measures.

The staff alternative would include all of the conditions of the WQC, with the exception of requiring Mr. Arkoosh to screen the project intake to prevent fish entrainment.

The staff alternative also includes three additional environmental measures: (1) develop and implement an ESCP that incorporates the erosion and sediment control measures of the WQC; (2) all of the Idaho DEQ water quality certification conditions for controlling and monitoring turbidity levels during construction, scheduling and minimizing in-water work to minimize adverse affects to wetlands and fisheries, moving fish from dewatered areas, limiting the use of pollutants and toxic chemicals such as soil stabilizers, dust palliatives, fertilizers, and deicing salts during construction and operation, minimizing disturbance of existing wetlands and native vegetation and restoring any such disturbed areas, disposing of dredged material in a manner that prevents the material from re-entering waters of the state, and implementing measures to manage and reduce the risk of spills of hazardous materials; and (3) notify the Commission, Idaho SHPO, and Indian Tribes of any unanticipated artifact discovery to protect any previously undiscovered cultural resources.

Proposed and recommended measures are discussed under the appropriate resource sections and summarized in section 4 of the EA.

2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

We recognize that the Commission is required to include valid WQC conditions in any license issued for the project. The Staff Alternative with Mandatory Conditions includes staff-recommended measures along with the mandatory condition to install a fish screen on the project intake. However, we do not feel this measure is necessary to protect fisheries resources at the project.

Incorporation of this mandatory condition into a new license would cause us to modify our environmental measures that we include in the Staff Alternative. These mandatory conditions includes a measure that we do not feel is necessary to protect fisheries resources in the project area.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We have not identified any other alternatives to Mr. Arkoosh's proposal.

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 described first, followed by the effects of the alternatives on the resources. 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 project is located on the Little Wood River, approximately six miles west of Shoshone, in Lincoln County, Idaho. The Little Wood River originates in the Pioneer Mountains, and flows approximately 130 miles down to its confluence with the Big Wood River, draining a 1,132-square-mile river basin. Water from the Little Wood River is an important source of irrigation water for the region.

Mountains and plateaus dominate the eastern and northern boundaries of the basin area. There are extensive and scattered areas of moderate relief including the vast Snake River Plain where the population, and the agricultural and industrial developments are concentrated. The area is mostly rural with construction, educational services, and agricultural, forestry, fishing and hunting, and mining as the main industries for Lincoln

⁴ Unless noted otherwise, the sources of our information are the license application (Arkoosh, 2011) and additional information filed by Mr. Arkoosh (2012a, 2012b, and 2012c).

County residents.⁵ The primary crops grown in Lincoln County are alfalfa, pasture, silage corn, wheat, oats, sugar beets, and potatoes.⁶ The livestock industry in Lincoln County is primarily dairy and beef cattle; additional livestock include sheep and swine.⁷

The climate in the region of the project is arid, with 10.97 inches of annual precipitation and 43.3 inches of snowfall each year, and midrange temperatures from 24.2 to 72 degrees Fahrenheit.⁸

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR § 1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the 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 analysis, we have identified no resources that would be cumulatively affected by licensing the Little Wood River Project. This project operates run-of-river, and bypasses a 1.3-mile-long reach of the Little Wood River in an area that is primarily used for agriculture.

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, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that geology and soils, water quality, aquatic, terrestrial, recreation, aesthetics, and cultural resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to land use or socio-economic resources associated with the proposed action, and therefore, these resources are not assessed in the

⁵ U.S. Census Bureau, 2012.

⁶ University of Idaho Extension, 2012.

⁷ *Id.*

⁸ Idaho DEQ, 2005.

EA. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geological and Soil Resources

3.3.1.1 Affected Environment

The proposed project is located along the Little Wood River in undeveloped range land that consists of an overstory of big sagebrush, rabbit brush, and bitter brush, with an understory of grasses. The density of the vegetation is restricted by basalt outcrops and livestock grazing. The area of the project is characterized by parent material of loess and basalt, overlain by loams, silty loams, sandy loams, and sandy clay loams.⁹

In the area of the diversion, the soils are classified as a Burch-Quencheroo-Dryck complex, with 0-2 percent slope range. The soil is primarily loam and silty loams with parent materials of mixed alluvium and bedrock. The area of the feeder canal and penstocks are primarily classified as Burch-Quencheroo-Dryck, Ackelton-Jestrick-Rock outcrop complex, and Starbuck-Sidlake-Rock outcrop complex. The Ackelton-Jestrick-Rock outcrop complex consists of predominantly loamy soils over duripan and bedrock derived from volcanic rock, and exposed rock outcrops. Starbuck-Sidlake-Rock outcrop complex consists of loamy soils overlaying bedrock derived from volcanic rock. Soils in the area of the transmission line are similar to those found in the area of the feeder canal and penstock, with basalt outcrops a dominant feature.

3.3.1.2 Environmental Effects

Land-disturbing activities associated with the proposed project construction, operation, and maintenance could cause erosion and sedimentation. To minimize erosion and sedimentation, Mr. Arkoosh proposes to: (1) design the impoundment and tailrace canal to have a velocity of 2 fps to trap suspended sediment; (2) reseed disturbed areas with native plant and grass species following construction; and (3) properly dispose of excess soil material away from open or flowing water.

Idaho DFG recommends the applicant's proposed measures. However, Idaho DEQ defined specific measures to control or minimize erosion as part of the WQC.

Our Analysis

Due to the semi-arid conditions and the basalt outcrops, erosion potential in the area of the proposed project is low; however, land-disturbing activities associated with the proposed project construction and operation could cause erosion and sedimentation.

⁹ NCRS, 2012

Mr. Arkoosh's proposed revegetation efforts would minimize erosion if applied timely, and properly disposing of soils in upland areas would minimize erosion and deposition in waters. However, designing the impoundment and tailrace to capture sediments would primarily serve to capture sediments from other sources or from site construction if erosion control was not successful. In support of these measures, Mr. Arkoosh reports that the impoundment of the Little Wood River Ranch I project, located on the Little Wood River approximately 2 miles downstream of the proposed project, has trapped between 57,000 and 67,000 cubic yards of sediment in 23 years of operation. An additional 750 to 1,000 cubic yards of sediment has been trapped in the low-velocity tailrace canal at the Little Wood River Ranch I project. The river gradient, impoundment size, hydroelectric capacity, and soil conditions for the new project are similar to the existing Little Wood River Ranch I project; therefore, it is expected that the impoundment proposed for the Little Wood River Ranch II Project would also serve as a significant sediment trap and the new feeder canal would create an additional, though smaller sediment trap than the impoundment.

The WQC includes 13 erosion and sediment control measures, including provisions for selecting BMPs for sediment and erosion control, installing erosion and sediment controls before beginning project construction, installing and maintaining permanent erosion and sediment controls, stabilizing project banks to protect from high flows, developing and implementing an inspection and maintenance plan to monitor effectiveness of the erosion and sediment control measures, disposal of construction debris, revegetating disturbed areas, stabilizing fill slopes to prevent erosion, selecting erosion control measures that will minimize subsequent maintenance, and preventing significant amounts of sediment to leave the site that may enter waters of the state. These measures would help ensure that erosion and sedimentation due to project construction and operation would be minimized.

The measures proposed by Mr. Arkoosh would help control erosion and sedimentation; however, the measures lack specific detail. Therefore, Mr. Arkoosh should develop and file for Commission approval a comprehensive ESCP that incorporates the WQC conditions. These measures would adequately control erosion from land-disturbing activities. This plan would be developed in consultation with Idaho DFG, Idaho DEQ, and FWS.

3.3.2. Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

The natural hydrograph of the Little Wood River consists of peak flows from snowmelt during the late spring months and low flows during the late summer months of August and September. However, current discharge patterns in the project area are substantially altered by irrigation flows. During the summer, the Big Wood Canal Company diverts approximately 200 to 400 cfs of water from the Snake River via the Milner-Gooding Canal to the Little Wood River approximately 6 miles upstream of the proposed project. Discharge data collected at U.S. Geological Survey (USGS) gage number 13151500 on the Little Wood River near Shoshone, ID indicates that the historical mean annual discharge near the proposed project site is approximately 280 cfs. Discharge from May to late September typically ranges between 300 and 450 cfs, and flows during the remainder of the year typically range between 50 and 150 cfs.

