

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Gibson Dam Hydroelectric Company, LLC

Project No. 12478-003
Montana

NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT

(January 12, 2012)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission) regulations, 18 CFR Part 380 (Order No. 486, 52 F.R. 47897), the Office of Energy Projects has reviewed the application for license for the Gibson Dam Hydroelectric Project, located at the U.S. Department of the Interior, Bureau of Reclamation's Gibson dam on the Sun River in Lewis and Clark and Teton Counties, Montana, and has prepared a final environmental assessment (EA) for the project. The project would occupy a total of 68.5 acres of federal lands.

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

A copy of the final EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659.

You may also register online at <http://www.ferc.gov/docs-filing/esubscription.asp> to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

For further information, contact Matt Cutlip at 503-552-2762 or matt.cutlip@ferc.gov.

Kimberly D. Bose,
Secretary.

**FINAL ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE**

Gibson Dam Hydroelectric Project—FERC Project No. 12478-003

Montana

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

January 2012

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ACRONYMS AND ABBREVIATIONS

APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	best management practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
DO	dissolved oxygen
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FDR	Forest Development Road
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
GDHC	Gibson Dam Hydroelectric Company, LLC
GID	Greenfields Irrigation District
Gibson Dam Project	Gibson Dam Hydroelectric Project
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
kV	kilovolt
mg/L	milligrams per liter
Montana DEQ	Montana Department of Environmental Quality
Montana FWP	Montana Fish, Wildlife and Parks
Montana SHPO	Montana State Historic Preservation Officer
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
NERC	North American Electric Reliability Corporation
NFS	National Forest System
NHPA	National Historic Preservation Act of 1966
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
project	Gibson Dam Hydroelectric Project
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RM	river mile
SD1	Scoping Document 1
SD2	Scoping Document 2
WECC	Western Electricity Coordinating Council
WMA	Wildlife Management Area

EXECUTIVE SUMMARY

Proposed Action

On August 28, 2009, Gibson Dam Hydroelectric Company, LLC (GDHC) filed an application for an original license to construct and operate the 15-megawatt (MW) Gibson Dam Hydroelectric Project (project) located on the Sun River, near Augusta, Montana. The project would occupy 68.5 acres of federal lands, 44.0 acres within the Lewis and Clark National Forest administered jointly by the U.S. Department of Agriculture, Forest Service (Forest Service) and the U.S. Department of the Interior, Bureau of Reclamation (Reclamation)¹ and 24.5 acres of lands administered by the U.S. Department of Interior, Bureau of Land Management. The proposed project would generate approximately 40,000 megawatt-hours (MWh) annually for distribution to the Northwest subregion of the Western Electricity Coordinating Council. This final environmental assessment (EA) evaluates the environmental impacts and economic costs associated with licensing the project.

Proposed Facilities

The proposed project would use Reclamation's existing 199-foot-tall, 960-foot-long Gibson dam, 1,296-surface-acre reservoir, intake structure, and outlet works consisting of two jet-flow valves with a total hydraulic capacity of 3,050 cubic feet per second, and would include installation of two 72-inch-diameter, 120-foot-long steel main penstocks, with two sets of smaller, feeder penstocks branching off of each of the main penstocks to provide flow to the four turbine units, a 120-foot-long by 60-foot-wide concrete and prefabricated metal powerhouse with four Francis-type turbines located at the base of the dam, and a new 3,000-square-foot maintenance building located 1,400 feet downstream of the dam near existing Reclamation buildings on the east side of the access road to Gibson dam. The proposed project would also consist of a 26.19-mile-long transmission line consisting of three distinct segments and a substation extending east from the powerhouse to an interconnection point near Jackson's Corner at Highway 287. The three transmission-line segments would include: (1) 4.57-mile-long, 34.5-kilovolt (kV) Canyon Segment; (2) 4.71-mile-long, 34.5-kV Plains Segment; and (3) 16.91-mile-long, 69-kV Plains Segment. The proposed substation would be located between the 34.5-kV Plains Segment and the 69-kV Plains Segment. The project would be operated

¹ The Forest Service states that the existing Gibson dam is located within a Reclamation withdrawal on National Forest System lands. Reclamation states that it has primary administration over the areas occupied by its structures and works, as well as the areas required to administer, maintain, operate, and protect these structures and works.

in a run-of-release mode, using only the available water released from the reservoir by Greenfields Irrigation District through its formal agreement with Reclamation.

Proposed Environmental Measures

GDHC proposes several environmental measures to protect aquatic, terrestrial, recreational, aesthetic, and cultural resources:

- Operate the project run-of-release;
- Schedule project construction activities to minimize conflicts with wildlife (specifically elk migration, bighorn sheep lambing, grizzly bear foraging, and sharp-tailed grouse courtship/mating), recreation use, and access;
- Implement the following resource management plans filed with the license application: (1) Erosion and Sediment Control Plan, (2) Construction Water Quality Monitoring Plan, (3) Post-Construction Water Quality Monitoring Plan, (4) Noxious Weed Control Plan, (5) Bear Safety Plan, (6) Recreation During Construction Plan, (7) Avian Protection Plan, and (8) Historic Properties Management Plan;
- Develop and implement, after final design and prior to construction: a Stormwater Pollution Prevention Plan; a Spill Prevention, Control, and Countermeasures Plan; and a Blasting Plan;
- Develop and implement a Construction Traffic Control Plan and a Fire Control Plan;
- Conduct additional field surveys, after final design and prior to construction, to locate and avoid wetlands and sensitive plant species during construction activities; and
- Implement transmission-line visual resources measures specified in the applicant's Visual Resources Design Report as modified by Alternative A of the applicant's March 24, 2010, Additional Information Request response filing, including burying portions of the transmission line, siting the line within existing distribution-line corridors, and modifying non-project distribution lines to avoid or minimize aesthetic effects and enhance existing aesthetic values.

Alternatives Considered

This final EA considers the following alternatives: (1) GDHC's proposal, as outlined above; (2) GDHC's proposal with staff modifications (staff alternative); (3) staff alternative with all agency mandatory conditions (staff alternative with mandatory conditions); and (4) no action, meaning that GDHC would not construct or operate the project.

Staff Alternative

Under the staff alternative, the project would be constructed and operated as proposed by GDHC with the modifications and additional measures described below. Our recommended modifications and additional environmental measures include, or are based on, recommendations made by federal and state resource agencies that have an interest in resources that may be affected by construction and operation of the proposed project.

Under the staff alternative, the project would include most of GDHC's proposed measures, as outlined above, with the exception of GDHC's proposal to enhance aesthetic resources by modifying non-project distribution lines located along the project's transmission-line alignment. In addition, the staff alternative would include: (1) modification of the Noxious Weed Control Plan to include additional provisions for herbicide application restrictions, and for monitoring invasive plants and noxious weeds at three year intervals; (2) modification of the Erosion and Sediment Control Plan to include a requirement that the proposed Stormwater Pollution Prevention Plan; Spill Prevention, Control, and Countermeasures Plan; and a Blasting Plan be filed with the Commission for approval, prior to implementation; (3) a Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan that would be developed 60 days prior to any ground-disturbing activities; (4) an Interpretive Display Plan that provides for three interpretive displays, one each at Gibson Overlook, the viewing turnaround below Gibson dam, and near the Sun River diversion dam at the mouth of the Sun River Canyon, and includes provisions for filing a schedule, site drawings, specifications, interpretive display contents, and maps showing the location of the interpretive displays in relation to the project boundary; (5) a Transmission Line Management Plan that includes measures for protecting vegetation during construction and operation of the project's transmission line, a description of visual resources protection measures, and a map of transmission line locations with identification of above-ground and below-ground sections, access points, gates, and roads; and (6) modifications to the Avian Protection Plan to include additional provisions for notifying Montana FWP within 24 hours of discovering an avian nest on any project transmission-line facilities, and filing the final updated Avian Protection Plan with the Commission for approval, prior to implementation. The staff alternative includes all of the Montana Department of Environmental Quality's section 401 water quality certification conditions and all of the

mandatory conditions specified by Reclamation under section 4(e) of the Federal Power Act. Additionally, the staff alternative, as outlined above, includes all of the mandatory conditions specified by the Forest Service under section 4(e), except portions of two conditions staff does not recommend as discussed below.

Staff Alternative with Mandatory Conditions

The staff alternative with mandatory conditions contains all of the measures listed in the staff alternative, as outlined above, and the portions of the two section 4(e) conditions that staff does not recommend: (1) Forest Service 4(e) condition no. 16 – additional as-yet unspecified interpretive displays as part of the interpretive display plan; and (2) Forest Service 4(e) condition no. 17 – additional as-yet unspecified recreation measures as part of the recreation plan.

No-Action

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

Public Involvement and Areas of Concern

Before filing its license application, GDHC conducted pre-filing consultation under the Alternative 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.

Before the application was filed, we conducted scoping to determine what issues and alternatives should be addressed. On March 9, 2006, we issued a scoping document (SD1) and distributed it to interested parties, soliciting comments, recommendations, and information on the project. Scoping meetings were held in Fairfield, Montana, on April 11, 2006, and in Helena, Montana, on April 12, 2006. We conducted an environmental site review on April 11, 2006. Based on discussion during the scoping meetings, site review, and written comments filed with the Commission, a second scoping document (SD2) was issued on February 8, 2007. We issued an additional scoping document on October 28, 2009, because the project as proposed in the final license application differed from the project as described in GDHC's SD1 and SD2. On May 26, 2010, we issued a notice requesting comments, final terms and conditions, recommendations, and prescriptions.

The Commission issued its draft EA for the proposed licensing of the Gibson Dam Project on May 3, 2011. Staff requested that comments on the draft EA be filed within 30 days from the issuance date (i.e., by June 2, 2011). Staff received comments from the Montana Historical Society, U.S. Environmental Protection Agency, Reclamation, Forest

Service, and Zachary Winestine. In Appendix A of this final EA, we summarize the written comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text for the final EA.

The primary issues associated with licensing the project are the ability to protect geologic and soils, aquatic, terrestrial, threatened and endangered species, recreation and land use, aesthetics, and socioeconomic resources during project construction and operation.

Staff Alternative

Aquatic Resources

Construction of the proposed project would result in a temporary increase in sedimentation and turbidity in the Sun River during installation and removal of the cofferdam required for construction of the powerhouse. However, adverse effects would be minimized through implementation of the applicant's proposed Construction Water Quality Monitoring Plan and Erosion and Sediment Control Plan.

Water discharged to the Sun River through the project's Francis turbines may have a lower dissolved oxygen concentration as compared to existing conditions where all water exits the reservoir under turbulent conditions via jet-flow valves. The effect on aquatic resources is expected to be minor, and GDHC's proposed post-construction water quality monitoring program would identify whether supplemental aeration and additional monitoring would be necessary to address any potential adverse effects.

The number of fish entrained would remain the same as under existing conditions. The survival rate of entrained fish passing through Francis turbines may be better than under current conditions where fish are passed through a jet-flow valve, which would result in a minor beneficial effect on fisheries resources of the Sun River.

Terrestrial Resources

Construction of the maintenance facility, proposed substation, and transmission line would result in the temporary loss of about 10 acres of vegetation and the permanent loss of about 1 acre of vegetation. Vegetation over underground portions of the proposed transmission line would need to be kept in low-growing, primarily herbaceous forms, thus precluding the establishment of most woody vegetation following construction. The development and implementation of a Transmission Line Vegetation Management Plan would guide these management activities and ensure that adverse effects on sensitive plants and wildlife are minimized.

Implementation of a Noxious Weed Control Plan would minimize the potential for introduction of non-native vegetation and noxious weeds during project construction and

initial project operations. The potential for noxious weed and non-native vegetation establishment as a result of long-term maintenance of the project's transmission line and any other ground-disturbing activities would be minimized by a requirement to monitor and control noxious weeds and non-native species. Construction activities would disturb wildlife because of increased human activities at construction sites and increased construction traffic on nearby roads. Operation of the proposed transmission line could result in avian collisions and possibly electrocutions, although this potential would be minimized by using best management practices included in the applicant's proposed Avian Protection Plan. Because there would be more people in the vicinity of Gibson dam to operate and maintain the powerhouse and project-related facilities, the potential exists for increased human-bear interactions. Implementation of the applicant's proposed Bear Safety Plan would help to minimize the potential for human and bear interactions.

Threatened and Endangered Species

FWS' August 5, 2010, filing identified bull trout, Canada lynx, black-footed ferret, and grizzly bears as occurring in Lewis and Clark and Teton Counties. Project construction and operation would have no effect on bull trout, Canada lynx, and black-footed ferret. Implementation of GDHC's Bear Safety Plan together with timing restrictions on construction would reduce potential disturbance to grizzly bears to discountable levels, and therefore, this species would not likely be adversely affected by project construction and operation. Development of a Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan at least 60 days prior to any future ground-disturbing activities would ensure that appropriate measures are in place to adequately protect special status species during long-term operation and maintenance of the project.

Recreation

Construction of the powerhouse could result in short-term disturbance of recreational visitors to the project area, including Mortimer Gulch and Home Gulch campgrounds and several trails and scenic vistas. Negative effects could include exposure to noise and dust, and traffic delays on Forest Development Road 108 as equipment and construction material are transported to the construction site. Additional recreational visitor traffic delays could occur during construction of underground portions of the proposed transmission line that are within or adjacent to public roadways. Measures proposed by GDHC and recommended by staff (e.g., scheduling construction to minimize traffic delays, restricting access to the Sun River between Gibson dam and Beaver Creek, and posting signs upstream and downstream of the dam warning trail users of construction activities at the base of the dam) would minimize the effects on recreational visitors during construction activities. We expect that there would be no long-term adverse effect of GDHC's proposed project on recreational resources;

however, staff's recommended interpretive displays would represent a long-term enhancement to the recreational resources near Gibson dam.

Cultural Resources

Cultural resources within the area of potential effects would be protected or effects would be mitigated according to the requirements of the applicant's Historic Properties Management Plan.

Aesthetics

There would be short-term construction effects due to the presence of small work crews, equipment activity, dust, and materials storage along the transmission line route. However, work would proceed quickly and areas with surface disturbance would be revegetated immediately following construction. Thus, construction effects would be temporary and localized.

Long-term aesthetic effects would result from the construction of transmission-line poles along the proposed transmission-line alignment. The new poles would vary in height between 50 and 65 feet. However, aesthetic effects of the transmission line would be minimized by burying about 6 miles of the line and siting the poles in locations that are designed to limit the adverse effects to the regionally important Rocky Mountain Front and Sun River Canyon viewsheds.

Socioeconomics

Construction of the proposed Gibson Dam Project would benefit the local economy by providing local employment opportunities for up to 25 workers for the construction period. Spending on equipment parts, supplies, and maintenance would peak during construction but remain at levels during project operation that may provide a minor economic benefit to the region. During operations, the project would periodically employ between one and five individuals for operations and maintenance activities. Total economic influx to the local economy is difficult to estimate, but based on estimated labor costs for construction, approximately \$4 to \$5 million would be paid in wages and approximately \$1 million would be paid to local material suppliers.

Under the no-action alternative, no project would be constructed and environmental conditions would remain the same.