Water Quality

In the proposed project area, the Little Wood River has been designated by Idaho DEQ as a water quality limited segment.¹⁰ This designation is based on the stream segment not currently meeting its beneficial uses for cold water biota, salmonid spawning, primary and secondary contact recreation, and agricultural water supply. This designation is primarily attributable to excess sediments, nutrients, temperature, and bacteria.

Fisheries Resources

In the proposed project area, the Little Wood River is primarily a warmwater fishery. Fish species inhabiting the Little Wood River in the project area include carp, redbreast shiner, smallmouth bass, bridgelip sucker, and brown bullhead. Idaho DFG stated that the lower reaches of the Little Wood River (i.e., the proposed project area) provide marginal spawning and summer rearing habitat for native salmonids (i.e., trout).¹¹ Idaho DFG indicated that the loss of habitat from development of floodplain areas, irrigation diversions, livestock grazing, and hydropower development has adversely affected fish habitat and native trout populations within the lower reaches of the Little Wood River. Brown trout and rainbow trout have been collected in the Little Wood River upstream of the proposed project area and likely occur on occasion within the project area during non-summer months.

¹⁰ Section 303(d) of the Clean Water Act, 16 U.S.C. §1313(d).

¹¹ Letter filed as part of the application for license filed by the applicant under the previous licensing procedure for P-12063.

Idaho DFG manages the Little Wood River from the mouth to the Milner-Gooding Canal as a warmwater fishery, with smallmouth bass as the primary game fish. Idaho DFG indicates that if habitat conditions in the lower reaches of the Little Wood River improve, it may change its management vision to promote salmonid fisheries.

3.3.2.2 Environmental Effects

Water Quantity

Construction and operation of the proposed project would reduce flows within a 1.3-mile-reach of the Little Wood River bypassed by the feeder and tailrace canals. The applicant proposes to implement an Operational Compliance and Monitoring Plan that would provide the minimum flows presented in Table 2 in the bypassed reach. The applicant would use the U.S. Department of Agriculture's Surface Water Supply Index (SWSI)¹² as the basis for establishing the appropriate minimum flow. During wet, normal, and slightly dry years (SWSI values greater than -2 as of April 1), the minimum flows would range 13 cfs to 55 cfs depending on the month. During dry years (SWSI values between -2 and -3 as of April 1), the minimum flow would be no less than 13 cfs at all times. During extremely dry years (SWSI values of -3 or less as of April 1), the minimum flow would be no less than 10 cfs at all times.

The applicant would install a continuous flow monitoring gage downstream of the project diversion at a location agreed upon by Idaho DFG to monitor compliance of minimum flow releases in the bypassed reach. Additionally, the applicant would record forebay water elevations on an opportunistic basis to ensure run-of-river operations.

Idaho DFG and Idaho DEQ recommend the minimum flow regime proposed by the applicant.

Our Analysis

The best available data for estimating flows at the proposed project site are from USGS gages at Shoshone (8 miles upstream) and Richfield (26 miles upstream). Flows at Shoshone were collected from 1922 to 1959 and flows at Richfield were collected from 1911 to 1972. Both periods of record include a substantial number of missing data, especially during the winter months. However, due to the long period of records, enough winter data were collected to make reasonable estimates of winter flows.

¹² The SWSI uses non-exceedance probabilities to normalize the magnitude of water supply variability between basins. The non-exceedance values are then re-scaled to range from +4.1 (extremely wet) to -4.1 (extremely dry). A SWSI value of 0.0 indicates a median water supply as compared to historic occurrences.

Table 2. Monthly minimum flows proposed for the Little Wood River Ranch II Hydroelectric Project bypassed reach (Source: applicant).

Month	Minimum Flow (cfs)		
	Baseline Minimum Flow SWSI > -2	SWSI \leq -2 and \geq -3	SWSI < -3
January	13	13	10
February	13	13	10
March	13	13	10
April	42	13	10
May	55	13	10
June	48	13	10
July	35	13	10
August	36	13	10
September	36	13	10
October	13	13	10
November	13	13	10
December	13	13	10

During portions of the year, flow measurements at Shoshone are higher than natural flows within the Little Wood River because they include water conveyed from the Snake River via the Milner-Gooding Canal. While there may be some agricultural withdrawals or additions between Shoshone and the project site, measurements at Shoshone are the best data available for estimating existing flows within the project area. Table 3 shows the mean monthly flows at Shoshone and our extrapolated estimate of these flows at the project.

Estimated average existing flows at the project site without the diversion would range from 66 cfs to 413 cfs depending on the month with a monthly mean of 233 cfs. On an annual basis, the proposed wet to slightly dry year minimum flows would range from 13 cfs to 55 cfs depending on the month with a mean of 28 cfs. During dry years, the minimum flow would be 13 cfs and during very dry years it would fall to 10 cfs.

Flows at Richfield are measured upstream of the confluence with the Milner-Gooding Canal; therefore, these flows provide a better estimate of natural flows at the project site. Table 4 shows the mean monthly flows at Richfield and our extrapolated estimate of what natural flows would be for the project area.

Estimated average natural flows at the project site without the project diversion would range from 111 cfs to 268 cfs depending on the month, with a mean of 173 cfs. Minimum flows provided from the project would be the same as previously described.

Table 3. Measured monthly discharge at Shoshone, estimated discharge at the project site, and the proposed minimum flows (Source: USGS, applicant, and staff).

Month	Discharge at Shoshone (cfs)	Estimated existing discharge at the Project Site (cfs) ¹³	Minimum flow – wet to slightly dry year (cfs)	Minimum flow- dry year (cfs)	Minimum flow – very dry year (cfs)
SWSI score			> -2	≤ -2 and ≥ -3	< -3
January	123	127	13	13	10
February	146	151	13	13	10
March	150	155	13	13	10
April	196	202	42	13	10
May	380	392	55	13	10
June	400	413	48	13	10
July	381	393	35	13	10
August	353	364	36	13	10
September	282	291	36	13	10
October	63.6	66	13	13	10
November	106	109	13	13	10
December	133	137	13	13	10
Annual mean	267	233	28	13	10

Based on flows measured at Richfield between 1911 and 1972, we estimate that there would have been about 5 days where the estimated natural flows at the project site would have been 13 cfs or lower. The data measured at Shoshone from 1922 to 1959 indicate that existing flows at the project site would have been 13 cfs or lower on 24 days. The all time low flow estimated at the project site based on Richfield data would be 9 cfs. Based on Shoshone data, the-all time low flow at the project site is estimated to be 1 cfs. The data presented above indicate that the 13 cfs and 10 cfs proposed minimum flows are relatively rare flows under both natural and existing conditions.

¹³ The watershed area of the Little Wood River at Richfield is 570 square miles (mi²) and it is 620 mi² at Shoshone. Based on the 50 mi² increase in watershed size from Richfield to Shoshone which is approximately 18 river miles, we extrapolated a watershed size of approximately 640 square miles for the project site 8 river miles downstream of Shoshone. We then developed a flow adjustment factor to estimate flows in the project area based on flows at Richfield and Shoshone. For Richfield, the flow adjustment factor was $640/570 = 1.123$. At Shoshone the flow adjustment factor was $640/620 = 1.032$.

Table 4. Measured monthly discharge at Richfield, estimated discharge at the project site, and the proposed minimum flows (Source: USGS, applicant, and staff).

Month	Discharge at Richfield (cfs)	Estimated natural discharge at the Project Site (cfs)	Minimum flow – wet to slightly dry year (cfs)	Minimum flow- dry year (cfs)	Minimum flow – very dry year (cfs)
SWSI score			> -2	≤ -2 and ≥ -3	< -3
January	142	159	13	13	10
February	149	167	13	13	10
March	179	201	13	13	10
April	239	268	42	13	10
May	199	223	55	13	10
June	152	171	48	13	10
July	102	115	35	13	10
August	99	111	36	13	10
September	124	139	36	13	10
October	149	167	13	13	10
November	161	181	13	13	10
December	156	175	13	13	10
Annual mean	154	173	28	13	10

In developing a method for establishing a minimum flow for protection of aquatic resources, Tennant (1976) suggested that 10 percent of the average annual flow is the minimum instantaneous flow to sustain short-term survival habitat for most aquatic resources. The average of the monthly minimum flow proposed by the applicant for wet to slightly dry years is 28 cfs which corresponds to 12 and 17 percent of the average annual flows under current and natural flow conditions, respectively. During dry years, the proposed minimum flow would be 13 cfs, which corresponds to 6 and 8 percent of the average annual flows under current and natural flow conditions, respectively. During very dry years, the proposed minimum flow would be 10 cfs, which corresponds to 4 and 6 percent of the average annual flows under current and natural flow conditions, respectively.

Under all three of these minimum flow scenarios, the amount of water in the bypassed reach would be greatly reduced compared to existing flows. We do not expect the reductions to have a significant effect on the aquatic habitat and the fish community it supports because current aquatic habitat conditions at the project are limited by high sedimentation and turbidity levels, high nutrient levels, and elevated water temperatures.

Changes in available flow would have minor effects on sedimentation, turbidity, or nutrient levels; therefore, these limiting factors would remain poor and unchanged.

Further, we would expect that a reduced flow within the bypassed reach would not significantly affect carp, redbreast shiners, brown bullhead, or smallmouth bass inhabiting this area. These species are habitat generalists capable of tolerating degraded conditions. We would expect no significant effects on these species from a reduction of wetted area.

The applicant's proposal to install a continuous flow monitoring gage downstream of the project diversion in a location agreed upon by Idaho DFG would be sufficient for compliance monitoring of minimum flow releases. Additionally, the applicant's proposal to record forebay water elevations on an opportunistic basis would ensure run-of-river operations.

Water Quality

The proposed project has the potential to increase water temperatures in the Little Wood River. The applicant proposed to plant native riparian vegetation along the project reach which could influence thermal loading of the Little Wood River. The proposed project also has the potential to increase erosion during construction; however, the applicant indicates that once it is constructed the project impoundment and the feeder and tailrace canals would trap some of the sediment load of the Little Wood River. The applicant proposes to periodically remove accumulated sediments from the canals. Additionally, the applicant proposes to plant native riparian vegetation along the riverbed.

Idaho DFG and Idaho DEQ recommend the applicant's proposed measures. In addition, Idaho DEQ issued a WQC for the project that includes 10 measures that the applicant must implement during construction and operation to reduce the risk of spills of hazardous materials in the project area, and 37 measures the applicant must implement during construction and operation to reduce erosion and sedimentation in the project area. These measures provide limitations and conditions for the handling, storing, and use of hazardous materials, how all fill and dredge material is to be handled, require the use of best management practices (BMPs) to reduce project related erosion and sedimentation, require daily turbidity monitoring, provide limitations on how in-water work is to be conducted, and require vegetation protection and restoration. The conditions on the WQC are listed in Section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

Our Analysis

The construction and operation of the proposed project could influence water temperatures through removal of riparian vegetation during construction, increased water

surface area and reduced velocities within the project impoundment, and reduced flows within the bypassed reach. During construction of the proposed project, riparian vegetation would likely be removed as part of the construction of the diversion dam. Removal of this vegetation would reduce shading along the river margins and increase exposure to solar radiation. This increased exposure to solar radiation would result in some, albeit minor, increase in the water temperature of the Little Wood River.

The creation of the 9.1-acre impoundment upstream of the diversion dam would increase surface area of the Little Wood River and decrease water velocities within that section of the river. We do not expect any thermal stratification to occur within the shallow impoundment (i.e., less than 10 feet deep); however, the combination of increased surface area and reduced velocities would increase thermal loading through increased exposure to solar radiation and warm air temperatures at that location. Any warming that occurs within the impoundment would be conveyed to areas downstream via the power canal or bypassed reach.

Diversion of flow to the power canal would reduce flows within the bypassed reach, thereby reducing velocities and the volume of water within the bypassed reach. Reducing velocities and the volume of water passing through the bypassed reach would increase thermal loading within that reach of the river and water temperatures within the bypassed reach would be elevated when compared with existing flow conditions. Downstream of the project, the effects of the minimum flows on water temperature would be less significant since any increase in water temperature would be diluted by the cooler water returning via the tailrace canal.

Cumulatively, all of these factors would result in a net increase of water temperatures within the project area and areas downstream.

The applicant proposes to plant native species in riparian areas within the bypassed reach and upstream of the proposed project. Planting trees and shrubs along the bypassed reach and above the diversion would eventually increase shading as the plantings mature, reducing thermal loading and offsetting potential elevated water temperatures from the project diversion. The fish community would also benefit from the reduced temperature and additional cover.

The measures addressing the spill of hazardous materials during project construction and operation that are required by the WQC would minimize the risk of spill of hazardous substances and would protect water quality in Little Wood River and its fish populations.

The proposed project would require construction of a diversion dam, a feeder canal, an intake structure, penstocks, a powerhouse, a switchyard, and a tailrace canal. Construction of the diversion dam would include placement of rip-rap and rock rubble in

and along the streambed and formation of several concrete structures, including a flow bypass with slide gates, an intake to the feeder canal with slide gates, a concrete walkway, a divider wall, and a wing wall downstream of the bypass. These construction activities would disrupt the streambed and result in some temporary increases in turbidity downstream of the construction area; however, implementing the erosion and sediment control measures that are required by the WQC would reduce these effects. Managing the timing and implementation of all of the erosion and sediment control measures would best be accomplished through the development of a comprehensive ESCP.

Construction of the penstocks, powerhouse and switchyard would disturb approximately 0.15 acres of soil during construction. Construction of the feeder and tailrace canals would require disturbance of approximately 7.5 and 5.9 acres of soil surface, respectively. None of this construction would require in-water work, so during construction, erosion would primarily only occur as a result of surface runoff from rain events. Although rain events are likely, without implementation of the BMPs required by the WQC, such surface flow could temporarily (i.e., while surface runoff is occurring) increase sedimentation and turbidity of the Little Wood River within the project area and areas downstream.

Initial flows passed through the feeder and tailrace canals would incorporate fine sediments from these disturbed areas and would increase sedimentation and turbidity of the Little Wood River downstream of the project area. However, because most of the canal construction would consist of excavation of bedrock, we would expect that the canal channels would stabilize quickly and increased turbidity levels from initial startup would dissipate within several hours to several days.

After initial start-up, project-related erosion throughout the project area would decrease due to stabilization through soil settling and revegetation.

The applicant has suggested that in addition to the impoundment trapping sediment, the feeder and tailrace canals would be designed to have low velocities and would act as settling areas. The applicant indicates he would periodically remove any accumulated sediments from the impoundment and canals. This would result in a net decrease in the sediment load in the project area when compared to current conditions. These measures, in addition to the use of erosion and sediment control measures during construction and operation, would be protective of the fish populations in the Little Wood River.

Fisheries Resources

The applicant proposes to implement an Environmental Features Design Plan that would include provisions for the design and construction of a plunge pool below the

project diversion structure in consultation with Idaho DFG to ensure the project would be compatible with any future requirements to construct fish passage facilities.

Idaho DFG recommends the applicant's proposed measures. In addition, the WQC issued by Idaho DEQ requires screening the project intake and the collection and transport of fish that become stranded due to de-watering during project start-up.

Our Analysis

The proposed project could affect both upstream and downstream fish movements. The proposed diversion structure would span the main channel of the Little Wood River and would not include any upstream fish passage facilities. The diversion structure would be a barrier to upstream fish movements and fish inhabiting the bypassed reach or areas downstream would be unable to access areas upstream of the proposed project.

There are no anadromous fish in the project area. However, of the species known to inhabit the proposed project area, smallmouth bass, suckers, and chubs (as well as occasional brown and rainbow trout) are the species most likely to attempt to move upstream of the proposed project location. Information contained within the application suggests that habitat below the site of the proposed diversion structure is similar to habitat immediately upstream of this site. Additionally, we have no evidence to indicate that any of the fish populations within the project area are maintained or supported as a result of migrations (spawning or otherwise) or movements into upstream habitats. Because no unique or necessary habitat for the species present in the project area has been identified upstream of the proposed project and none of these species are known to make long distance spawning migrations within the Little Wood River, blocking upstream passage should not result in any significant change in the relative abundance of these species.

Fish moving downstream and approaching the diversion structure could access areas downstream of the project by passing through the bypassed reach or by passing through the feeder and tailrace canal. Passage into the bypassed reach would occur via the minimum flow releases or any spilled flows. These flows would be released through a 10-foot-wide by 8-foot-high gate on the diversion structure. Spill flows and minimum flows during non-drought summers (35-55 cfs) would likely create a plunge area several feet deep below the discharge gate. We would expect that under these flows conditions, fish survival while passing through the spill gate and plunging roughly 7-8 feet into the plunge pool would be high and there would be little mortality or injury. During releases of 13 cfs or 10 cfs to the bypassed reach there would be a shallower plunge depth below the spill gate (possibly less than 2 feet deep) and a greater chance for some mortality or injury of fish to occur.