Conclusions

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

In section 4.2 of the EA, we estimate the likely cost of alternative power for each of the four alternatives identified above. Under the no-action alternative, the project would not be constructed and would not produce any power. Our analysis shows that during the first year of operation under the proposed action, the project would produce power at an annual cost that is \$1,937,130, or \$48.43/MWh, more than the cost of alternative power. Under the staff alternative, the project would produce power at an annual cost that is \$1,916,430, or \$47.91/MWh, more than the cost of alternative power. Under the staff alternative with mandatory conditions, the project would produce power at an annual cost of \$1,922,020, or \$48.05/MWh, more than the cost of alternative 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 (40,000 MWh annually); (2) the 15 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by GDHC, as modified by staff, would adequately protect 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 significantly affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

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

Gibson Dam Hydroelectric Project FERC Project No. 12478-003—Montana

1.0 INTRODUCTION

1.1 APPLICATION

On August 28, 2009, Gibson Dam Hydroelectric Company, LLC (GDHC) filed an application for an original license with the Federal Energy Regulatory Commission (Commission or FERC) to construct and operate the 15-megawatt (MW) Gibson Dam Hydroelectric Project (Gibson Dam Project or project), which would generate an estimated average of 40,000 megawatt-hours (MWh) of electricity annually. The proposed project would be located at the U.S. Department of the Interior, Bureau of Reclamation's (Reclamation) Gibson dam on the Sun River, near Augusta, Montana (figure 1). The project would occupy 68.5 acres of federal lands, 44.0 acres within the Lewis and Clark National Forest administered jointly by the U.S. Department of Agriculture, Forest Service (Forest Service) and Reclamation² and 24.5 acres of lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM). GDHC proposes 15 MW of new capacity and the installation of new penstocks, a prefabricated metal powerhouse, a maintenance building, and a 26.19-mile-long 34.5-/69-kilovolt (kV) transmission line.

² The Forest Service states that the existing Gibson dam is located within a Reclamation withdrawal on National Forest System lands. Reclamation states that it has primary administration over the areas occupied by its structures and works, as well as the areas required to administer, maintain, operate, and protect these structures and works.

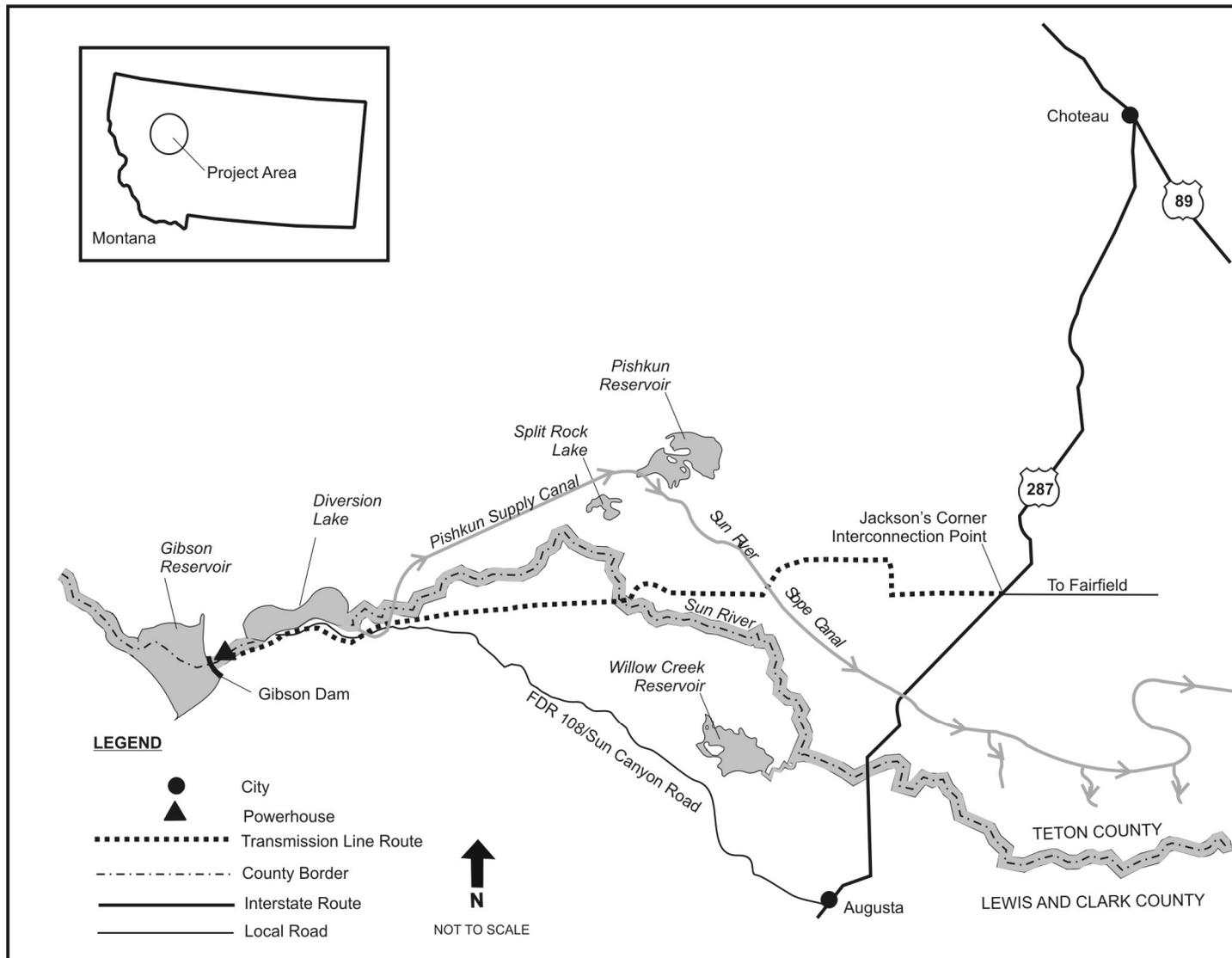


Figure 1. Location of Gibson Dam Hydroelectric Project (Source: GDHC, 2009, and Reclamation, 1973, as modified by staff)

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

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

Issuing an original license for the project would allow GDHC to generate electricity for the term of a new license, making electric power from a renewable resource available.

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

In this final EA, we assess the environmental and economic effects of constructing and operating the project: (1) as proposed by GDHC, (2) with our recommended measures, and (3) with our recommended measures and all agency mandatory conditions. We also consider the effects of the no-action alternative. Important issues that are addressed include: erosion and sedimentation associated with project construction; project operational effects on dissolved oxygen (DO) in the Sun River and on fish entrainment and mortality; project construction and operation effects on sensitive plants, noxious weeds, wildlife, and local recreational resources; project effects on cultural resources; and project effects on views of the Rocky Mountain Front and Sun River Canyon.

1.2.2 Need for Power

The Gibson Dam Project would provide hydroelectric generation to meet part of Montana's power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 15 MW and generate approximately 40,000 MWh per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Gibson Dam Project is located in the Northwest subregion of the Western Electricity Coordinating Council (WECC) of the NERC. According to NERC's 2010 forecast, average summer peak demand requirements for the WECC region are projected to grow at a rate of 1.4 percent from 2010 through 2019 (NERC, 2010). NERC projects reserve margins (generating capacity in excess of demand) will range between 27.9 percent and 38.2 percent of net internal demand during the 10-year forecast period, including new capacity additions. Over the next 10 years, WECC estimates that about 6,285 MW of additional capacity will be brought on line.

We conclude that power from the Gibson Dam Project would help meet a need for power in the WECC in both the short and long-term. The project provides power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the 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 Gibson Dam Hydroelectric Project (Source: staff).

Requirement	Agency	Status
Section 18 of the FPA	U.S. Department of the Interior, and U.S. Department of Commerce	No fishway prescriptions or request for reservation of authority to prescribe fishways were filed by either agency.
Section 4(e) of the FPA (land management conditions)	Reclamation, Forest Service	Reclamation and the Forest Service filed terms and conditions on July 16, 2010, and July 23, 2010, respectively.
Section 10(j) of the FPA	FWS	FWS filed one section 10(j) recommendation on July 16, 2010.

Requirement	Agency	Status
Clean Water Act— Section 401 water quality certification	Montana DEQ	Montana DEQ issued section 401 certification with conditions on December 4, 2009.
Endangered Species Act Consultation	FWS	Completed; concurrence letter filed on June 20, 2011.
National Historic Preservation Act	Montana SHPO	GDHC filed a Historic Properties Management Plan on May 17, 2010. Montana SHPO signed the Programmatic Agreement by letter dated July 28, 2011, and filed on November 21, 2011.

Notes: FPA – Federal Power Act

FWS – U.S. Department of the Interior, Fish and Wildlife Service

Montana DEQ – Montana Department of Environmental Quality

Montana SHPO – Montana State Historic Preservation Officer

Reclamation – U.S. Department of the Interior, Bureau of Reclamation

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the Federal Power Act (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 U.S. Department of the Interior (Interior). No fishway prescriptions or request for reservation of authority to prescribe fishways were filed by either agency.

1.3.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation will be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. Reclamation filed conditions on July 16, 2010, and the Forest Service filed final conditions on July 23, 2010, pursuant to section

4(e) of the FPA. These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.1.3 Section 10(j) Recommendations

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

The U.S. Department of the Interior, Fish and Wildlife Service (FWS) timely filed, on July 16, 2010, one recommendation under section 10(j), as summarized in section 5.4.1, *Recommendations of Fish and Wildlife Agencies*. In section 5.4, we also discuss how we address the agency recommendation 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 Clean Water Act. On September 17, 2009, GDHC applied to the Montana Department of Environmental Quality (Montana DEQ) for section 401 certification for the Gibson Dam Project. Montana DEQ received this request on September 17, 2009. Montana DEQ timely issued the certification on December 4, 2009. The conditions of the certification are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. In its August 5, 2010, filing, FWS identified four federally listed species that may occur in the project vicinity: bull trout (threatened), grizzly bear (threatened), Canada lynx (threatened), and black-footed ferret (endangered). Critical habitat has been designated for bull trout and Canada lynx; however, no designated critical habitat for either species occurs within the project area. Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that licensing of the project, as proposed with staff-recommended measures and mandatory conditions, would have no effect on the bull trout, Canada lynx, black-footed ferret or any of these species designated critical habitat because the project area does not provide suitable habitat for these species. We also conclude that the project would not be likely to adversely affect the grizzly bear because implementation of the measures included in GDHC's Bear Safety Plan would ensure that any potential effects are insignificant.

FWS concurred with our findings by letter filed on June 16, 2011.

1.3.4 National Historic Preservation Act

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

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the construction and operation of the Gibson Dam Project. The terms of the PA would ensure that GDHC addresses and treats all historic properties identified within the project's area of potential effects (APE) through the implementation of its May 17, 2010, Historic Properties Management Plan (HPMP). By letter filed on November 21, 2011, the Montana SHPO notified the Commission that it signed the PA on July 28, 2011.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR, section 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, Endangered Species Act, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to Commission regulations.

1.4.1 Scoping

Before preparing this final EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on March 9, 2006. It was noticed in the Federal Register on March 21, 2006. Two scoping meetings were held, both advertised in the Great Falls Tribune, Choteau Acantha, Fairfield Sun Times, and Independent Record. A public scoping meeting and an environmental site review were held on April 11, 2006, in

Fairfield, Montana, and an agency scoping meeting was held on April 12, 2006, in Helena, Montana, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

<u>Commenting Entity</u>	<u>Date Filed</u>
Gene Sentz	April 17, 2006
Blackfeet Planning and Development, Blackfeet Tribal Historic Preservation Office	April 19, 2006
Montana FWP	April 24, 2006
Gene Sentz	April 26, 2006
Sun River Watershed Group	May 12, 2006
Montana Wildlife Federation	May 12, 2006
Montana DEQ	May 12, 2006
Daniel and Judith Bennet	May 16, 2006
Cold Mountain, Cold Rivers	May 17, 2006
Forest Service	May 17, 2006
Dan Bennet	May 17, 2006
Paul Edwards	May 17, 2006
Forest Service	May 17, 2006
Mert and Vicki Freyholtz	May 17, 2006
Steve Gilbert	May 17, 2006
Beth Hill	May 17, 2006
Gerry Jennings	May 17, 2006
Peter Markalunas	May 17, 2006
John Chase Maxwell	May 17, 2006
Reclamation	May 17, 2006
Gene Sentz	May 17, 2006
Upper Missouri Breaks Audubon Society	May 17, 2006
Sandra Walker	May 17, 2006
Zachary Winestine	May 17, 2006
Linda and Gene Sentz	May 17 and 18, 2006

<u>Commenting Entity</u>	<u>Date Filed</u>
Joanne Pawlowski	May 18, 2006
Kathy Merrick	May 26, 2006
Deep Creek Ranch & Management Company, LLC	January 26, 2007

A revised scoping document (SD2), addressing these comments and soliciting further comments on the revised project proposal, was issued on February 8, 2007. The deadline for submitting comments in response to SD2 was March 9, 2007. The following entities provided additional written comments:

<u>Commenting Entity</u>	<u>Date Received by GDHC</u>
Michael Garrity – Alliance for the Wild Rockies, Native Ecosystems Council, Wildwest Institute	February 22, 2007
John Chase Maxwell	February 22, 2007
Barbara Birkeland	February 22, 2007
Katherine C. Golas	February 23, 2007
Gene & Linda Sentz (3 letters)	February 26, 2007
M. Carlson – Carlson Family Partnership	March 3, 2007
Janice Handleman	March 6, 2007
Kay Owen	March 6, 2007
Leslie Stoltz	March 6, 2007
Zachary Winestine	March 7, 2007
Karen Reeves	March 8, 2007
Linda Reeves	March 8, 2007
The Nature Conservancy of Montana	March 8, 2007
Dan Bennett	March 9, 2007
Covington & Burling – Deep Creek Ranch & Management, LLC; Deep Creek Grazing Association, Inc.; Teton Prairie, LLC.; Sun River Ranch, LLC; Mr. Larry Wilson; and Mr. Stoney Burk	March 9, 2007
Jack Feder	March 9, 2007
ZuZu Feder	March 9, 2007

<u>Commenting Entity</u>	<u>Date Received by GDHC</u>
Forest Service	March 9, 2007
Colleen Owen	March 9, 2007
Montana Wilderness Association	March 12, 2007
Montana DEQ	March 13, 2007
Reclamation	March 15, 2007
GDHC	March 23, 2007

The project as proposed in the license application differed from GDHC's proposals described in SD1 and SD2. Therefore, to support and assist with our environmental review, on October 28, 2009, we solicited additional written scoping comments on GDHC's revised proposal. We received one comment letter from Reclamation on January 25, 2010.

1.4.2 Interventions

On April 20, 2010, the Commission issued a notice accepting GDHC's application for an original license for the project and soliciting motions to intervene. This notice set June 21, 2010, as the deadline for filing protests and motions to intervene. In response to the notice, the Forest Service filed a motion to intervene on June 15, 2010. No motions to intervene in opposition to the project were filed.

1.4.3 Comments on the Application

A notice requesting comments, and final terms and conditions, recommendations, and prescriptions was issued on May 26, 2010. The following entities commented: Interior (representing Reclamation and FWS) by letter filed on July 16, 2010, and the Forest Service by letter filed on July 23, 2010.

1.4.4 Comments on the Draft EA

On May 3, 2011, we issued a draft EA for the Gibson Dam Project. Comments on the EA were due by June 2, 2011. Written comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
Montana Historical Society	May 23, 2011
U.S. Environmental Protection Agency	May 24, 2011
Reclamation	June 3, 2011

Commenting Entity

Forest Service

Zachary Winestine

Date Filed

June 3, 2011

June 6, 2011

Appendix A summarizes the comments that were filed, includes our responses to those comments, and indicates where we made modifications to the draft EA.