To prevent mortalities from a shallow plunge pool, the applicant could include design features in the plunge pool that would ensure adequate plunge depth (greater than 2 feet deep) at all flows. This may include a small amount of bedrock excavation below the project spillway or construction of a small concrete or rubble weir feature to create some ponding of water below the spill area. The applicant's proposal to design the plunge pool in consultation with Idaho DFG would ensure that the plunge pool incorporates any necessary features for fish protection.

Fish survival through the feeder and tailrace canals would likely be relatively high and there would be little or no injuries or mortalities occurring within these project features. However, passage through the penstocks and turbines would likely result in some mortality and injury to fish. EPRI (1992) estimates that fish mortality for Francis turbines with approximately 45 feet of head at 10-20 percent mortality; however, this was based on pooled data for a variety of species and did not account for variation in survival among species. Of the species likely to be entrained within the Little Wood River, survival of trout, suckers, and chubs would likely be around 80 percent. EPRI (1992) suggests that survival of smallmouth bass would be greater than for the other species, approaching 90 percent.

Idaho DFG indicates that the Little Wood River from Shoshone to the confluence with the Big Wood River is managed as a warm water fishery and the management direction for this reach is to maintain a smallmouth bass fishery. Due to the low abundance of native trout within the proposed project area, it is likely that few of these fish would be entrained by the proposed project and few fish would be lost to turbine mortality. Given the expected high survival rate of smallmouth bass (50 percent or better), project operation should not adversely affect Idaho DFG's ability to manage the Little Wood River as a warm water smallmouth bass fishery.

In the WQC, Idaho DEQ requires that the applicant salvage stranded fish in the bypassed reach found in dewatered segments upon project start-up. This would ensure that any fish that are stranded in dewatered segments would survive and not be affected by project operation.

Also in the WQC, Idaho DEQ requires that the applicant screen the project intake structures to prevent fish entrainment. However, the Idaho DEQ does not specify what type of screening is required or describe the bar spacing. Without more specificity, we are unable to analyze the effectiveness or the cost of the required screen.

3.3.3. Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

The project area receives approximately ten inches of precipitation annually that supports semi-arid vegetation. Two clearly defined natural vegetation types occupy the area: (1) riparian vegetation in a narrow zone along the Little Wood River; and (2) a sagebrush-grass association throughout the uncultivated upland areas on both sides of the river. Several small agricultural fields are also located in bottom lands along the Little Wood River. These fields are used to raise crops such as corn, wheat, or hay, and to pasture cattle. Riparian vegetation along the Little Wood River consists of willows, cattails, a variety of grasses and forbs, and some non-native species, such as Russian olive (*Elaeagnus angustifolia*). The riparian corridor varies in width from 0-45 feet along each bank of the Little Wood River. The overall quality of the riparian zone in the project area is degraded due to long-term adverse impacts from livestock grazing.

The sagebrush-grass associations consist of an overstory of big sagebrush, rabbit brush, and bitter brush, with an understory of cheatgrass, Sandberg's bluegrass, bluebunch wheatgrass, Thurber's needlegrass, bottlebrush squirreltail, and various other annual and perennial forbs. The density of the dry-land vegetation is severely restricted by basalt outcrops and livestock grazing.

In July 2010, Mr. Arkoosh conducted a vegetation survey on the two BLM parcels potentially affected by the project. BLM Parcel 1 consisted of upland and riparian habitats and BLM Parcel 2 contained upland habitat. Four species of noxious weeds were found in the two parcels. Russian knapweed (*Acroptilon repens*), Russian olive, and Scotch thistle (*Onopordum acanthium*) were found in BLM Parcel 1. BLM Parcel 2 contained diffuse knapweed (*Centaurea diffusa*).

A list of special status plants with the potential to occur in the project area was compiled based on consultation with BLM. A botanical survey was conducted in July 2010. No state or federally-listed threatened, endangered or candidate plant species were found during the survey.

Wildlife

The project area has not changed significantly since it was last surveyed in 1983. Wildlife resources include large and small mammals, reptiles, waterfowl, raptors, game birds and a variety of songbirds. Mule deer are fairly common in the project area and frequent the riparian, rangeland, and cultivated habitats. Pronghorn antelope also occupy the rangelands of Lincoln County and could visit the project area. Mule deer and antelope would most likely visit the project area during winter to escape the deeper snow cover of higher elevations.

3.3.4.2 Environmental Effects

Mr. Arkoosh proposes to implement mitigation measures that would adhere to the measures and plans included in the Environmental Features Design Plan, the Riparian Habitat Improvement Plan, and the Environmental Monitoring Plan, filed with the Commission on April 24, 2012.

Terrestrial measures within the Environmental Features Design Plan would include: (1) designing a raptor-proof transmission line that incorporates the most current guidelines;¹⁴ (2) conducting avian surveys for three years after transmission line construction to monitor for adverse effects; and (3) installing a log boom and egress ramp in the feeder canal immediately upstream of the powerhouse intake to prevent wildlife entrapment within the project facilities.

Terrestrial measures within the RHIP would include: (1) removing invasive Russian olive tree within the riparian improvement area; (2) revegetating riparian areas disturbed by project construction with perennial vegetation as recommended by Idaho DFG; and (3) constructing approximately 2.6 miles of perimeter fence enclosing the riparian improvement area according to Idaho DFG specifications. In addition, Mr. Arkoosh would develop further details for implementing the RHIP, including a schedule, with Idaho DFG through a HIP agreement.

Terrestrial measures included in the Environmental Monitoring Plan include: (1) conducting surveys to monitor revegetation efforts in the Little Wood River riparian zone within the project reach for five years following the beginning of project operations; and (2) conducting noxious weed surveys one year and five years after the beginning of project operations. The noxious weed surveys would be conducted according to the specifications recommended by Idaho State Department of Agriculture Northside Tri-Counties Cooperative Weed Management Area. The results of the surveys under the Environmental Monitoring Plan would be compiled into a report and submitted to Idaho DFG, Idaho DEQ and the Commission.

¹⁴ The license application states that Mr. Arkoosh will construct the transmission line using “avian protection standards pursuant to *Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996* or other current standard recommended by wildlife agencies.” (See LA at 20). The referenced document was updated in 2006 by the Avian Power Line Interaction Committee (APLIC). By correspondence to Nick Josten dated August 25, 2011, Dwayne Winslow (FWS) provided the citation to the most recent APLIC guidelines, issued in 2006 (See FLA Appendix A - Consultation Documents). Staff assume that this most recent edition of the suggested practices will be used in the design and construction of the proposed transmission line.

Idaho DFG recommends the applicant's proposed measures, and Commission staff believe they will be adequate to protect terrestrial resources in the project area.

Our Analysis

Environmental Features Design Plan

This plan is designed to afford protective measures to both aquatic and terrestrial resources, which may be affected by the project. Designing and constructing the transmission line in accordance with the current APLIC guidelines would minimize the risk of avian collisions and electrocutions. In addition, Mr. Arkoosh would conduct avian collision surveys for the first three years post-construction, beginning with the first spring or fall avian migration period to occur after transmission poles and lines have been erected. Surveys would utilize a simplified survey form developed with FWS, and would occur from mid-March through April, and in September. If the survey results show a significant level of avian mortality events, Mr. Arkoosh would coordinate with the FWS to implement cost-effective mitigation measures to reduce the risk of collision, which may include the installation of flight diverters. The proposed surveys would allow FWS and the Commission to evaluate the effectiveness of the measures and determine if additional, cost-effective measures are needed.

These measures would be protective of avian species and wildlife in the project area.

Riparian Habitat Improvement Plan

Russian olive trees and other invasives out compete native vegetation and reduce the quality of wildlife habitat. Removal of the invasive Russian olive tree and non-native shrubs will prevent their spread within the project area. Revegetating the area with native species and installing the 2.6-mile perimeter fence around the improvement area would enhance the riparian habitat within the project area. The measures included in the RHIP would adequately protect and enhance the riparian habitat within the project area.

The perimeter fence, installed to protect riparian vegetation from livestock grazing, would include at least two gaps to allow wildlife movement through and across the bypassed reach for Little Wood River, and access for drinking water. The log boom and egress ramp would prevent wildlife from becoming entrained in the project facilities.

The applicant proposes to develop the HIP agreement in cooperation with Idaho DFG to identify measures that would be consistent with Idaho DFG's ongoing habitat improvement efforts, and would include a cost-sharing agreement for the implementation of some measures. The HIP agreement would contain additional details on how the measures included in the RHIP would be carried out and a schedule for implementing

those measures. In addition, while the Commission does not oppose such funding arrangements, cost sharing cannot be enforced in a license as it is the licensee's responsibility to implement all measures included in any license issued. Such details should be provided for Commission review and approval before implementing the plan. The revised RHIP should include, at a minimum, the distance from the bypassed reach of the Little Wood River that Russian olive trees will be removed, the location and type of vegetation to be planted along the bypassed reach of the Little Wood River, and the construction specifications of the fencing to be installed around the bypassed reach of the Little Wood River, including the location of any wildlife gaps.

Environmental Monitoring Plan

Mr. Arkoosh would monitor the riparian vegetation to ensure that the area revegetated with native plants is adequately established in the riparian improvement zone and that the effort to remove Russian olive is successful. The Environmental Monitoring Plan includes a survey for noxious weeds in year one and year five following the commencement of project operations. We find that these monitoring efforts would be adequate to assess the effects of project construction, operation, and maintenance on riparian vegetation in the project boundary.

3.3.4. Threatened, Endangered, and Sensitive Species

In a letter filed with the Commission on April 26, 2012, the FWS provided a list of federally threatened, endangered, and candidate species that may occur within the proposed project area. FWS stated that there are no threatened or endangered species that occur in Lincoln County. There are two candidate species, the wolverine (*Gulo gulo*) and the greater sage-grouse (*Centrocercus urophasianus*), which may occur in Lincoln County; however, FWS stated that there is insufficient habitat within and around the Project area to support these species, and therefore it is unlikely that the wolverine and greater sage-grouse are present.

In their comments, terms, and conditions, Idaho DFG stated that there are no state-listed critical habitats in or near the project area. The pygmy rabbit (*Brachylagus idahoensis*), a Species of Greatest Conservation Need in Idaho, occurs in sagebrush habitats similar to those found in the project area; however, no occurrences within the project area have been reported to Idaho DFG.

We conclude, based on the lack of suitable habitat in the project area, that the project will have no affect on threatened, endangered, or sensitive species or their habitats.

3.3.5. Recreation and Land Use

3.3.5.1 Affected Environment

The project site, occupying mostly private land and 3.3 acres of BLM land, offers few recreational resources. The proposed project area is located in a remote area primarily used for grazing and agriculture. There are no known recreational resources on the BLM land within the project boundary, although occasional hunting or other dispersed recreation use is possible. Hunting for upland birds and ducks occurs on the private land within the project area with landowner consent. There are no public recreation sites or any known motorized or non-motorized trails in the immediate project area. The closest trail to the project area is a utility terrain vehicle trail approximately 2.5 miles south of the project boundary.¹⁵ Idaho DFG manages the project reach of the Little Wood River as a warm water fishery, though there is little opportunity to sport fish along this reach. Degraded water quality discourages swimming and other water contact sports. The project area does not appear favorable for boating.

3.3.5.2 Environmental Effects

The proposed project construction could disturb wildlife and vegetation, which may negatively affect bird hunting and sport fishing; however, these activities occur infrequently in the project area.

No specific concerns relating to hunting, fishing or other recreation opportunities were expressed by agencies or other interested parties during project consultation.

Our Analysis

We do not anticipate that the proposed project will have a significant effect on recreation resources in the project area. Staff recognize installing the 2.6-mile perimeter fence around the riparian improvement area to protect riparian habitat may impede public access for recreational use (such as bird hunting). However, the proposed riparian improvement area would include at least two gaps in the fencing that may, with landowner permission, allow access through the riparian improvement area. Such access could potentially accommodate recreational use, including bird hunting, where appropriate. The proposed reservoir would be small and provide little opportunity for recreational use. Since access is restricted, and the existing sport fishing resource is small, we believe that few recreationists use the area and that the project's impact on these resources will not be significant.

¹⁵ State of Idaho Department of Parks and Recreation, 2012.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA, as amended (section 106), requires the Commission to evaluate potential effects on properties listed or eligible for listing in the National Register prior to an undertaking. An undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including, among other things, processes requiring a federal permit, license, or approval. In this case, the undertaking is the proposed issuance of an original license for the project. Potential effects associated with this undertaking include project-related effects associated construction or with the day-to-day operations and maintenance of the project after issuance of an original license.

Historic properties are cultural resources listed or eligible for listing on the National Register. Historic properties represent things, structures, places, or archeological sites that can be either Native American or Euro-American in origin. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources also have to have enough internal contextual integrity to be considered historic properties. For example, dilapidated structures, heavily disturbed archeological sites, and isolated artifacts, may not have enough contextual integrity to be considered eligible.

Section 106 also requires that the Commission seek concurrence with the Idaho State SHPO on any finding involving effects or no effects on historic properties, and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of adverse effects on historic properties.

Cultural Resource Investigations and Cultural Resources Identified¹⁶

The project area lands have long been disturbed by land clearing and crop planting, as well as grazing animals and irrigation ditch construction. As part of the licensing process, Mr. Arkoosh, through his contractor Cultural Resource Consulting (CRC), conducted a pedestrian cultural resources inventory of the Area of Proposed Effects (APE) in August, 2010, which included all lands within the project boundary.

¹⁶ Information for this section is derived from the cultural resources report, “Archaeological and Historic Sites Inventory Report, Little Wood River Ranch II Hydroelectric Project, Lincoln County, Idaho” authored by Stephanie Crockett (August, 2010).

The inventory identified a historic property within the APE that is eligible for the National Register of Historic Places. The site, LWR-1, is located on private land and may be associated with the original 1906 homesteader and/or railroad construction and maintenance. The inventory notes the site is in poor condition. LWR-1 contains five features: (1) a lava rock foundation; (2) a lava rock “T” shaped foundation; (3) a rock alignment; (4) a deep depression; and (5) a depression with a low berm. Prior to this inventory, no cultural properties had been recorded within or in the vicinity of the APE.

3.3.6.2 Environmental Effects

Potential effects of the proposed project on cultural resources within the APE could result from construction, operation, and maintenance of project facilities. However, LWR-1 would be located approximately 68 feet upstream of the edge of the impoundment, and, as the project would operate run-of-river, the natural flow of the river upstream of the impoundment is not anticipated to change. Therefore, Mr. Arkoosh and CRC concluded that the proposed project would not have any adverse effects to historic properties located within the terrestrial portions of the APE, including LWR-1.

Mr. Arkoosh contacted the Idaho SHPO, seeking its concurrence with a finding of no adverse effects to historic properties under the current licensing proceeding. The Idaho SHPO concurred with Mr. Arkoosh’s findings.¹⁷

Our analysis

Commission staff agrees with the findings and determinations made by CRC and Mr. Arkoosh, and concur that the proposed project would not have any adverse effects to historic properties. Mr. Arkoosh should notify the Commission, the SHPO, and Indian tribes immediately if previously unidentified archeological or historic properties are discovered during the course of construction, operation, or maintenance of project facilities.

3.3.7. Aesthetic Resources

3.3.7.1 Affected Environment

The project area is characterized by sagebrush and desert grasses, with small areas of irrigated pasture and farmland along the Little Wood River. The landscape within the project area is very similar to the landscape of the surrounding region. Within the project area, livestock grazing has degraded the riparian zone.

¹⁷ The letter from the Idaho SHPO, dated March 20, 2012, was filed as part of a response to additional information filed with the Commission by Mr. Arkoosh on April 3, 2012.

The proposed project includes 2.2 miles of transmission line, of which approximately 2 miles would be installed above ground. This portion would include transmission line poles that would be approximately 40 feet high. The transmission line corridor would intersect a rural gravel road that is lightly-used by the public. Residences would be generally at least 3,500 feet away from the transmission line corridor. Excluding the transmission line, the proposed project facilities would not be visible from nearby public roads. Residences would be generally located more than 1,500 feet away from the proposed site for the powerhouse.

3.3.7.2 Environmental Effects

The project's diversion, feeder and tailrace canals, powerhouse, and transmission line would create a long-term, but moderate, contrast with the existing landscape. The transmission line would be visible from nearby public roads and residences. The presence of equipment and vehicles during project construction would have short-term negative effects on views and noise levels. Noise produced by the powerhouse may be audible offsite, but is expected to be of a low intensity and should not significantly change ambient noise levels in the area.