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.

2.2 APPLICANT'S PROPOSAL

2.2.1 Project Facilities

The proposed project would be located on the Sun River at the Gibson dam, which is approximately 19 miles northwest of Augusta, Montana, and approximately 35 miles west of Fairfield, Montana. The project would require modifying the dam's existing outlet works and constructing new penstocks, a powerhouse at the base of the dam, a maintenance building, a substation, and buried and overhead segments of a transmission line.

Two 120-foot-long, 72-inch-diameter steel main penstocks, each with a capacity of 1,525 cfs, would be attached to the existing outlet works. Each main penstock would continue approximately 10 feet from the existing outlet works before the first of two feeder penstocks bifurcates from each of the main penstocks. These 60-foot-long, 54-inch-diameter feeder penstocks would extend from the main penstocks into the new 120-foot-long, 60-foot-wide reinforced concrete and metal powerhouse to provide flow to the 1.5-MW Francis turbines. Sixteen feet past the bifurcation of the first feeder penstock, each main penstock would bifurcate again, and two 72-foot-long, 72-inch-diameter feeder penstocks would extend from the main penstocks into the powerhouse to provide flow to the two 6-MW Francis turbines. The two main penstocks would continue an additional 80 feet, go through the powerhouse, and extend approximately 14 feet downstream of the powerhouse. The jet flow valves would be reinstalled on the terminal ends of the main penstocks to provide flow releases when inflow exceeds the powerhouse capacity, or the project is offline.

The powerhouse would be located within the currently inundated river channel of the Sun River on the downstream side of Gibson dam. GDHC proposes to construct a temporary cofferdam across the river channel at the downstream side of the powerhouse to facilitate dewatering of the in-water work area for powerhouse construction. The concrete powerhouse would be constructed on bedrock within the existing river bed and the areas around the powerhouse footprint would be filled with gravel and riprap as necessary to prevent flow releases from eroding the powerhouse area. A temporary flow bypass pipe would connect to one of the existing outlet works on the downstream side of the dam and extend downstream below the cofferdam to provide up to a 200-cubic-foot-

per-second (cfs) flow release to the Sun River during the non-irrigation construction period.

The project would require construction of a 26.19-mile-long transmission line extending from the powerhouse to the interconnection point at Jackson's Corner. The transmission system would also require construction of a new substation 9.28 miles east of the dam. The proposed project would consist of the new generating, transmission, and maintenance facilities only, and would not include the dam or reservoir (figure 2).

The project boundary would include about 202.5 acres of land, including 68.5 acres of federal lands. Project lands for energy transmission purposes would occupy 55.6 acres of federal lands, and project lands for non-transmission purposes would occupy 12.9 acres of federal lands. The west side of the project boundary begins immediately downstream of Gibson Dam, and includes lands around the existing valve house, the proposed powerhouse, the tailrace area of the Sun River, the overhead transmission line from the powerhouse to the maintenance building, the proposed maintenance building, the existing access road from the maintenance building to the base of the dam, and a 60-foot-wide corridor along the remaining length of proposed transmission line. The Forest Service owns the lands downstream of Gibson dam associated with the aforementioned existing and proposed generating facilities within the project boundary, and lands within the 34.5-kV Canyon Segment of the transmission line. Other lands along the project transmission line and substation are owned by BLM, the state of Montana, and private land owners.

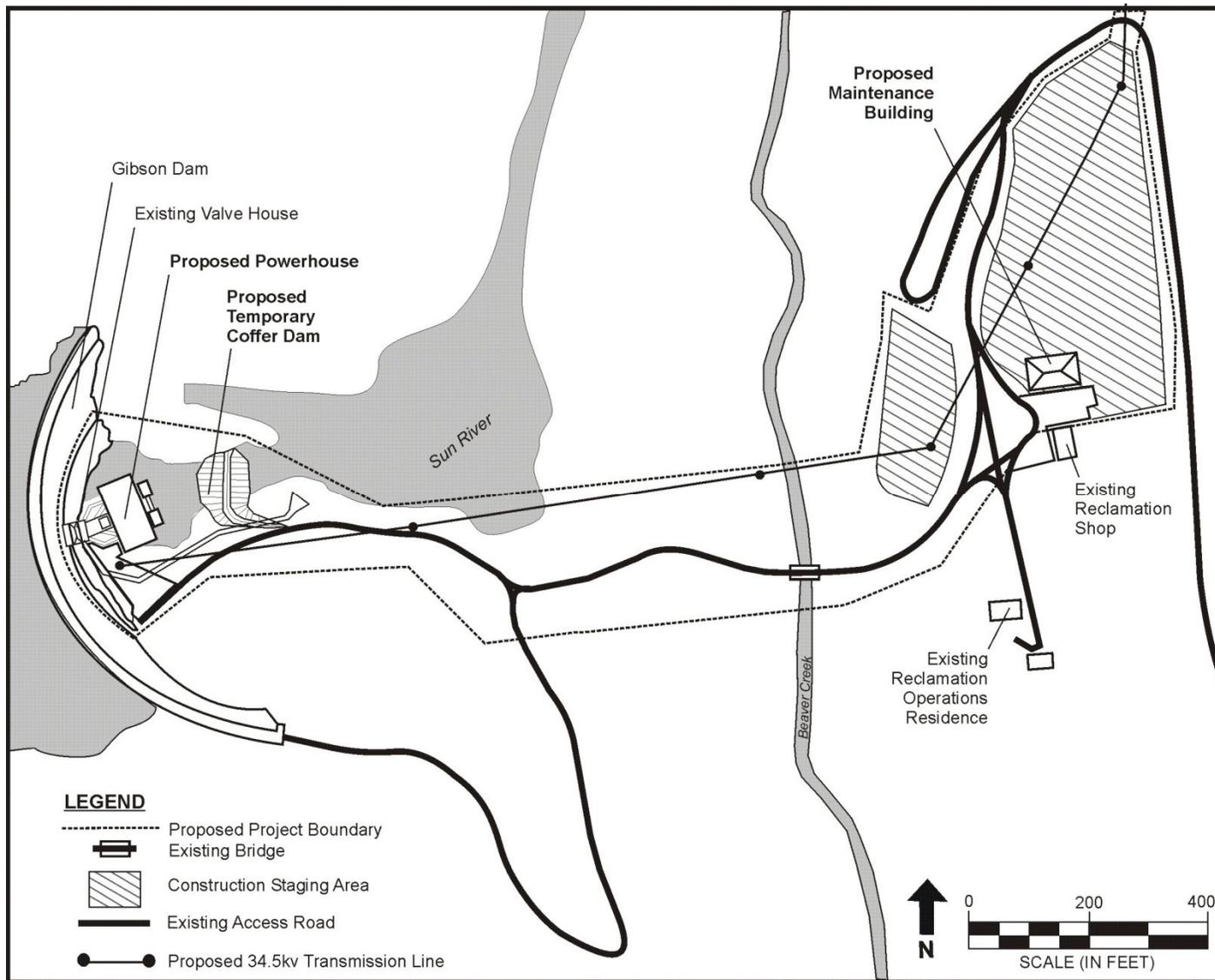


Figure 2. Gibson Dam Hydroelectric Project—existing and proposed facilities (Source: GDHC, 2009, as modified by staff).

Transmission Line

The proposed 26.19-mile-long transmission line consists of three distinct segments beginning at the dam and continuing east to the interconnection point at Jackson's Corner: (1) the 4.57-mile-long, 34.5-kV Canyon Segment; (2) the 4.71-mile-long, 34.5-kV Plains Segment; and (3) the 16.91-mile-long, 69-kV Plains Segment. The project's transmission system would also require construction of a new substation located between the 34.5-kV Plains Segment and the 69-kV Plains Segment.

34.5-kV Canyon Segment

The 34.5-kV Canyon Segment begins at the dam and continues 4.57 miles east to the 34.5-kV Plains Segment near the National Forest boundary at the mouth of Sun River Canyon. This segment would consist of 1.27 miles of buried transmission line and 3.30 miles of above-ground, three-phase³ transmission line constructed on 50- to 55-foot-high poles. In addition to burial of portions of the project's primary transmission line, the applicant also proposes to bury 1.27 miles of existing single-phase 7.2-kV distribution line and remove the remaining existing distribution-line poles within the Sun River Canyon. The above-ground portions of existing distribution line would be reconstructed on the project's new, larger transmission-line poles.

34.5-kV Plains Segment

All 4.71 miles of the 34.5-kV Plains Segment would be buried from the eastern boundary of the Canyon Segment to the proposed substation.

Substation

A 34.5-/69-kV step-up substation would be constructed at the eastern terminus of the 34.5-kV Plains Segment. The proposed substation would be located on BLM lands and would be accessed via an existing, unimproved road corridor extending about 0.5 mile north from the Sun Canyon road.

69-kV Plains Segment

The 69-kV Plains Segment would originate at the substation and extend 16.91 miles east to the interconnection point at Jackson's Corner. The transmission line would consist of a three-phase 69-kV line constructed on 55- to 65-foot-high poles. GDHC proposes to modify portions of existing 7.2-kV and 12.5-kV distribution lines in the

³ A three-phase transmission line consists of three separate transmission cables that are constructed on the same pole.

vicinity of the proposed alignment and reconstruct portions of the existing distribution lines on the project's new, larger transmission-line poles.⁴

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

2.2.3 Project Operation

The project would be operated as a run-of-release project and would result in no change in the existing flow regime of the Sun River. Power generation would vary according to the amount of water being released for irrigation purposes by Greenfields Irrigation District (GID) through its formal agreement with Reclamation. If the powerhouse goes offline, flows would bypass the turbines and would be released directly into the tailrace basin through the jet-flow valves until the powerhouse is brought back online.

During the non-irrigation season, voluntary releases are made to provide for fish habitat in the Sun River. Under current conditions, flow from the reservoir is released to the Sun River through the jet-flow valves located at the base of Gibson dam. All flow releases over 3,050 cfs are made through the Gibson dam spillway. Average daily streamflow at the gage at the base of Gibson dam varies from less than 200 cfs to over 3,500 cfs. Typical releases for irrigation begins in May and last until September, with average peak monthly flows of approximately 2,600 cfs occurring in June. Average monthly flows are about 2,000 cfs in May and about 1,600 cfs in July. Average monthly flows outside the irrigation season range from about 200 cfs to 600 cfs.

The project would have a minimum and maximum hydraulic capacity of 50 and 1,500 cfs, respectively. At flows less than the maximum discharge capacity of the turbines, the jet-flow valves would be closed and the flow would be regulated through the

⁴ The specific locations of GDHC's proposed modifications to existing distribution lines are identified in the visual resources design report (Sandscape and Whitewater, 2009) as modified by Alternative A of the applicant's March 24, 2010, Additional Information Request response filing (GDHC, 2010b).

turbines. If the required reservoir release exceeds the turbine/generator capacity of 1,500 cfs, the necessary additional release would be made through one or both of the jet-flow valves into the tailrace, up to a combined total release of 3,050 cfs through the project powerhouse and the jet-flow valves. Releases in excess of 3,050 cfs would be made through the Gibson dam spillway.

Flow settings in the powerhouse would be set to accomplish the following in order of precedence: (1) release all required irrigation and instream flow through the powerhouse turbines; (2) release flows in excess of turbine capacity through one or both jet-flow valves, and (3) release flows in excess of turbine and jet-flow valve capacity through the spillway.

2.2.4 Environmental Measures

GDHC proposes the following measures for the protection and enhancement of environmental resources:

- Operate the project run-of-release.
- Schedule project construction activities to minimize conflicts with wildlife (specifically elk migration, bighorn sheep lambing, grizzly bear foraging, and sharp-tailed grouse courtship/mating), recreation use, and access.
- Implement the Erosion and Sediment Control Plan filed with the license application, which includes provisions for implementing best management practices (BMPs) during construction to minimize sedimentation, erosion, and vegetation loss.
- Develop and implement a Stormwater Pollution Prevention Plan; Spill Prevention, Control, and Countermeasures Plan; and Blasting Plan after final design⁵ and prior to construction.
- Implement the Construction Water Quality Monitoring Plan filed with the license application.
- Implement the Post-Construction Water Quality Monitoring Plan filed with the license application, which includes provisions for monitoring

⁵ Conceptual designs for project facilities were included in the final license application; however, some detailed information on project facilities and environmental measures would be addressed during the final design stage of the project, prior to construction.

water quality for 3 years following initial project operations, and implementing measures for DO enhancement and additional water quality monitoring based on the results of the initial monitoring program.

- Conduct field surveys, after final design and prior to construction, to locate and avoid wetlands and sensitive plant species during construction activities.
- Implement the Noxious Weed Control Plan filed with the license application.
- Implement the Avian Protection Plan filed with the license application.
- Implement the Bear Safety Plan filed with the license application.
- Implement the Recreation during Construction Plan filed with the license application.
- Develop and implement a Fire Control Plan.
- Develop, after final design of the project, and implement a Traffic Control Plan to minimize delays, hazards from wide loads, and construction equipment effects on recreational visitor use of Forest Development Road (FDR) 108.
- Implement the HPMP filed with the Commission on May 17, 2010 (GDHC, 2010d).
- Implement transmission-line visual resources measures specified in the applicant's visual resources design report as modified by Alternative A of the applicant's March 24, 2010, Additional Information Request response filing, including burying portions of the transmission line, siting the line within existing distribution-line corridors, and modifying non-project distribution lines to avoid or minimize aesthetic effects and enhance existing aesthetic values.

2.2.5 Modifications to Applicant's Proposal—Mandatory Conditions

The following mandatory conditions have been provided and would be made part of any license issued, unless modified by the conditioning agency.

Section 4(e) Land Management Conditions—Reclamation

With two exceptions, all of Reclamation's 4(e) conditions are standard, administrative, or legal in nature and not specific environmental measures. We therefore do not analyze these conditions in this EA. Reclamation's administrative conditions stipulate the following: coordination between GDHC and Reclamation; Reclamation's review and approval of project-related plans; identification of ownership, land use, easement, and water right requirements; establishment of a Memorandum of Understanding and Contributed Funds Agreement with Reclamation; establishment of a construction, operation, and maintenance agreement between GDHC and Reclamation; consultation with Reclamation regarding design and construction of project facilities that are an integral part of, or could affect the structural integrity or operation of, the federal facility or reservation; and filing as-built drawings with Reclamation's Regional Director; implementation of measures for identifying, responding to, and reporting conditions that could compromise the structural integrity and purposes of the federal reservation; absolution of the United States from claims against it by GDHC; GDHC recognition of the primary right of any Reclamation project activity or the fulfillment of Indian water rights associated with the Reclamation project over GDHC's activities; specification that the Commission's Regional Engineer cannot authorize advance construction of any project works until receipt of Reclamation's written acceptance of construction plans and specifications; Reclamation review and approval of final plans and contractor-designed cofferdams, blasting, and deep excavations prior to the start of construction; and prohibition of GDHC from using Reclamation lands for any purposes other than those purposes authorized by the license.