No specific concerns relating to noise or visual effects were expressed by agencies or other interested parties during project consultation.

Our Analysis

The proposed project would not have a significant effect on aesthetic resources or noise levels in the project area. Due to the project area's remote location, there are few viewpoints which may be affected by the project. We anticipate that the transmission line would have a minimal impact on aesthetic resources. The staff have not identified any unique visual features that differentiate the project area from the surrounding area. Since there are no residences within 1,500 feet of the proposed powerhouse site, we do not anticipate that noise from the powerhouse would have an adverse effect on nearby residents.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Little Wood River Project would not be constructed. There would be no changes to the physical, biological, recreational, or cultural resources of the area and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced from nonrenewable fuels.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Little Wood River Project's use of the Little Wood River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,¹⁸ the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using the 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 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 DEVELOPMENTAL BENEFITS OF THE PROJECT

Table 5 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by Mr. Arkoosh in his license application and subsequent filings. We find that the values provided by Mr. Arkoosh are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; estimated future capital investment required to maintain and extend the life of plant equipment and facilities; licensing costs; and normal operation and maintenance cost.

¹⁸ 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.

Table 5. Parameters for economic analysis of the Little Wood River Project (Source: staff and Mr. Arkoosh, 2011, 2012a,b,c).

Economic Parameter	Value
Period of analysis	30 years
Interest/discount rate	7.25 percent ^a
Federal tax rate	35 percent ^b
State tax	3 percent ^b
Insurance rate	0.25 percent ^b
Average annual generation (MWh)	5,323 ^c
Energy value (\$/MWh)	\$56.58 ^{d,e}
Term of financing	20 years
Construction cost	\$2,205,929 ^a
License application cost	\$40,000 ^{a,f}
Operation and Maintenance, \$/year	\$45,000 ^a

^a From final license application filed August 28, 2009.

^b Assumed by staff.

^c Provided by the applicant in the Additional Information Request Response filed May 24, 2011.

^d Provided by applicant based on the Idaho Power Avoided Cost Rates for Non-Fueled Projects, dated August 30, 2011.

^e The applicant may be eligible for a Renewable Energy Credit Revenue (RECR), upon completion of the project, which the applicant estimates would average \$6 per MWh. If the applicant is eligible for the RECR at the rate provided by the applicant, the project revenue would increase by approximately \$32,000 in the first year of operation.

^f This cost is included in the overall construction cost of the project shown above.

4.2 COMPARISON OF ALTERNATIVES

Table 6 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 action alternatives considered in this EA: the applicant's proposal, the staff alternative, and the staff alternative with mandatory conditions.

Table 6. Summary of the annual cost of alternative power and annual project cost for the action alternatives for the Little Wood River Project (Source: staff).

	Mr. Arkoosh's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Installed capacity (MW)	1.23	1.23	1.23
Annual generation (MWh)	5,323	5,323	5,323
Annual cost of alternative power (\$/MWh)	\$301,175 56.58	\$301,175 56.58	\$301,175 56.58
Annual project cost (\$/MWh)	\$305,275 57.35	\$305,545 57.40	\$305,545 57.40
Difference between the cost of alternative power and project cost (\$/MWh)	(\$4,100) ^a (0.77) ^a	(\$4,370) ^a (0.82) ^a	(\$4,370) ^a (0.82) ^a

^a A number in parentheses 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.

4.2.1 No-action Alternative

Under the no-action alternative, the project would not be constructed as proposed and would not produce any electricity. No costs for construction, operation and maintenance, or proposed environmental protection, mitigation, or enhancement measures would be incurred by the applicant.

4.2.2 Mr. Arkoosh's Proposal

Under Mr. Arkoosh's proposal, the project would require construction of a dam, a feeder canal, an intake, two penstocks, a powerhouse containing generation facilities, a tailrace, and a transmission line. Mr. Arkoosh proposes various environmental measures to protect, mitigate, and enhance existing environmental resources in the vicinity of project features.

Under Mr. Arkoosh's proposal, the project would have an installed capacity of 1.23 MW and would generate an average of 5,323 MWh annually. The average annual cost of alternative power would be \$301,175, or about \$56.58/MWh. The average annual project cost would be \$305,275 or about \$57.35/MWh. Overall, the project would

produce power at a cost which is \$4,100, or \$0.77/MWh, more than the cost of alternative power.¹⁹

4.2.3 Staff Alternative

The staff alternative would have the same capacity and energy attributes as Mr. Arkoosh's proposal. Table 7 shows the staff-recommended additions, deletions, and modifications to Mr. Arkoosh's proposed environmental protection and enhancement measures, and the estimated cost of each.

Based on a total installed capacity of 1.23 MW and an average annual generation of 5,323 MWh, the cost of alternative power would be \$301,175, or about \$56.58/MWh. The average annual project cost would be \$305,545 or about \$57.40/MWh. Overall, the project would produce power at a cost which is \$4,370, or \$0.82/MWh, more than the cost of alternative power.²⁰

4.2.4 Staff Alternative with Mandatory Conditions

This alternative is similar to the Staff Alternative with the exception of the addition of the installation of fish screens over the intake.²¹ This alternative would have the same capacity and energy attributes as Mr. Arkoosh's proposal and the staff alternative, and produce power for the same cost as the staff alternative.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 7 gives the cost of each of the environmental enhancement measures 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.

¹⁹ Commission staff note that the inclusion of the RECR would change the average annual cost of project power to approximately \$27,900, or \$5.24/MWh, less than the cost of alternative power.

²⁰ Commission staff note that the inclusion of the RECR would change the average annual cost of project power to approximately \$27,710, or \$5.21/MWh, less than the cost of alternative power.

²¹ As the condition for fish screening did not include any specificity to type, bar spacing, or other details, Commission staff were unable to assign a cost to this measure.

Table 7. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of construction and operation of the Little Wood River Project (Source: staff).

Enhancement/Mitigation Measures	Entities	Capital (2011\$)^a	Annual (2011\$)^a	Levelized Annual Cost (2011\$)^b	Notes
1. Implement the Riparian Improvement Plan, including	Mr. Arkoosh, Staff, Idaho DFG	\$26,000	\$1,530	\$2,960	c
1a. Remove Russian olive trees and other non-native plant species, shrubs and grasses from project lands	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	
1b. Plant native trees, shrubs, and grasses on project lands	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	
1c. Install 2.6-mile-long perimeter fence around riparian improvement area	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	
1d. Enter into Habitat Improvement Plan with Idaho DFG	Mr. Arkoosh, Idaho DFG	\$0	\$0	\$0	
2. Implement the Operational Compliance Monitoring Plan, including	Mr. Arkoosh, Staff, Idaho DFG, Idaho DEQ				

Enhancement/Mitigation Measures	Entities	Capital (2011\$)^a	Annual (2011\$)^a	Levelized Annual Cost (2011\$)^b	Notes
2a. Install a continuous flow monitoring device	Mr. Arkoosh, Staff, Idaho DFG, Idaho DEQ	\$2,700	\$200	\$340	
2b. Install minimum flow release structures	Mr. Arkoosh, Staff, Idaho DEQ, Idaho DFG	\$0	\$0	\$0	d
2c. Maintain minimum flows as stipulated in the Operational Compliance Monitoring Plan	Mr. Arkoosh, Staff, Idaho DEQ, Idaho DFG	\$0	\$0	\$0	e
2d. Record forebay elevations to monitor for run-of-river operations	Mr. Arkoosh, Staff, Idaho DEQ, Idaho DFG	\$0	\$0	\$0	e
3. Implement the Environmental Features Design Plan, including					
3a. Design and install sediment trapping in the feeder and tailrace canals	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	d
3b. Install a plunge pool	Mr. Arkoosh, Staff, Idaho DFG	\$2,000	\$0	\$150	

Enhancement/Mitigation Measures	Entities	Capital (2011\$)^a	Annual (2011\$)^a	Levelized Annual Cost (2011\$)^b	Notes
3c. Install log boom and exit ramps	Mr. Arkoosh, Staff, Idaho DFG	\$3,800	\$200	\$420	
3d. Design and build transmission line to reduce risk of avian collision	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	d
3e. Conduct avian protection surveys	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	e
4. Implement the Environmental Monitoring Plan, including					
4a. Long-term monitoring to control noxious and invasive plant species	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	e
4b. Monitoring the results of the Riparian Improvement Plan for five years	Mr. Arkoosh, Staff, Idaho DFG	\$0	\$0	\$0	e
5. Implement industry-standard erosion control measures	Mr. Arkoosh, Idaho DEQ, Idaho DFG				d

Enhancement/Mitigation Measures	Entities	Capital (2011\$)^a	Annual (2011\$)^a	Levelized Annual Cost (2011\$)^b	Notes
6. Develop and implement an erosion and sedimentation control plan.	Staff	\$1,500	\$0	\$110	f
7. Revise the Riparian Habitat Improvement Plan and submit to the Commission for approval.	Staff	\$1,000	\$0	\$80	
8. Notify the SHPO, tribes, and Commission if any archeological artifacts are found.	Staff	\$0	\$0	\$0	g
9. Remove stranded fish from the bypassed reach on project startup	Staff, Idaho DEQ	\$1,000	\$0	\$80	
10. Install fish screens over intake	Idaho DEQ	Unknown	Unknown	Unknown	h

^a Costs were provided by Mr. Arkoosh unless otherwise noted.