Environmental conditions stipulated by Reclamation that are analyzed in the EA include the following:

- Condition no. 5 stipulates that GDHC revegetate all newly disturbed land areas with plant species indigenous to the area, and approved by Reclamation, within 6 months of project construction unless otherwise specified by Reclamation.
- Condition no. 10 specifies that the timing, quantity, and location of water releases and release changes from the facilities be at the sole discretion of Reclamation.

Section 4(e) Land Management Conditions—Forest Service

The Forest Service's conditions 1 through 10, 14, and 18 through 20 are standard, administrative, or legal in nature and not specific environmental measures. We therefore do not analyze these conditions in this EA. They would include the following: requiring GDHC to obtain a Forest Service special-use authorization; establishing conditions that would need to be met if the license is surrendered or transferred; obtaining Forest Service

approval of final design plans for project components deemed to be affecting or potentially affecting National Forest System (NFS) resources; obtaining Forest Service approval of changes in project facilities or operations from approved exhibits filed with the Commission; annually consulting with the Forest Service regarding measures needed to ensure the protection and development of the natural resource values of the project area; reserving the right of the Forest Service to modify its conditions to respond to new laws and regulations directing changes in management of the area, additional study results, discovery of noxious species, and newly listed or special-status species; maintaining project features to standards acceptable to the Forest Service; developing a Safety During Construction Plan; indemnifying the United States for actions of GDHC related to its authorized use and occupancy of NFS lands; reserving the Forest Service's right to use or permit others to use NFS lands for any purpose, as long as such use does not interfere with project purposes specified in a new license; developing a Public Safety Plan; consulting with and obtaining approval from the Forest Service prior to erecting signs on NFS lands; having unrestricted use by the United States of any road constructed within the project area for purposes deemed necessary for the protection, administration, and use of NFS lands, and extending such rights to state, local entities, and the public, provided such use does not unreasonably interfere with project safety or security or cause GDHC to incur incremental maintenance costs; and limiting the use of vehicles related to hydroelectric project operations to roads or specifically designed access routes and reserving the right of the Forest Service to either close or reconstruct such routes if damage to soil or vegetation is occurring.

Environmental conditions stipulated by the Forest Service that are analyzed in the EA include the following:

- Condition no. 11 specifies development and implementation of an Invasive Plant and Noxious Weed Management Plan.
- Condition no. 12 specifies development and implementation of a Threatened, Endangered, Proposed For Listing, and Sensitive Species Plan at least 60 days prior to ground-disturbing activities.
- Condition no. 13 specifies development and implementation of an Erosion Control Measures Plan.
- Condition no. 15 specifies development and implementation of a Hazardous Substances Plan.
- Condition no. 16 specifies development and implementation of a Recreation Plan.

- Condition no. 17 specifies development and implementation of an Interpretive Display Plan.
- Condition no. 21 specifies that GDHC develop and implement a Transmission Line Management Plan.
- Condition no. 22 specifies that GDHC implement the finalized HPMP.

Water Quality Certification Conditions—Montana DEQ

Montana DEQ issued certification for the proposed project on December 4, 2009. Certification conditions 4 through 9 are standard, administrative, or legal in nature and not specific environmental measures. We therefore do not analyze these conditions in the EA. They would include the following: notifying Montana DEQ and Montana Fish, Wildlife and Parks (Montana FWP) in writing not less than 2 weeks prior to commencing any construction activity within the project boundary, which may result in a discharge of pollutants to state waters and notifying both agencies within 7 days after completion of any construction activity; notifying Montana DEQ and Montana FWP within 24 hours of any unauthorized discharge of pollutants to state waters within the project boundary; allowing Montana DEQ reasonable access to the project and reviewing appropriate records in order to determine compliance with conditions of this certificate; obtaining all permits, authorizations and certifications required by federal, state or local laws, regulations or ordinances prior to the commencement of any activity that could violate Montana's water quality standards and reservation of Montana DEQ's authority to require plans, corrective actions, and monitoring necessary to correct water quality violations that may result from operation, maintenance, or construction associated with the project; if the project is found, at any time, not to be in compliance with any of the conditions of this certification, or if the permittee constructs or operates this project in any way other than as specified in the application or supporting documents, as modified by the conditions of this certification, the terms of the certification would be considered to have been violated; and expiration of the certification upon the assignment of transfer of the property covered by this certification unless the new owner submits to Montana DEQ a written consent to all of the terms and conditions of the certification.

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

- Condition no. 1 specifies that GDHC implement its proposed Construction Water Quality Monitoring Plan, as presented in its license application.
- Condition no. 2 specifies that GDHC implement its Post-Construction Water Quality Monitoring Plan, as presented in its license application,

beginning in the first July to September period following project startup. The need for any action(s) by GDHC to enhance DO in the Sun River below Gibson dam would be determined by Montana DEQ, based on its review of the three-year DO monitoring program and resulting final report.

- Condition no. 3 specifies that GDHC consult with Montana DEQ to develop a new DO Monitoring Plan to assess the success of the DO enhancement measures, if DO enhancement in the Sun River is required.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include GDHC's proposals for the following:

- Operate the project run-of-release.
- Schedule project construction activities to minimize conflicts with wildlife (specifically elk migration, bighorn sheep lambing, grizzly bear foraging, and sharp-tailed grouse courtship/mating), recreation use, and access.
- Implement the Erosion and Sediment Control Plan filed with the license application, which includes provisions for implementing best management practices (BMPs) during construction to minimize sedimentation, erosion, and vegetation loss.
- Develop and implement a Stormwater Pollution Prevention Plan; Spill Prevention, Control, and Countermeasures Plan; and Blasting Plan after final design and prior to construction.
- Implement the Construction Water Quality Monitoring Plan filed with the license application.
- Implement the Post-Construction Water Quality Monitoring Plan filed with the license application, which includes provisions for monitoring water quality for 3 years following initial project operations, and implementing measures for DO enhancement and additional water quality monitoring based on the results of the initial monitoring program.
- Conduct field surveys, after final design and prior to construction, to locate and avoid wetlands and sensitive plant species during construction activities.

- Implement the Noxious Weed Control Plan filed with the license application.
- Implement the Avian Protection Plan filed with the license application.
- Implement the Bear Safety Plan filed with the license application.
- Implement the Recreation During Construction Plan filed with the license application.
- Develop and implement a Fire Control Plan.
- Develop, after final design of the project, and implement a Traffic Control Plan to minimize delays, hazards from wide loads, and construction equipment effects on recreational visitor use of Forest Development Road (FDR) 108.
- Implement the HPMP filed with the Commission on May 17, 2010 (GDHC, 2010d).
- Implement visual resources protection measures at project facilities that are specified in the applicant's visual resources design report as modified by Alternative A of the applicant's March 24, 2010, Additional Information Request response filing, including burying 5.98 miles of the project's transmission line.

Our alternative would not include GDHC's proposal to enhance aesthetic resources by modifying non-project distribution lines located along the project's transmission-line alignment.

In addition, the staff alternative would include:

- Modification of the Noxious Weed Control Plan to include additional provisions for herbicide application restrictions, and for monitoring invasive plants and noxious weeds within the project boundary at three year intervals (Forest Service 4(e) condition no. 11);
- Modification of the Erosion and Sediment Control Plan to include a requirement to file the proposed Stormwater Pollution Prevention Plan; Spill Prevention, Control, and Countermeasures Plan; and Blasting Plan with the Commission for approval, prior to implementation;

- A Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan that would be developed 60 days prior to any ground-disturbing activity (Forest Service 4(e) condition no. 12);
- An Interpretive Display Plan that provides for three interpretive displays, one each at Gibson Overlook, the viewing turnaround below Gibson dam, and near the Sun River diversion dam at the mouth of the Sun River Canyon, and includes provisions for filing a schedule, site drawings, specifications, interpretive display contents, and maps showing the location of the interpretive displays in relation to the project boundary (Forest Service 4(e) condition no. 17); and
- A Transmission Line Management Plan that includes measures for protecting vegetation during construction and operation of the project's transmission line; a description of proposed visual resources protection measures; a map of transmission line locations, with identification of above-ground and below-ground sections, gates, access points, and roads (Forest Service 4(e) condition no. 21).
- Modification of the Avian Protection Plan to include additional provisions for notifying Montana FWP within 24 hours of discovering an avian nest on any project transmission-line facilities, and filing the final updated Avian Protection Plan with the Commission for approval, prior to implementation.

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 section 4(e) conditions in any license issued for the project. The staff alternative with mandatory conditions would be the same as the previously described staff alternative except that it would include Forest Service 4(e) condition nos. 16 and 17 without staff revisions.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We considered one alternative to the applicant's proposal for the transmission line, but eliminated it from detailed analysis because it is not reasonable in the circumstances of this case. This alternative was recommended by Zachary Winestine in his comments on the draft EA and includes several technical measures that could be incorporated into the project design to allow GDHC to bury as much of the 26.19-mile-long transmission line as possible. Zachary Winestine recommends that GDHC: (1) install surge arresters

and reactors along the 34.5-kV section of transmission line, (2) use direct current (DC) for power transmission rather than alternating current (AC), and (3) use a larger low-flow turbine to address resonance issues.

Surge arrestors reduce amplitude (wave heights) of electrical surges, protecting the system equipment from electrical fluctuations. Reactors allow a transmission cable to pass current over long distances without an excessive voltage rise on the system, also protecting equipment from damage. Both components can be used to increase the amount of transmission line that can be installed underground; however, reactors and surge arrestors are expensive. The cost of the equipment is one of the primary reasons why buried transmission lines can be from three to twenty times more expensive than overhead lines (USDA, 2001). In addition to equipment costs, transmission line burial would also incur additional installation costs from trenching and laying of transmission line conduits, splicing lines, adding fluids or gasses to cool the lines, and site restoration. We estimate that the incremental capital cost of burying more of the line would be about \$500,000 per mile, which equates to a levelized annual cost of \$750,000⁶ to bury the remaining 20 miles of transmission line.

DC transmission lines are relatively common for high voltage lines that extend very long distances (e.g., greater than 110 volts and extending at least 400 miles), rather than for lower voltage shorter distance lines such as the one proposed for this project (i.e., 34.5 to 69 kV and extending 26 miles). DC transmission lines require construction of a conversion station, which would likely be substantially more expensive and have a larger footprint than the proposed AC substation that would be necessary to interconnect project power with the AC electrical transmission grid. About 14 percent of conversion station costs are for the cost of the building while the remaining costs are for engineering, insurance, construction, and equipment (e.g., specialized valves, converter transformers, filters, and other equipment are estimated to be 56 percent of the total cost) (Larruskain et al., 2005). While DC transmission systems are being evaluated for several applications, the traditional high voltage DC system is designed for the transmission of large amounts of energy and is not economical for loads less than 20 MW (Larruskain et al., 2005). Estimates of the total capital cost for the installation of high voltage DC transmission lines, including the required conversion station costs, range from approximately \$1.6 million to almost \$2 million per mile, depending on the load, distance traveled, and geographic constraints of the area in which the installation occurs (Bahrman, 2006). We estimate that the incremental capital costs of converting the entire transmission line to

⁶ This cost is assumed to include all costs necessary for the additional equipment, installation, insulation, and site restoration required for burial of the entire length of transmission line. Individual site factors, including geology, actual equipment selected, and other factors would influence the actual cost to bury this line.

DC could exceed \$38 million, which would equate to a levelized annual cost of about \$2.6 million.

Resonance can occur when electrical transmission cables are placed underground, and can be a limitation to the amount of transmission line that can be buried.⁷ Resonance affects lower voltage lines more than it affects higher voltage lines; therefore, using a higher voltage line can allow for a longer length of a transmission line to be buried. Increasing the turbine size and generating at higher hydraulic capacities is one possible way to achieve a higher voltage transmission line and minimize resonance. Zachary Winestine recommends that GDHC replace the two 1.5-MW turbines with a single 3-MW turbine to reduce the risk of resonance-damaging equipment, and allow for more of the transmission line to be buried.

The capital costs of installing a single 3-MW turbine would likely be comparable to those of installing two 1.5-MW turbines. The minimum hydraulic capacity of each 1.5-MW turbine would be 50 cfs, which would enable generation during most low flow conditions. The minimum hydraulic capacity of a 3-MW turbine would be about 100 cfs. Thus, when flow releases are less than 100 cfs, no generation would be possible. We estimate that the reduced generation potential of a larger low-flow turbine would be about 1,300 MWh, which equates to a levelized annual cost of about \$54,000.

GDHC proposes to bury a total of 5.98 miles of the 26.19-mile-long transmission line, including the portion of the transmission line that would be the most visible to the public (e.g., 1.27 miles within the Sun River Canyon and the entire 4.71 miles of the plains segment west of the substation). The remainder of the above ground portion of transmission line would be located on private lands or lands that are not of high value to the public for viewing the Rocky Mountain Front or Sun River Canyon. Because of the high costs, technological difficulties, and limited benefits, we don't consider burying additional lengths of the transmission line up to the entire 26.19 miles to be a reasonable alternative.

⁷ Resonance in underground cables can create a backflow situation, where instead of flowing down the line to the connection point with the transmission grid, ions flow backwards to the generator resulting in reduced generator output and possible damage to equipment.

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. Under each resource area, historical and current conditions are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.⁸

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Sun River is formed by the confluence of the North and South Forks of the Sun River immediately upstream of Gibson dam and reservoir. From the tailrace of Gibson dam the river flows approximately 102 miles east to the confluence with the Missouri River near Great Falls, Montana. The topography around Gibson dam and in the area about 3 miles downstream of and east of the dam along the Sun River Canyon is mountainous and partially forested. This 3-mile-long portion of the proposed project is located within Lewis and Clark National Forest. From the eastern boundary of the National Forest east to the confluence with the Missouri River, the topography varies from rolling hills to flat lands with typical high prairie vegetation, agricultural lands, and scattered small wetland areas. The Sun River basin encompasses approximately 2,200 square miles and includes portions of Cascade, Lewis and Clark, and Teton counties, Montana. Major land uses in the Sun River basin include livestock grazing, crop production, forestlands, urban and rural residential, and wildlife habitat. About 106,655 acres of irrigated land are currently farmed in the Sun River basin. Additionally, there are about 300,000 acres of dry cropland, 400,000 acres of rangeland, and 100,000 acres of pastureland.

The climate of the project area is typical of the semi-arid northern intermountain area. It is characterized by light and variable precipitation, as well as warm sunny days and cool nights through the summer months. Winter weather is erratic and occasionally severe. Temperatures in the area have historically varied from a maximum of 106 degrees Fahrenheit (°F) to a minimum of -43°F. January is the coldest month with an average temperature of 22.0°F, and July is the warmest with an average temperature of 65.1°F. The average annual precipitation in the project area is 13.95 inches, and the average annual snowfall is 42.7 inches.

⁸ Unless otherwise indicated, the source of our information is the license application (GDHC, 2009).

Drainage to the Sun River at Gibson dam primarily originates from the Rocky Mountains in the extreme western part of the basin. Elevations in the basin range from 9,000 feet along the Continental Divide to about 3,350 feet in Great Falls, Montana.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR §1508.7), 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 actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we identified water quality and fisheries resources as having the potential to be cumulatively affected by the proposed project in combination with other past, present, and foreseeable future activities. Reclamation, in its scoping comments filed on January 25, 2010, states that increased activity from project-related personnel onsite could result in cumulative effects on terrestrial resources, threatened and endangered species, recreation, and land use. We consider such potential effects to be direct project effects, rather than cumulative effects, and address them in the appropriate resource sections.

Water quality was selected because the quality of water released from the proposed powerhouse to the Sun River would be largely determined from the point of withdrawal from Gibson reservoir and whether water flows through the jet-flow valves, the powerhouse, or the spillway. GID through its formal agreement with Reclamation controls the quantity and timing of releases from the reservoir. Downstream of the powerhouse, the quality of water would be influenced not only by releases at Gibson dam but also the amount of water diverted from the Sun River for irrigation purposes and associated return of irrigation water to the river and its tributaries via surface or groundwater. In addition, project construction activities would contribute to cumulative effects.

Fishery resources were selected because water quality downstream of the proposed powerhouse, which is influenced by several factors as identified above, directly influences the habitat quality for fish populations and their prey base. In addition, changes to flow routing from the existing jet-flow valves to the project powerhouse would affect entrainment mortality rates. The amount of aquatic habitat in the Sun River is directly related to the timing and quantity of flows released from Gibson dam and diverted from the Sun River for irrigation purposes.

3.2.1 Geographic Scope

The geographic scope of analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

There are no other hydroelectric projects on the Sun River;⁹ however, Reclamation's Sun River Project includes several water storage and distribution facilities throughout the basin for the primary purpose of storing and releasing water for irrigation. Gibson dam and reservoir (river mile [RM] 102) is the primary water storage facility for the Sun River Project. Downstream of Gibson dam at RM 92 irrigation diversions occur at the Sun River diversion dam. The Sun River diversion dam diverts water into the Pishkun supply canal. Additional irrigation diversions occur at RM 52 at the Fort Shaw diversion dam, which diverts water into the Fort Shaw canal.

These dams and irrigation diversions have cumulatively affected fisheries and water quality resources of the Sun River. For both of these resources we considered the cumulative effects in the Sun River from the base of Gibson dam to the confluence with the Missouri River in Great Falls, Montana. We selected this geographic scope because construction and operation of the project, in combination with irrigation flow diversions, fish stocking, and agricultural and other land use practices, may cumulatively affect Sun River fisheries and water quality resources.

In section 3.3.2.3, we discuss the cumulative effects of licensing the project on fisheries and water quality resources.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and future actions and their effects on water quality and fisheries resources. Based on the potential term of a license, the temporal scope looked 30 to 50 years into the future, concentrating on the effect on water quality and fisheries from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information for each resource. We identified the present resource conditions

⁹ Three small hydroelectric power projects located about 35 miles east of Gibson dam were recently issued FERC licenses. The projects are located on irrigation canals that are associated with Reclamation's Sun River Project near the Town of Fairfield, Montana. The projects include the 5-MW Lower Turnbull Drop (FERC No. 12597), 4.1-MW Upper Turnbull Drop (FERC No. 12598), and the 1.05-MW Mill Coulee Drop (FERC No. 12599).

based on the license application, agency comments on the draft license application, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific site-specific and cumulative 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 geologic and soils, aquatic, terrestrial, threatened and endangered species, recreation and land use, aesthetics, and socioeconomic resources may be affected by the proposed action and action alternatives. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geologic and Soil Resources

3.3.1.1 Affected Environment

Gibson dam and Gibson reservoir are located in the foothills of the southern Flathead Range of the Rocky Mountains. The Flathead Range is part of the northern Montana overthrust belt. In the Gibson dam area, Cretaceous clastics and upper Paleozoic carbonates are deformed by thin-skinned thrust faulting into the distinct valley and ridge topography of the Montana overthrust belt. Major thrust faults lie both upstream and downstream of the dam site, although there is no evidence of recent fault activity. East of the mountain front, the transmission line route is underlain by relatively flat-lying Cretaceous marine sandstone, siltstone, and shale. Pleistocene glaciations and related processes affected much of the present geology of the project area. Glacial deposits overlie bedrock over large areas near the base of the mountains where the Sun River emerges from its canyon.

Bedrock at the location of the proposed powerhouse is in the lower stratum of the Castle Reef Dolomite Formation of the Madison Limestone. This stratum is light- to medium-gray, thick bedded, fine to coarsely crystalline dolomite; calcitic dolomite; dolomitic limestone; and limestone.

Terraces underlain by gravel form much of the upland surface. Soils along the transmission line route consist primarily of gravelly clay loams, derived from weathering of Cretaceous bedrock. Soils tend to be shallow and support sparse vegetation.

The earthquake hazard in the proposed project area is low to moderate. According to the U.S. Geological Survey Earthquake Hazards Program, the probability for

occurrence of a magnitude 5.0 or greater earthquake within 30 miles of the project area over 50 years is approximately 0.7. The nearest quaternary fault to the project area is the Mission fault, located 58 miles to the west.

3.3.1.2 Environmental Effects

Ground disturbance associated with the construction of the project could release sediment into the Sun River and its tributaries. Construction activities such as clearing, grading, and excavation can expose soils, talus, alluvium, and weathered bedrock to wind and water erosion. Once mobilized, these materials could enter the Sun River, increasing sedimentation and turbidity.

Ground disturbance would occur at several locations in the project area. Construction of new penstocks, a powerhouse at the base of the dam, and a maintenance facility would cause ground disturbance near Gibson dam. Removal of existing and construction of new transmission facilities, including a substation, overhead and underground transmission lines, and construction access roads would cause ground disturbance along the length of the transmission corridor. Construction effects could be most pronounced in areas where cleared or excavated material is primarily fine-grained material (i.e., soil and sediment), where the construction activities occur nearest to the Sun River and on steep slopes above the river.

Construction of several temporary facilities would also require ground clearing activities. A temporary cofferdam would be constructed downstream of the proposed powerhouse construction site to facilitate dewatering at the powerhouse site during construction.¹⁰ A temporary bypass pipe would be connected to one of Gibson dam's existing discharge pipes to route water to the Sun River downstream of the proposed temporary cofferdam. Existing water between Gibson dam and the cofferdam would be pumped downstream over bedrock or riprap to the Sun River. Two proposed temporary construction staging areas would be located near the maintenance shop (figure 2).

Because of the potential for erosion and sediment mobilization as a result of project construction, GDHC filed an Erosion and Sediment Control Plan with the final license application. This plan describes the existing features, proposed land-disturbing activities, and sediment and erosion control measures to be used during project construction. The Erosion and Sediment Control Plan would use BMPs based on the Montana Department of Transportation's Erosion and Sediment Control BMPs (Montana DOT, 2010). Site-specific BMPs are presented based on the conceptual project design. In its Erosion and Sediment Control Plan, GDHC also proposes to develop and implement a Stormwater Pollution Prevention Plan after final design of the project, but prior to initiation of construction.

¹⁰ The cofferdam would prevent backwatering into the work area.

GDHC also proposes to time construction activities to coincide with seasonal conditions that would minimize sediment disturbance and transport. Blasting (if required) and excavating for the powerhouse is proposed to occur during the Gibson reservoir low water period (October through February), and dewatering of the tailrace would occur during the period of low releases to the Sun River (October through April). Off-road work associated with transmission line construction would occur during dry periods or frozen ground conditions.

BMPs proposed to address powerhouse construction effects include installing a floating oil absorption boom on both sides of the cofferdam and using clean riprap, washed gravel, and an impermeable membrane to construct the cofferdam. Sediment control structures are proposed to limit transport in areas of land disturbance. Silt fencing, sediment traps, straw bale barriers, fiber rolls, and a check dam would be installed between work areas and the Sun River to limit sedimentation. After the completion of the powerhouse construction, the cofferdam would be removed and water flow to the Sun River would be restored via the new powerhouse tailrace.

BMPs proposed to address construction activities at the proposed staging area and maintenance facility are conventional for construction sites. No trees would be cleared within the staging area, and disturbed areas would be limited as practical to preserve existing vegetation. A 10-foot-wide vegetation buffer would be preserved around the perimeter of the staging area to reduce erosion and sediment transport. Silt fencing and straw bale barriers would be used to retain sediment-laden runoff.

BMPs proposed to address construction activities associated with the transmission line and substation are designed to limit erosion and the transport of sediment in runoff. Tree clearing would be minimized within the transmission right-of-way. Fiber rolls, straw bale barriers, and silt fencing would be installed where appropriate to prevent erosion and reduce sediment laden runoff. Erosion at soil stockpiles would be minimized using plastic covers, and exposed soils would be protected by straw mulch or temporary seeding.

GDHC proposes to inspect erosion, sedimentation, and slope instability control measures at a minimum of every 7 days and after each 0.2-inch or greater rain or snow melt event in critical areas and after each 0.5-inch or greater rain or snow melt event in non-critical areas throughout the construction period. The inspections would be conducted to evaluate the effectiveness of BMPs currently in place, as well as the need for further erosion, sedimentation, and slope instability measures. Maintenance of the control measures would be initiated based on the findings of the inspections. Sediment accumulated at silt fences and sediment barriers would be removed when they reach approximately one-half capacity.

Reclamation states in its July 16, 2010, filing, that GDHC should specify the quantities and source of temporary cofferdam materials, and that the environmental effects of transporting and disposing the materials should be evaluated. Forest Service 4(e) condition no. 13 stipulates that GDHC file with the Commission an Erosion Control Measures Plan that is approved by the Forest Service.

Staff Analysis

Project construction would mobilize sediments due to disturbance of soil, talus, alluvium, and weathered bedrock in the vicinity of the Gibson dam and along the proposed transmission line route. Without properly designed and constructed sediment controls, ground disturbance could represent a substantial source of sedimentation to the Sun River, causing increased turbidity and elevated sediment loading. The actions proposed in GDHC's Erosion and Sediment Control Plan are consistent with standard construction practices and should effectively minimize any erosion, sedimentation, and slope stability effects in the project area.

The BMPs presented in this plan are site-specific, but based on conceptual project plans. GDHC accounts for refinements to this plan based on final project design by committing to develop a Stormwater Pollution Prevention Plan after final design, but prior to construction, in accordance with the requirements of the Clean Water Act permit program for Stormwater Discharges Associated with Construction Activity under the Montana Pollutant Discharge Elimination System. The Stormwater Pollution Prevention Plan would also likely identify the specific areas considered to be critical for erosion control and, therefore, subject to more rigorous inspections. Typically, critical areas would include, at a minimum, areas where land disturbance is required adjacent to the Sun River and perennial streams, as well as soil piles. The plan would be developed in consultation with Montana DEQ. The plan should also help serve the Forest Service condition to develop an Erosion Control Measures Plan prior to initiating ground-disturbing activities.

Elevated turbidity and increased sedimentation could occur in the Sun River downstream of Gibson dam, despite properly functioning control measures. During construction of the cofferdam, Sun River streambed sediments would be disturbed and transported downstream. The subsequent removal of the cofferdam would also mobilize sediments. However, these effects would be temporary. Any erosion, sedimentation, or slope stability effects would be minor and on the same level as common infrastructure projects such as road and building construction projects when proper erosion controls are in place.

GDHC indicates on page 12 of its Erosion and Sediment Control Plan that its proposed cofferdam would require 1,625 cubic yards of clean gravel and 325 cubic yards of riprap to construct. At the conclusion of the powerhouse construction, GDHC states that it would remove the cofferdam material and use it onsite as final fill and grade

material, or dispose of it offsite. Identification of the source of gravel and riprap for use in constructing the cofferdam would not be feasible until final design of the cofferdam occurs. Similarly, the amount of cofferdam material that would be able to be used onsite for fill and grade material is not likely to be known until after final design of the project is complete. Including in the final cofferdam design, the proposed source of gravel and riprap to be used to construct the cofferdam, the proposed offsite disposal site for surplus riprap and gravel not used onsite, and how environmental effects associated with excavating material and disposal of material would be addressed would enable Reclamation to review, comment, and approve GDHC's proposal.¹¹

GID through its formal agreement with Reclamation would continue to control water flow through the project. The current flow regime would not be modified once the project becomes operational. Therefore, the project would have no effect on long-term erosion on the Gibson reservoir shoreline or Sun River stream banks and stream bed. Any potential long-term erosion effects along the transmission line corridor (e.g., rutting of access roads) could be addressed through a Transmission Line Management Plan.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

All Gibson reservoir water rights are held jointly between Reclamation and GID. Irrigation is the primary purpose of the water in Gibson reservoir, with all other uses playing secondary roles.

Releases from Gibson reservoir are measured and recorded by Reclamation at a permanent stream gage installed at the base of Gibson dam. The average daily Sun River streamflow at the gage location varies from less than 200 cfs to more than 3,500 cfs. Typical releases for irrigation begin in May and last until September, with peak flows occurring in June. Average monthly flows for low (2001), average (1989–2004), and high (1991) water years range from 50 to nearly 5,000 cfs (figure 3). The maximum discharge through the Gibson dam outlet works is 3,050 cfs. Any flows greater than this are discharged through the drop inlet spillway.

¹¹ Condition no. 1 of Reclamation's 4(e) conditions stipulates that GDHC will provide for Reclamation review and approval of all project designs.

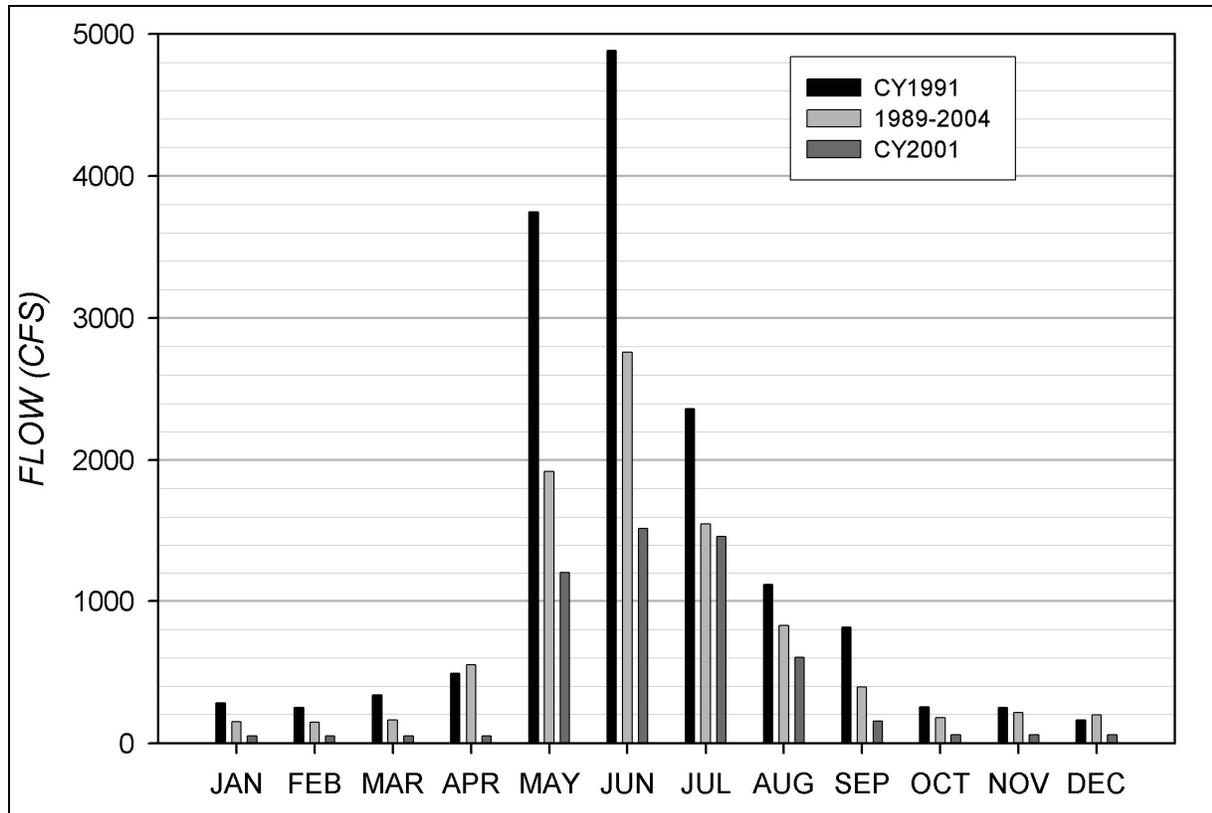


Figure 3. Average monthly flows in the Sun River below Gibson Dam for low (2001), average (1989-2004), and high (1991) water years (Source: GDHC, 2009).