^b Cost estimated by staff.

^c The cost of measures 1a. through 1d. are included as a single cost to implement the Riparian Improvement Plan.

^d The cost of this measure is included in the overall construction costs of the project.

^e The cost of this measure is included in the overall operation and maintenance costs of the project. Mr. Arkoosh will be performing most of the maintenance and environmental monitoring himself; therefore, no additional cost is calculated for these measures.

^f As the applicant has developed several erosion and sediment control measures as part of the license application, we anticipate the cost of developing a comprehensive plan to be minimal. Construction cost for erosion and sediment

control measures is assumed to be included in the current construction cost. Cost of implementing measures is assumed to be included in the cost for implementing the Riparian Improvement Plan.

^g The implementation of this measure would only happen if archeological artifacts are found; therefore, we are not assigning a cost to this measure.

^h As Idaho DEQ did not provide dimensions or other characteristics of this fish screen, Commission staff are unable to assign a cost to this measure.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of Mr. Arkoosh's proposal, Mr. Arkoosh's proposal as modified by staff, Mr. Arkoosh's proposal as modified by staff with mandatory conditions (agency alternative), and the no-action alternative.

We summarize the environmental effects of the different alternatives in Table 8.

Table 8. Comparison of Alternatives for the Little Wood River Ranch II Project (Source: staff).

Resource	No Action Alternative	Mr. Arkoosh's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Geological and Soil Resources	No changes to geologic and soil resources	Minor effects expected during construction	Minor effects would be reduced by implementation of the ESCP	Same as Staff Alternative
Water Quantity	No changes to existing flow conditions	1.3-mile bypassed reach would be greatly dewatered; with flow limited to between 10 cfs and 55 cfs	Same as Mr. Arkoosh's Proposal	Same as Mr. Arkoosh's Proposal
Water Quality	No changes to existing water quality conditions	Minor sedimentation expected during construction and slight temperature increase during operation	Same as Mr. Arkoosh's Proposal	Same as Mr. Arkoosh's Proposal
Fisheries Resources	No changes to existing fisheries resources	Loss of stream connectivity and low levels of entrainment mortality and injury	Same as Mr. Arkoosh's Proposal plus protection from stranding during project startup	Same as Staff Alternative plus a reduction in fish mortality

				from turbine entrainment
Terrestrial Resources	No changes to terrestrial resources	Minor risk of avian collision/ electrocution and wildlife entrapment in project features; riparian habitat improved; and noxious weeds controlled.	Same as Mr. Arkoosh's Proposal except detailing plans and specifications provided through a revised RHIP	Same as Staff Alternative
Cultural Resources	No changes to cultural resources	No effects to cultural resources resulting from project construction, operation, or maintenance	Same as Mr. Arkoosh's proposal except the Commission, the Idaho SHPO, and affected tribes must be notified of any unanticipated cultural resource discovery	Same as Staff Alternative

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purpose 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 a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for licensing the Little Wood River Ranch II Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative as the preferred alternative. This alternative includes the applicant's proposal, resource agency recommendations, and some additional measures. We recommend this alternative because: (1) issuance of an original hydropower license by the Commission would allow the applicant to build and operate the project as an economically beneficial and dependable source of electrical energy; (2) the 1.23 MW of electric capacity available comes from a renewable resource that 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 and enhance environmental resources affected by building, operating, and maintaining the project.

In the following section, we make recommendations as to which environmental measures proposed by Mr. Arkoosh or recommended by agencies or other entities should be included in any subsequent license issued for the project. In addition to Mr. Arkoosh's proposed environmental measures, we recommend additional environmental measures to be included in any license issued for the project, as described in section 5.2.2 below. Finally, for the reasons outlined below, we recommend certain conditions specified by Idaho DEQ not be included in the staff alternative. The condition we are not recommending is the installation of a fish screen over the project intake. We recognize, however, that the Commission must include this condition in any license due to its mandatory nature.

5.2.1 Measures Proposed by Mr. Arkoosh

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

Geological and Soil Resources

- Implement erosion and sediment control measures, including reseeded with suitable plant and grass species following construction and properly disposing of excess soil material away from open or flowing water.

Aquatic Resources

- Implement an Operational Compliance and Monitoring Plan that would include provisions for: (1) monthly minimum flows ranging from 10 to 55 cfs to the bypassed reach; (2) construction of a minimum flow release

structure on the diversion; (3) installation of a continuous flow monitoring gage downstream of the project diversion in a location agreed upon by Idaho DFG to monitor compliance of minimum flow releases; and (4) recording of forebay water elevations on an opportunistic basis to ensure run-of-river operations.

- Implement an Environmental Features Design Plan that would include provisions for: (1) design and construction of feeder and tailrace canals to act as settling ponds to remove sediments from the water; and (2) design and construction of a plunge pool below the project diversion structure in consultation with Idaho DFG to ensure the project would be compatible with any future requirements to construct fish passage facilities.

Terrestrial Resources

- Implement an Environmental Features Design Plan that would include provisions for: (1) construction of a log boom and ramp in the feeder canal immediately upstream of the powerhouse intake to prevent big game entrapment; and (2) construction of the transmission line to protect raptors, and monitoring the effects on raptors for three years after transmission line construction.
- Implement a Riparian Habitat Improvement Plan that includes provisions for: (1) removal of Russian olive trees and other non-native plant species along the Little Wood River; (2) planting of native riparian vegetation along the natural riverbed to reduce solar heating; and (3) installing fences with wildlife passage/water access gaps on applicant-owned lands along the bypassed reach of the Little Wood River to protect riparian vegetation from cattle grazing and ensure wildlife movement through the project bypassed reach.
- Implement an Environmental Monitoring Plan that includes provisions for: (1) long-term monitoring to control noxious and invasive plant species; and (2) monitoring the effectiveness of the Riparian Habitat Improvement Plan measures for five years.

5.2.2 Additional Measures Recommended by Staff

We recommend the measures described above, and the following four additional staff-recommended measures: (1) develop and implement an ESCP that incorporates the specific requirements of the Idaho DEQ WQC for controlling erosion and sedimentation; (2) all of the Idaho DEQ water quality certification conditions for controlling and monitoring turbidity levels during construction, scheduling and minimizing in-water

work to minimize adverse affects to wetlands and fisheries, moving fish from dewatered areas, limiting the use of pollutants and toxic chemicals such as soil stabilizers, dust palliatives, fertilizers, and deicing salts during construction and operation, minimizing disturbance of existing wetlands and native vegetation and restoring any such disturbed areas, disposing of dredged material in a manner that prevents the material from re-entering waters of the state, and implementing measures to manage and reduce the risk of spills of hazardous materials; (3) submit a final RHIP be filed for Commission approval that contains a detailed description and specifications of the riparian habitat improvement measures (species, location, and amount of native plantings, fencing specifications, etc.) and a schedule for implementing the measures; and (4) notify the Commission, Idaho State Historic Preservation Office (Idaho SHPO), and Indian Tribes of any unanticipated artifact discovery to protect any previously undiscovered cultural resources. Below we discuss our additional staff recommended measures.

Erosion and Sediment Control Plan

Proposed activities related to the construction, operation, and maintenance of the project could cause soil erosion and sedimentation. To address the short-term and long-term effects of erosion and sedimentation from constructing and operating the project, Mr. Arkoosh proposes to implement measures such as reseeded with suitable plant and grass species following construction, and properly disposing of excess soil material away from open or flowing water. However, Mr. Arkoosh's proposal does not include the WQC conditions which would further reduce the amount of an erosion and sedimentation during construction and operation of the project. Therefore, we recommend Mr. Arkoosh develop and implement an ESCP in consultation with Idaho DFG, Idaho DEQ, and FWS. This plan would have an estimated annual cost of \$110, and we find that these measures would be worth the cost.