At elevation 4,724 feet (normal high water elevation), Gibson reservoir surface area is about 1,296 acres and contains about 96,477 acre-feet of water. At elevation 4,610 feet (minimum operational water level), the reservoir surface area is about 400 acres and contains about 5,300 acre-feet of water. Gibson reservoir annually fluctuates between these extreme water elevations and volumes.

Flow regimes and water quantity in the Sun River have been substantially altered by the Sun River Project. According to the 2004 Water Quality Restoration Plan and Total Maximum Daily Loads for the Sun River Planning Area, the primary effect has been dewatering of the river below the Sun River diversion dam (RM 92) (Montana DEQ, 2004). The Sun River from Sun River diversion dam to Fort Shaw diversion dam (RM 52) is on the Montana FWP's Chronically Dewatered List.

Total water demand for GID's 83,241 acres of irrigated land is approximately 250,000 acre-feet annually. GID's total available storage of approximately 126,877 acre-feet (96,477 acre-feet of live storage in Gibson reservoir and 30,400 acre-feet of live storage in Pishkun reservoir) does not meet the annual demand. Irrigation operations,

therefore, depend on sustained Sun River instream flow, in addition to reservoir water storage.

Water Quality

Water quality standards applicable to Gibson reservoir and the Sun River downstream of Gibson dam are shown in table 2. These waters are classified as B-1, which means they are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

Table 2. Numeric water quality criteria for B-1 classified waters (Source: staff).

Parameter	Background Condition	Numeric Criteria
Temperature ^a	32°F to 66°F	1°F maximum increase above background
	66°F to 66.5°F	No discharge is allowed that would cause the water temperature to exceed 67°F
	>66.5°F	The maximum allowable increase in water temperature is 0.5°F
DO ^b	NA	4.0 mg/L from October through February; 8.0 mg/L from March through September ^c
Total gas pressure	NA	110 percent saturation
Turbidity	NA	5 NTUs above background

Notes: DO – dissolved oxygen

°F – degrees Fahrenheit

mg/L – milligram per liter

NA – not applicable

NTU – nephelometric turbidity unit

^a Montana does not have absolute standards for water temperature. Temperature regulation is relative and prohibits increases of various amounts above naturally occurring water temperature.

^b The freshwater aquatic life standard for DO in Montana is contingent on the classification of the waterbody and the presence of early life stages of fish.

^c The 8.0-mg/L standard is applicable when early life-stages of fish are present.

Water quality in Gibson reservoir is considered generally good due to the reservoir and its tributaries occurring solely within the Lewis and Clark National Forest, and because it is located upstream from population centers and agricultural areas. The Sun River from Gibson dam downstream to Muddy Creek is considered to be impaired and does not fully support coldwater fisheries or other aquatic life (Montana DEQ, 2010). Specified causes of impairment include flow regulation and modification (water temperature), grazing and other alterations in riparian or shoreline zones (sedimentation and siltation), and channelization from flow regime alterations.

Gibson Reservoir Water Temperature—Gibson reservoir temperature profiles from 2004, 2006, and 2007 indicate that the reservoir develops a warm surface layer in spring that increases in thickness through the summer due to solar and atmospheric heating (figure 4). Surface water temperatures increase from 45°F to 50°F in June to as high as 68°F in late July and August. Water temperatures at the bottom of the reservoir were lower than surface temperatures, ranging from less than 45°F in June to as high as 64°F in late July and in August. Summer temperature variation at depth was influenced by reservoir surface elevation resulting from drawdown. During the winter and as the reservoir fills with spring runoff, a uniformly cool to cold temperature profile is established in Gibson reservoir. Water temperatures in November and April were about 35°F at all depths. GDHC did not measure water temperatures between November and April because the reservoir was not stratified and likely had uniform water temperatures during the winter months.

Gibson Reservoir Dissolved Oxygen—During the summer months, Gibson reservoir develops a DO gradient (figure 5). Data collected by Montana DEQ in 2004 and 2007 show that surface DO levels are highest in the spring months, when surface water is cooler and decrease as surface water warms. Near the reservoir surface, DO levels can be from greater than 11 mg/L in April to as low as 7.7 mg/L in late July and August. Deeper in the reservoir, DO levels ranged from above 11.0 mg/L in June to as low as 6.9 mg/L in July and August.

Sun River Water Temperature—Continuous water temperature data collected in 2006 at three locations approximately 0.1, 2.0, and 30 miles downstream from Gibson dam indicate that water temperatures in the tailrace ranged from near freezing through the winter months to greater than 60°F in late summer, and there was no substantial increase between the tailrace and two miles downstream near Hannan Gulch. 30 miles downstream near the town of Augusta, however, Sun River water temperatures are severely affected by consumptive water withdrawals for irrigation. Consumptive water withdrawals decrease streamflow, thereby reducing the amount of water that is available to absorb heat energy. Consequently, reduced streamflows typically cause elevated water temperatures. 2006 water temperature data indicate that Sun River daily-maximum water temperatures increased by about 15°F at Augusta as compared to the Gibson dam tailrace.

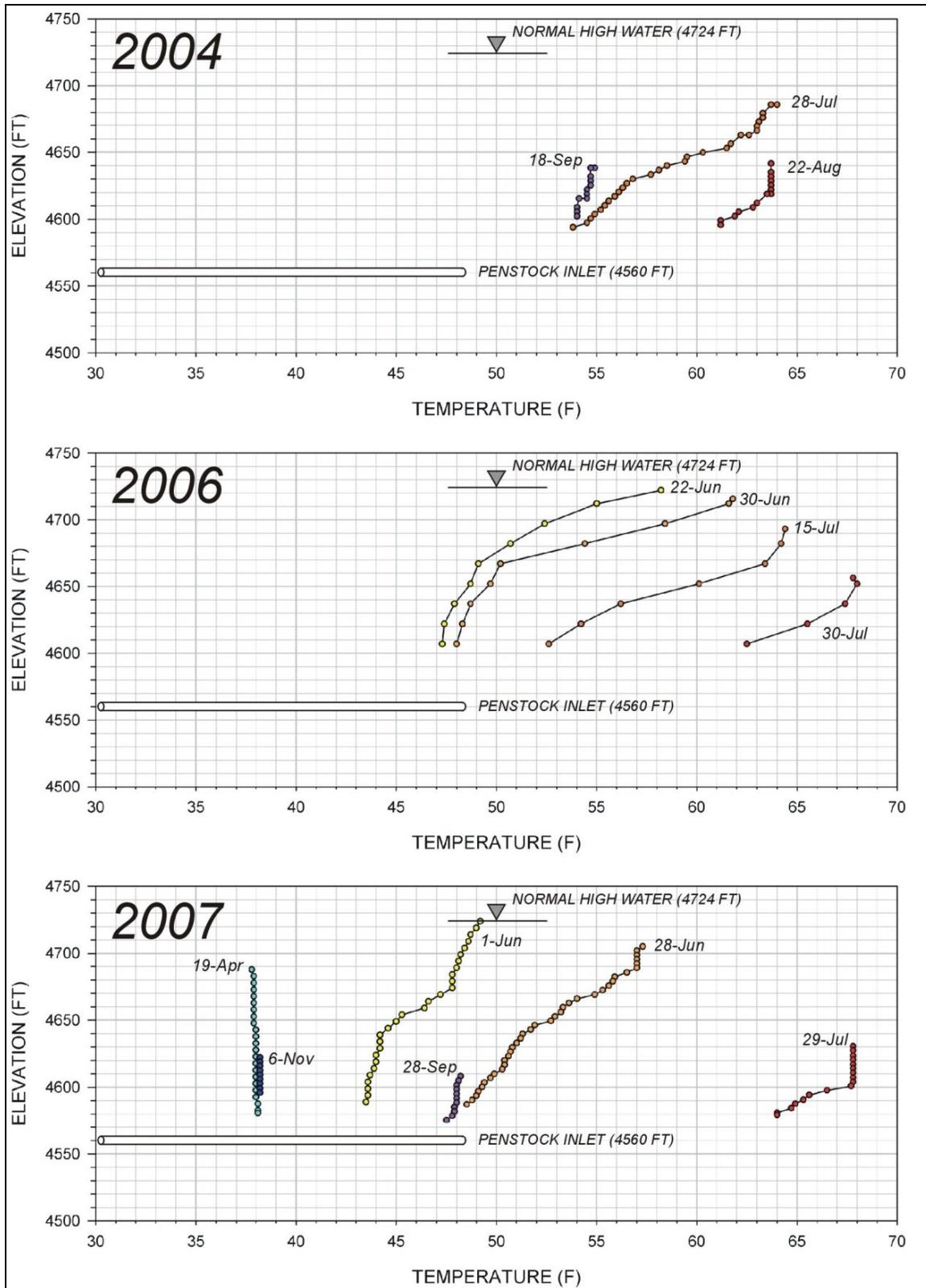


Figure 4. Temperature profiles for Gibson reservoir for 2004, 2006, and 2007 (Source: GDHC, 2009).

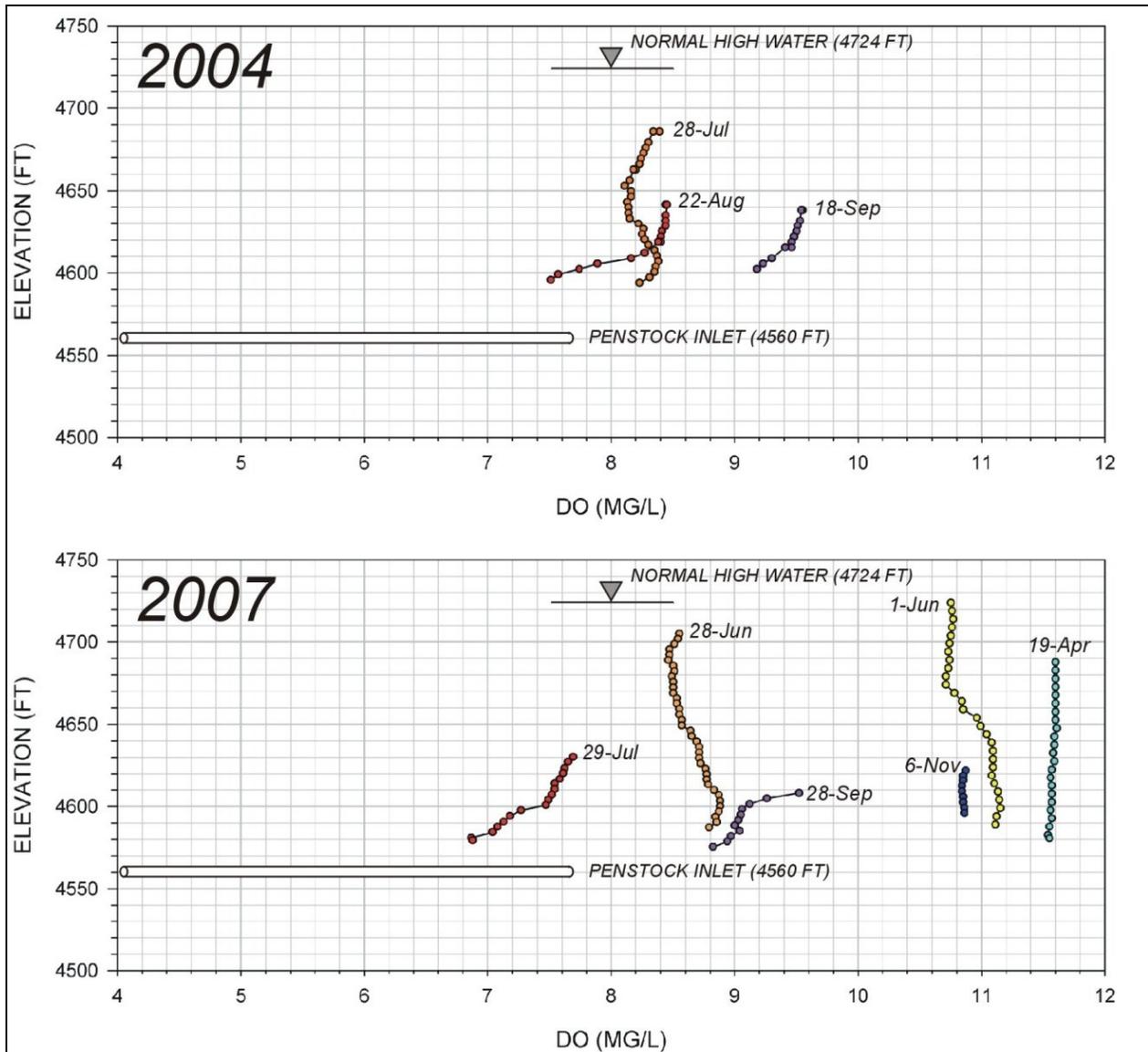


Figure 5. Dissolved oxygen profiles for Gibson reservoir for 2004 and 2007 (Source: GDHC, 2009).

Sun River Dissolved Oxygen—Figure 7 shows DO data for the Sun River collected during 2007 in the tailrace pool immediately below the Gibson dam outlet gates. All measurements in the water column met state DO standards for early life stages and other life stages of fish. Measurements were also taken in the streambed at three locations in late summer 2008. Measurements taken at a depth of approximately 12 centimeters using standpipes indicated that DO levels within the streambed are reduced by 0.48 mg/L to 2.32 mg/L relative to the levels measured in the water column, with greater differences occurring in areas with fine-grained streambed sediments (table 3).

Figure 8 shows a composite of DO data collected in 2007 in the tailrace pool and DO-depth profiles measured in Gibson reservoir on the same days. These data indicate that during the summer months, DO levels immediately downstream of the dam outlet valves were 1.0 to 1.5 mg/L higher than DO levels measured in the reservoir at the elevation of the penstock intake. The higher DO levels measured in the tailrace are likely due to oxygenation of water by turbulence caused during its release through the jet-flow valves that are used to control outflows from Gibson dam.

The Sun River reach between Gibson dam and Sun River diversion dam (approximately 3 miles downstream) is characterized by a series of riffles. Immediately downstream of Sun River diversion dam, the river passes over a waterfall that the diversion dam is constructed on. These turbulent areas provide considerable aeration and likely increase DO levels.

Sun River Total Dissolved Gas Supersaturation—Gas supersaturation can occur when dissolved gases in water are subjected to high pressure conditions, typically when accelerated spillway water is forced into a deep plunge pool. Comments provided by Montana DEQ (2008) point to DO data for July 2007 as an indication of possible gas supersaturation. For the elevation and temperature conditions at the tailrace pool on July 29, 2007, DO saturation occurs at approximately 7.9 mg/L. DO measurements taken in the tailrace pool on July 29, 2007, indicate DO levels between 8.3 and 8.5 mg/L, or approximately 108 percent saturation.

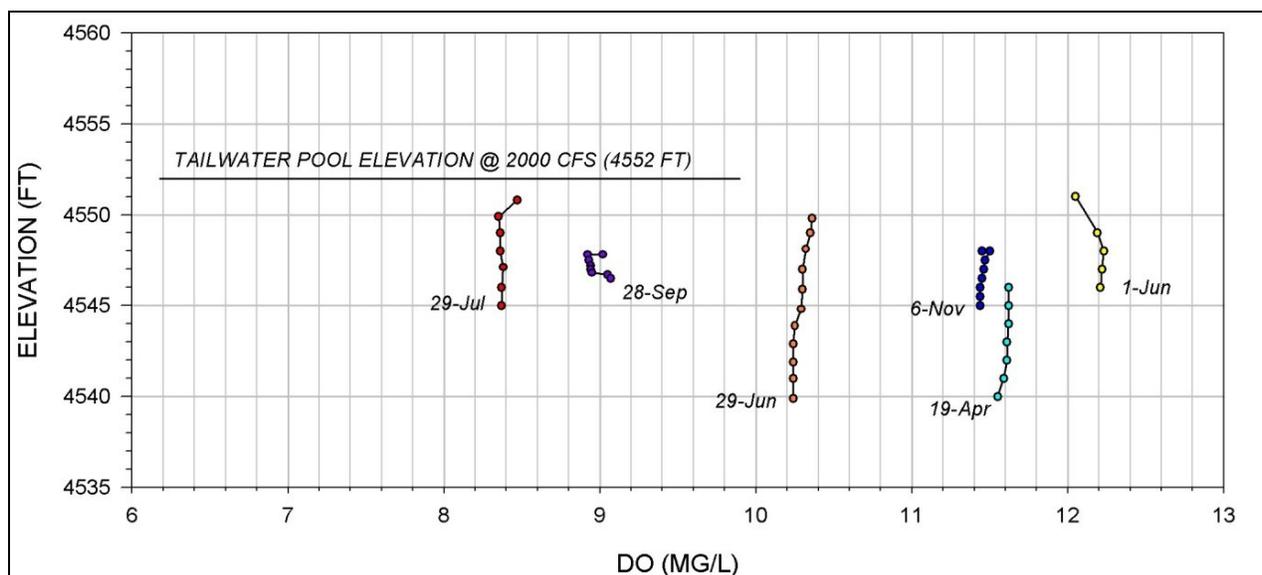


Figure 6. Sun River dissolved oxygen levels measured immediately below Gibson dam outlet in 2007 (Source: GDHC, 2009).

Table 3. Measured dissolved oxygen differential between water column and streambed sediments (Source: GDHC, 2009).

Station	Change in DO, mg/L (water column DO minus intergravel DO)		Sediment Description
	July 31, 2008	August 25, 2008	
Gibson dam tailrace (RM 102)	0.48	0.65	Coarse gravel and cobble
Blacktail Bridge (RM 101.5)	1.07	0.72	Slightly finer than tail-out
Hannan Gulch (RM 100)	2.32	2.13	Fine gravel and sand

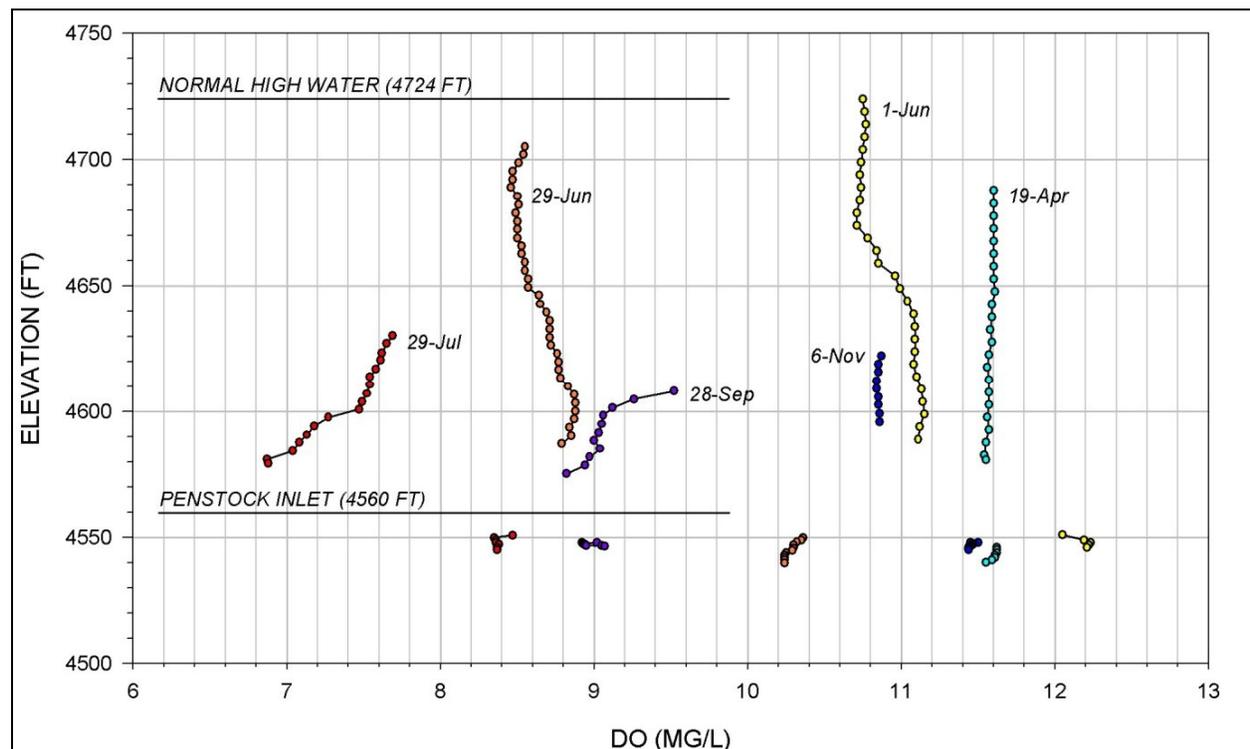


Figure 7. Gibson reservoir and Sun River dissolved oxygen measured in the tailrace pool immediately below Gibson dam outlet in 2007 (Source: GDHC, 2009).

Fishery Resources

Fish Community

Gibson reservoir and the Sun River, including the North and South Forks that flow into the reservoir, contain a variety of both native and introduced fish species. Native fish species with special status that occur in the project area include the Arctic grayling (*Thymallus arcticus*) and westslope cutthroat trout (*Oncorhynchus clarki lewisi*). Other native fish species that occur in the Sun River and in Gibson reservoir include mountain whitefish, longnose sucker, mountain sucker, northern pike, fathead minnow, lake chub, longnose dace, native stonecat, burbot, and mottled sculpin.

The Arctic grayling historically occurred throughout the upper Missouri River basin upstream of Great Falls, Montana. The current population of grayling in Gibson reservoir originated from stocking efforts made by Montana FWP in the North and South Forks of the Sun River, upstream of Gibson reservoir, from 1999 through 2001. Gibson reservoir grayling populations are concentrated in the upstream end of the reservoir and are thought to use the Sun River and its forks for spawning.

Currently, the Arctic grayling is listed as sensitive by the Forest Service and BLM. Montana FWP lists it as a species of special concern—G5-S1, indicating it is not vulnerable in most of its range, but in the state of Montana, it is at high risk because of extremely limited and potentially declining numbers, extent, and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.

The westslope cutthroat trout is a subspecies of cutthroat trout that occurred historically throughout the Northern Rocky Mountain states, including the Sun River basin. Viable, but genetically impure, populations of westslope cutthroat trout still occur within the North Fork of the Sun River drainage upstream of Gibson reservoir, and westslope cutthroat and rainbow trout hybrids have been found in Gibson reservoir by Montana FWP. The Forest Service and BLM categorize the westslope cutthroat trout as a sensitive species. It is currently listed as a G4T3-S2 species by Montana FWP, meaning that globally it is apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining. However, in the state of Montana, it is at risk because of very limited and potentially declining numbers, extent, and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.

Sun River Fishery

Montana FWP rates the Sun River as an excellent recreational fishery in the headwaters above Gibson reservoir. The 2005 Montana Angler Satisfaction Ratings indicate that the Sun River provides for a fair fishery with an average rating of 2.86 on a scale of 5 (58 responses) from Gibson dam to Muddy Creek (85.3 miles downstream), and 2.60 (15 responses) for the lower river downstream of Muddy Creek to its confluence

with the Missouri River (17.1 miles). Water management practices, notably streamflow diversions for irrigation, contribute to seasonally low streamflow and associated high water temperatures that affect gamefish populations, especially trout and whitefish, in the Sun River downstream from Gibson dam.

A total of 16 species of fish are known to occur in the Sun River downstream from Gibson dam, including several warmwater species that are restricted to downstream areas near its confluence with the Missouri River (table 4). Montana FWP surveys indicate that mountain whitefish, brown trout, and rainbow trout are the most abundant species overall, and limited sampling conducted between Gibson dam and the Pishkun canal (table 5) suggest that coolwater species predominate in the first 10 miles of river downstream from Gibson dam.

Table 4. Fish species found in the Sun River downstream of Gibson dam (Source: GDHC, 2009).

Common Name	Scientific Name	River Miles^a	Species Type
Black bullhead	<i>Ictalurus melas</i>	0–17.1	Introduced
Fathead minnow	<i>Pimephales promelas</i>	0–17.1	Native
Common carp	<i>Cyprinus carpio</i>	0–26.6	Introduced
Native stonecat	<i>Noturus flavus</i>	Not available	Native
Northern pike	<i>Esox lucius</i>	0–26.6	Native
Burbot	<i>Lota lota</i>	0–62.1	Native
Brown trout	<i>Salmo trutta</i>	0–93.7	Introduced
Longnose dace	<i>Rhinichthys cataractae</i>	0–96.5	Native
Longnose sucker	<i>Catostomus catostomus</i>	0–96.5	Native
Mountain whitefish	<i>Prosopium williamsoni</i>	0–96.5	Native
White sucker	<i>Catostomus commersoni</i>	0–96.5	Introduced
Lake chub	<i>Coueseus plumbeus</i>	17.1–96.5	Native
Mountain sucker	<i>Catostomus platyrhynchus</i>	17.1–96.5	Native
Brook trout	<i>Salvelinus fontinalis</i>	52.5–102.4	Introduced
Rainbow trout	<i>Oncorhynchus mykiss</i>	0–102.4	Introduced
Mottled sculpin	<i>Cottus bairdi</i>	0–102.4	Native

^a River mile (RM) 0 is at the Missouri River confluence in Great Falls, Montana, RM 17.1 is at the confluence of Muddy Creek with the Sun River, RM 93.7 is about 2 miles upstream of the entrance to the Pishkun canal, and RM 102.4 is at the base of Gibson dam.

Table 5. Number of fish collected during surveys conducted by Montana FWP in the upper Sun River from Sun River diversion dam (RM 92) to Gibson dam (RM 102) (Source: GDHC, 2009).

Species	1987	1988	Total
Brook trout	1	2	3
Brown trout	1		1
Longnose sucker	4		4
Mottled sculpin	1	1	2
Mountain sucker	1		1
Mountain whitefish	4		4
Rainbow trout	22	18	40

Gibson Reservoir Fishery

Gibson reservoir is a popular sport fishing destination, but fishing for trout and grayling in the reservoir is considered only fair because of comparatively low fish populations and fishing access limitations, both of which are affected by water level fluctuations. Rainbow trout were stocked in Gibson reservoir by Montana FWP from 1933 through 1953, but this fishery is now sustained solely by natural reproduction in the North and South Forks of the Sun River and in other tributaries upstream of the reservoir. Limited spawning has been documented in reservoir shoreline areas where wave action provides inter-gravel aeration of incubating eggs. As noted previously, Arctic grayling were stocked in the North and South Forks of the Sun River upstream of Gibson reservoir from 1999 through 2001, and some natural reproduction appears to occur.

Fisheries surveys conducted by Montana FWP indicate that the fish population in Gibson reservoir is composed primarily of white sucker, westslope cutthroat and rainbow trout hybrids, rainbow trout, and Arctic grayling, with smaller numbers of westslope cutthroat trout and brook trout (table 6). These surveys were conducted as part of Arctic grayling status studies and were concentrated in the upstream portions of the reservoir.

Table 6. Results of recent Montana FWP fish surveys at Gibson reservoir^a (Source: GDHC, 2009).

Species	05/23/00	05/30/01	06/20/02	06/18/03	06/11/04	06/22/05	Avg.
Trap Nets							
Rainbow trout	20	0	0	11.6	0	17.8	8.2
Arctic grayling	17	30	75.5	3.4	0.8	2	21.5
Westslope cutthroat	5	0	0	0	0	0	0.8

Species	05/23/00	05/30/01	06/20/02	06/18/03	06/11/04	06/22/05	Avg.
White sucker	5	166	64	292	89.5	294.8	151.9
Westslope, rainbow trout hybrid	2	83	140	0	0	0	37.5
Brook trout	0	0	0	0.6	0.3	0.3	0.2
Floating Gill Nets							
Rainbow trout	19	0	0	--	--	--	6.3
Arctic grayling	17	3	2.2	--	--	--	7.4
Westslope cutthroat	4	0	0	--	--	--	1.3
White sucker	31	2	2	--	--	--	11.7
Westslope, rainbow trout hybrid	1	19	10.3	--	--	--	10.1
Brook trout	0	0	0	--	--	--	0.0
Sinking Gill Nets							
Rainbow trout	--	0	--	--	--	--	0
Arctic grayling	--	34	--	--	--	--	34
Westslope cutthroat	--	0	--	--	--	--	0
White sucker	--	20	--	--	--	--	20
Westslope, rainbow trout hybrid	--	19	--	--	--	--	19
Brook trout	--	0	--	--	--	--	0
Electrofishing ^b							
Rainbow trout	184	--	--	--	--	--	184
Arctic grayling	3	--	--	--	--	--	3
Westslope cutthroat	32	--	--	--	--	--	32
White sucker	0	--	--	--	--	--	0
Westslope, rainbow trout hybrid	40	--	--	--	--	--	40
Brook trout	0	--	--	--	--	--	0

Note: -- no data

^a Netting results are shown as the average number of fish caught per net.

^b Electrofishing results may include captures in the Sun River and tributaries upstream of Gibson reservoir.

3.3.2.2 Environmental Effects

Construction Effects on Aquatic Resources

Aquatic resources downstream of the dam may be affected during construction of the project if it alters streamflow released downstream into the Sun River or if it alters water quality compared to existing conditions. Some excavation would be required during construction of the project penstocks, powerhouse, and temporary cofferdam. This excavation would occur within the immediate vicinity of the dam and involve portions of the bank and channel of the tailrace pool below the dam.