Incorporating the WQC Conditions

Aquatic resources at the site could be impaired by the construction, operation, and maintenance of the project. To address the short-term and long-term effects of the project construction, operation, and maintenance, Idaho DEQ provided WQC conditions to limit turbidity, protect wetlands and fisheries resources, and preserve water quality at the project site. Implementation of these measures would protect aquatic resources during construction, operation, and maintenance of the project. Therefore, we recommend the implementation of the measures listed in the WQC, with the exception of screening the project intake to prevent fish entrainment. As many of these measures are instructions for how and when to perform certain construction, operation, and maintenance activities, there would be no additional cost to the applicant for their implementation, with the exception of removing fish stranded along the bypassed reach, which would have an estimated annual cost of \$80. We find that these measures would be worth the cost.

Revised Riparian Habitat Improvement Plan

Mr. Arkoosh proposes to finalize details for implementation of the RHIP, including a schedule, in the HIP agreement, to be developed in consultation with the Idaho DFG. The RHIP filed by Mr. Arkoosh outlines the minimum provisions required to improve riparian habitat in the bypassed reach, but lacks sufficient details to implement the plan. The RHIP also describes the source of funding for the riparian improvements, which includes federal funds and cost-sharing agreements with Idaho DFG. While the Commission does not oppose such funding arrangements, implementation of the plan can not be contingent on acquiring these funds. Therefore, we recommend that a final RHIP be filed for Commission approval that contains a detailed description and specifications of the riparian habitat improvement measures (species, location, and amount of native plantings, fencing specifications, etc.) and a schedule for implementing the measures. The revision of the RHIP and submitting it to the Commission would have an estimated annual cost of \$80, and we recommend this revised plan be required in any license issued for the project.

Cultural Resources

There are no historical or archaeological properties within the project area that are listed in the National Register of Historic Places. There is one site within the project area that is eligible for listing. More archaeological or historic sites may be discovered during construction or project modification that requires land-disturbing activities. Therefore, we recommend that Mr. Arkoosh notify the Commission, the Idaho SHPO, and Indian tribes immediately if any previously unidentified archeological or historic properties are discovered during the course of constructing, maintaining, or developing project works or other facilities at the project. There would be no annual cost for this measure.

5.2.3 Measures Not Recommended

Some of the measures proposed by Mr. Arkoosh and Idaho DEQ would not contribute to the best comprehensive use of the Little Wood River water resources, does not exhibit sufficient nexus to the project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend this measure.

Intake Screening

In the WQC, Idaho DEQ requires Mr. Arkoosh to screen the project intake structures to prevent fish entrainment. However, Idaho DEQ does not specify the type of screen (e.g., mesh, bar), the bar spacing (e.g., 1-inch, ¾-inch), or other specifics. Without more specificity, we are unable to analyze the effectiveness or the cost of the required screen; therefore; we can not recommend this measure. However, this measure is a

mandatory condition and would be a part of any license that may be issued for this project.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Minor amounts of sediment would enter the Little Wood River as a result of construction and initial operation of the project, even with the implementation of erosion control measures, resulting in short-term impacts to water quality and fish. Some fish entrainment injury and mortality would occur as a result of fish entering the turbines through the feeder canal and penstock. Upstream fish passage would be prevented. The long-term impact on fisheries resources is expected to be minor, given the existing condition of the fishery in the project area and the impaired nature of the Little Wood River upstream and downstream of the project. Approximately 13.5 acres of soil surface and riparian vegetation would be disturbed during project construction, but would be revegetated, and noxious plants removed from the project area. The project would also result in minor increases in noise and visual disturbance during construction and long-term aesthetic impacts during project operation. The long-term impact on aesthetics is expected to be minor, given the remote location and the present agricultural use of the land in the project area.

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 believes 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 any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. In response to our REA notice, Idaho DFG submitted recommendations for the project on May 3, 2012. Table 9 lists the state recommendations filed subject to Section 10(j), and whether the recommendations are adopted under the Staff Alternative. Environmental recommendations that we consider outside the scope of Section 10(j) have been considered under Section 10(a) of the FPA and are addressed in the specific resource sections of this document. We recommend adopting all recommendations that fall within the scope of 10(j).

Table 9. Fish and wildlife agency recommendations for the Little Wood River Ranch II Project (Source: staff).

Recommendation	Agency	Within scope of Section 10(j)	Annualized cost	Adopted?
Maintain a minimum flow of 13 cfs (October to March), 42 cfs (April), 55 cfs (May), 48 cfs (June), 35 cfs (July), 36 cfs (August and September). Flows can be reduced to 13 cfs between April and September during dry years and to 10 cfs during extremely dry years.	Idaho DFG, Idaho DEQ	Yes	\$0, included in the initial estimates for annual project generation	Yes
Implement erosion control measures	Idaho DFG	Yes	\$0, included in the estimate for construction	Yes
Design and construct feeder and tailrace canals to provide for flow velocity of less than 2 feet per second to trap sediment	Idaho DFG	Yes	\$0, included in the estimate for construction	Yes
Design and construct a plunge pool below the project diversion	Idaho DFG	Yes	\$150	Yes
Install log-boom and egress ramp to prevent wildlife entrapment	Idaho DFG	Yes	\$420	Yes
Design the transmission line to minimize adverse interactions with avian species, conduct avian surveys for the first three years of license	Idaho DFG	Yes	\$0, included in the estimate for construction	Yes
Enter into a cost-sharing agreement with Idaho DFG as part of a post-license HIP	Idaho DFG	No, funding is not a specific wildlife recommendation	\$0	No, but implementation details are required in the revised

				RHIP
Implement the RHIP, including removal of non-native trees (Russian olive) and shrubs, revegetate disturbed areas with native trees, shrubs, and grasses, and construct a 2.6-mile-long perimeter fence to protect riparian vegetation	Idaho DFG	Yes	\$2,960	Yes
Monitor the riparian zone for first five years of project operation	Idaho DFG	Yes	Included in the RHIP, annual cost, \$2,960	Yes
Conduct surveys for noxious weeds at year 1 and year 5 of project operation	Idaho DFG	Yes	\$0, included in the estimate for operation and maintenance	Yes

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 USC section 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 eight comprehensive plans that are applicable to the Little Wood River Ranch II Project.²² No inconsistencies were found.

²² (1) Bureau of Land Management. Forest Service. 1991. Snake River final activity/operations plan. Department of the Interior, Idaho Falls, Idaho. Department of Agriculture, Idaho Falls, Idaho. February 1991; (2) Idaho Department of Fish and Game. 2001. Fisheries management plan, 2007-2012. Boise, Idaho; (3) Idaho Department of Fish and Game. Bonneville Power Administration. 1986. Pacific Northwest rivers study. Final report: Idaho. Boise, Idaho. 12 pp; (4) Idaho Department of Fish and Game. Idaho Comprehensive Wildlife Conservation Strategy. Boise, Idaho. September, 2005; (5) Idaho Department of Health and Welfare. 1992. Idaho water quality standards and wastewater treatment requirements. Boise, Idaho. January 1992; (6) Idaho Water Resource Board. 1992. State water plan. Boise, Idaho. January 1992; (7) Idaho Water Resource Board. 1993. Comprehensive state water plan, Snake River: Milder Dam to King Hill. Boise, Idaho. March 17, 1993. 92 pp; and (8) Northwest Power and Conservation Council. 2009. Columbia River Basin fish and wildlife program. Portland, Oregon. Council Document 2009-09. October, 2009.

6.0 FINDING OF NO SIGNICANT IMPACT

Issuing an original minor license for the Little Wood River Ranch II Project, with our recommended measures, would provide a source of renewable power. Our recommended measures may reduce sediment in the Little Wood River, may lower water temperature through riparian planting, and may protect avian species. Project construction and operation would result in some minor sedimentation and erosion during project construction and initial operation, may increase water temperatures by decreasing water in the bypassed reach, may reduce fish habitat by reducing the flow available in the bypassed reach, may prevent upstream and downstream migration of fish, may create minor long-term effects to recreation and aesthetics, and may create temporary noise impacts from construction.

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

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