GDHC proposes to begin construction of a flow bypass system to provide instream flow releases to the Sun River during project construction at the end of the irrigation season (September 1). The temporary flow bypass system would allow for flow releases of up to 200 cfs throughout the duration of in-water construction, and return both release outlets to service by May 15 before the start of the irrigation season. To begin the dewatering work, the existing south jet-flow pipe emanating from the valve house would be shut down and modified to extend a 48-inch steel or high-density polyethylene pipe along the south bank around the work area to a discharge point downstream of the proposed cofferdam location. The temporary bypass pipe would have a flow capacity of 200 cfs. During modifications to the south jet-flow pipe, the north jet-flow pipe would provide the releases required by Reclamation. Once the 48-inch temporary bypass is operational, the north jet-flow pipe valve would be closed and the flow diverted through the temporary bypass pipe. The cofferdam would then be constructed, the tailrace basin dewatered, and construction of the powerhouse below the normal water line would begin. As construction of the powerhouse proceeds, the north jet-flow pipe would be modified, extending it through the powerhouse with valved bifurcations to the two turbines that it would also service. When powerhouse construction is complete below the tailwater elevation, the cofferdam would be removed. The newly modified north jet-flow pipe valve would be opened to maintain the flow releases required by Reclamation, and the smaller 48-inch temporary bypass pipe removed. At this time, the south jet-flow pipe would be modified and extended through the powerhouse and readied to release water. All work below the tailwater elevation, including the ability to release up to 3,050 cfs through the jet-flow valves should be complete by May 15, before the start of the irrigation season.

GDHC proposes to implement its Erosion and Sediment Control Plan, which includes project-wide BMPs to protect water quality, as well as upland resources. These BMPs would include ensuring equipment is clean and free of fluid leaks, soil, and invasive plants, and a tire wash would be located at the staging area. Graveled access roads would be maintained. As part of its Erosion and Sediment Control Plan, GDHC also proposes to develop and implement a spill prevention control and countermeasures

plan, after final design, but prior to the start of construction. Development of a hazardous substances plan is also stipulated as 4(e) condition no. 15 by the Forest Service.

GDHC proposes to implement its Construction Water Quality Monitoring Plan that includes provisions to monitor turbidity, total suspended solids, heavy metals, and petroleum distillates in the Sun River during construction. The plan details methods, locations, timeframe, and reporting for all construction-related water quality monitoring. GDHC also developed a construction approach and schedule that is designed to avoid affecting the amount of flow that is released from Gibson dam during the construction period.

Reclamation 4(e) condition no. 10 stipulates that the timing, quantity, and location of water releases and release changes from the facilities to be at the sole discretion of Reclamation. Conditions included in the water quality certification issued by Montana DEQ stipulate that GDHC implement its proposed Construction Water Quality Monitoring Plan, as presented in its license application.

Staff Analysis

GDHC's proposed construction approach would allow Reclamation to provide its scheduled flow releases to meet the needs of downstream irrigators and avoid any change in flow releases that could affect aquatic resources as long as major construction is completed by May 15. After May 15 flow releases in excess of the 200-cfs capacity of the temporary flow bypass pipe would be necessary to accommodate irrigation flow releases.

Because the project would continue to draw water from the same intakes that are currently used to provide releases into the Sun River, no changes in water temperature would be expected during project construction or operation. During the period when flows are released through the temporary bypass, flows would be released into the tailrace pool at slightly different locations compared to existing conditions, slightly altering hydraulic characteristics in the tailrace pool and potentially having a minor effect on downstream DO levels by altering the amount of aeration that occurs. However, these changes are not expected to cause any substantial adverse effects on water quality. Construction of the cofferdam would alter habitat conditions in the tailwater pool for the duration that the cofferdam is in place. These modifications would be unlikely to have a substantive adverse effect on fish populations because the substrate in the tailwater pool is primarily bedrock, a relatively unproductive habitat for aquatic biota.

Developing a Spill Prevention, Control, and Countermeasure Plan would ensure that the likelihood of accidental spills of fuel or other hazardous substances from construction equipment are minimized and, if spills occur, they would be addressed promptly. Monitoring turbidity, total suspended solids, heavy metals, and petroleum distillates in the Sun River prior to and during construction would ensure that any adverse

effects on water quality are identified and that appropriate actions are undertaken to protect aquatic resources in Gibson reservoir and the Sun River downstream of the project.

Post-Construction Flow Continuation

To ensure flow continuity during project operation, GDHC is designing the project such that in the event the turbines shut down, a jet-flow valve would immediately open in the powerhouse to allow continued release of water from the reservoir to prevent dewatering of the Sun River. Reclamation's condition no. 10 stipulates that the timing, quantity, and location of water releases and release changes from the facilities be at the sole discretion of Reclamation, both during and after construction.

Staff Analysis

GDHC includes provisions in its project proposal for ensuring that flows of up to 3,050 cfs can be released continuously through the powerhouse, as needed for irrigation purposes. GID through its formal agreement with Reclamation would continue to determine flow releases based on irrigation needs. Therefore, the project would have no discernable effect on water quantity over the term of a license.

Post-Construction Water Quality Monitoring

GDHC proposes and Montana DEQ's water quality certification condition no. 2 stipulates that GDHC implement a Post-Construction Water Quality Monitoring Plan to monitor the potential effects of the project on DO levels in the Sun River downstream of the project. Monitoring would be conducted every other week from July through September for the first 3 years of project operation. Sampling would include measurement of DO levels in the water column and in the streambed at the following locations: (1) at the downstream end of the Gibson dam tailrace pool (RM 102); (2) at the Blacktail Bridge crossing (RM 101.5); and (3) at Hannan Gulch (RM 100). Interim reports would be prepared at the end of the first two sample years and a final report would be prepared after the third year of sampling.

If monitoring indicates that DO reductions are low enough to affect downstream fish populations, GDHC proposes and Montana DEQ's certification condition no. 3 stipulates that GDHC: (1) install and operate a turbine aeration system; and (2) monitor its performance over a period, approved by resource agencies, sufficient to document its effectiveness.

Staff Analysis

Installation of turbines at the existing outlet works has the potential to decrease DO concentrations by reducing the degree of aeration that occurs to water that is

discharged downstream of the dam. Water currently discharges through the dam's jet-flow valves under turbulent conditions, which tend to entrain atmospheric gases, thus increasing DO concentrations relative to Gibson reservoir background levels. In contrast, discharging water through a powerhouse would reduce the capacity for DO entrainment. The potential to pass water with decreased DO concentrations would be greatest in July and August when water quality monitoring data indicate that DO concentrations near the depth of the intake are at the lowest levels of the year.

Water quality monitoring data indicate that DO concentrations in the Sun River under existing aeration conditions currently meet Montana DEQ standards of 8 mg/L during the summer months. Monitoring data also indicate that existing DO concentrations in the reservoir near the intake elevation during July and August fall below 8 mg/L; therefore, DO concentrations in the tailrace are enhanced by 1.0 to 1.5 mg/L due to the aeration provided by the jet-flow valves. These monitoring data indicate that it is likely that routing the water through the powerhouse would cause DO levels in the tailrace to periodically fall below state standards during summer months. Reduced DO concentrations would likely persist for up to 3 miles downstream of the dam, beyond which the river is aerated by a waterfall at the location of the Sun River diversion dam.

GDHC's proposed Post-Construction Water Quality Monitoring Plan would allow the magnitude and downstream extent of any potential change in DO levels to be evaluated. GDHC's proposal to consult with Montana DEQ and develop any actions that are necessary to increase DO levels in the Sun River below Gibson dam, should DO concentrations fall to a level that adversely affects the Sun River fishery, would ensure that any adverse effects of changes in DO levels on the Sun River fishery are addressed. If DO enhancement measures are required, implementation of a supplemental DO Monitoring Plan would enable the effectiveness of these measures to be assessed.

Herbicide Application

Herbicides could be used to control vegetation and noxious weeds around project facilities, especially along the 26.19-mile-long transmission line. In its comments on the draft EA, EPA recommends that GDHC use integrated weed management strategies that include cultural and biological methods and education and prevention to reduce weed spread and reduce the use of chemicals.

Staff Analysis

Herbicide application can result in contamination of water and corresponding adverse effects to aquatic biota. There are multiple pathways for herbicides to reach water, including: aerial drift during spraying, soil leaching to groundwater, surface transport via runoff, or direct spills. Acute exposure to concentrated herbicides in water can kill fish, macroinvertebrates, aquatic and riparian plants, amphibians, birds, and other wildlife. Repeated exposure to smaller concentrations may not directly kill organisms,

but can cause physiological and behavioral changes in fish and wildlife species that can lead to a reduction in population sizes (e.g., nest abandonment, decreased reproductive success, etc.).

If herbicide application is necessary to control noxious weeds or vegetation near project facilities, provisions could be included in GDHC's Noxious Weed Control Plan that require GDHC to use only herbicides that are approved by EPA for the specific application, and to only allow herbicide application by professional personnel appropriately trained in their use. Implementation of these measures would help minimize the potential for project-related herbicide contamination in the aquatic environment.

Fish Entrainment and Mortality

Project operation would have no effect on the number or species of fish entrained from Gibson reservoir because the project would not alter the timing, rate, or volume of water withdrawals, and all water passing the dam would pass via the existing deep intake (and by the spillway during spill events), as it does under existing conditions. However, installing the proposed Francis turbines could alter the mortality rate of fish that are entrained into the intake at Gibson dam, and therefore, may affect the number of fish that are recruited to the Sun River downstream of the dam.

GDHC does not propose any measures to address potential entrainment mortality, and no entity recommends that GDHC do so.

Staff Analysis

Although there is no information directly available on the mortality rate of fish passing through the existing Gibson dam jet-flow valves, a study was done at Reclamation's Tieton dam in Washington State comparing the mortality rates of kokanee salmon attempting to migrate through the pre-hydropower project jet-flow valves, and post-hydropower project Francis turbines (Hardin, 2001). It is noteworthy that the pre-project flow release characteristics of both Gibson dam and Tieton dam are similarly configured (table 7). Hardin (2001) reported that the results of an ongoing netting study conducted by Reclamation indicate that passage through the existing outlet works at Tieton dam resulted in an estimated 90 percent mortality, based on the collection of 8,500 kokanee and 4 bull trout. Hardin (2001) reported that the primary sources of injury to fish passing through the jet-flow valves was believed to be: the rapid depressurization that occurred when fish that were acclimated to the pressure of the deep reservoir were exposed to atmospheric pressures at the jet-flow valve exit; the extreme velocity of water exiting the jet-flow valves; and physical injury from fish striking the outlet works at high velocity.

Based on a review of fish mortality rates observed at other sites with Francis turbines similar to those proposed to be installed at Tieton dam, Hardin (2001) estimated that the mortality rate of fish passing through the dam would be reduced from 90 percent under the jet-flow valves to about 31 to 36 percent after the Francis turbines were installed. FWS in its biological opinion on the Tieton Dam Project drew a similar conclusion, using a conservative estimate of 60 to 80 percent mortality for fish passing through the jet-flow valves under existing conditions and about 35 percent after the turbines were installed (FWS, 2002). The mortality rates estimated by Hardin (2001) and FWS (2002) are similar to those reported for Francis turbines in other reviews of mortality rates measured in studies conducted at other hydroelectric projects with similar head, discharge, and outlet work characteristics (Eicher Associates, 1987; Franke et al., 1997; Winchell et al., 2000), and represent a reasonable estimate of the likely rate of mortality that would occur to fish passing through the Francis turbines proposed at Gibson dam.

Table 7. Outlet characteristics at Gibson and Tieton dams (Source: staff).

Characteristic	Gibson Dam	Tieton Dam
Number of penstocks/jet valves	2	2
Jet-flow valve diameter	60 inches	60 inches
Head at jet-flow valves	60–175 feet	78–191 feet
Combined discharge capacity	3,050 cfs	2,760

In its comments on the draft license application, Montana FWP stated that it was not aware of similar fish mortality being observed in the Gibson dam tailrace, which it suggests may indicate substantial differences between mortality at the two facilities. The lack of information on observed fish mortality below Gibson dam is likely attributable to differences in entrainment rates, as opposed to mortality rates. The only major difference between the outlet works at the two dams is that the intake at Gibson dam is located at the base of the dam at the same elevation as the jet-flow valves and the intake at Tieton dam is at the top of an intake tower, about 50 feet above the bottom of the reservoir. This difference in location may have a pronounced effect on entrainment rates if fish are less common in the deepest portion of the reservoir. In addition, kokanee salmon, which composed most of the entrainment catch at Tieton reservoir and do not occur in Gibson reservoir, is a pelagic species that is relatively susceptible to entrainment at deep intakes, and often attains high population levels in reservoir environments. These factors likely contribute to the entrainment of a much higher number of fish at Tieton dam, which would increase the likelihood of injured or dead fish being observed in the project tailrace.

3.3.2.3 Cumulative Effects

Grazing in riparian or shoreline zones, flow regulation and diversion for irrigated crop production, and land clearing for development have drastically reduced streamflows, elevated water temperatures, and severely altered aquatic and riparian habitat, thereby cumulatively affecting fisheries and water quality in the Sun River basin.

During project construction, the project would cause a temporary increase in turbidity during construction and removal of the cofferdam, likely causing a minor adverse effect on water quality in the project tailrace and for a short distance downstream. However, implementation of BMPs would help minimize any adverse effects and these minor construction effects are not expected to cumulatively affect fisheries or water quality in the Sun River basin.

During project operation, routing water through the project turbines may cause a minor reduction in DO levels downstream of Gibson dam. However, this effect would not persist more than three miles downstream due to aeration provided by a waterfall immediately downstream of the Sun River diversion dam. Further, if DO monitoring indicates the potential for adverse effects on the fishery in the Sun River downstream of the project, GDHC would implement measures to increase DO concentrations in the Sun River. Finally, since the project would improve mortality rates over existing conditions, project operations are not expected to cumulatively affect fisheries or water quality in the Sun River basin.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

The project area (land within the proposed project boundary) ranges in elevation from 4,840 feet at Gibson dam to below 4,200 feet at Jackson's Corner, the terminus of the transmission line. Four cover types are dominant within the project area and vicinity: grasslands, forest lands, agricultural lands, and wetlands (table 8).

Table 8. Montana land cover atlas cover types acreage and percent of project area (Source: Ecosystem Sciences, 2010).

Cover Type	Acres	% of Project Area
Water	4.5	0.7
Riparian	5.4	0.8
Barren lands	19.9	3.1
Shrublands	36.1	5.6

Cover Type	Acres	% of Project Area
Urban and agricultural lands	104.0	16.1
Forest lands	101.5	15.8
Grasslands	372.8	57.9
Total	644.3	100.0

Grassland is the dominant vegetation type, covering 58 percent of the project area within the proposed project boundary (Ecosystem Sciences, 2010). This vegetation type occurs in valleys and foothills, as well as on middle to high elevation mountain slopes on south aspects. It is dominated by short- to medium-height grasses and forbs and has a total grass cover from 20 to 70 percent. Commonly associated species include arrowleaf balsamroot, bluebunch wheatgrass, blue grama, bluestem, sedges, green needlegrass, Idaho fescue, lupine, needle and thread grass, rough fescue, timothy, and western wheatgrass. Rangelands and non-irrigated pasture are included in this vegetation type.

Forest lands cover about 16 percent of the project area (Ecosystem Sciences, 2010). Forest lands predominately occur in the Sun River Canyon near the existing Gibson dam. Tree cover within forest lands ranges from 20 to 100 percent. Dominant species include subalpine fir, Douglas-fir, ponderosa pine, limber pine, and Rocky Mountain juniper. Associated shrub species include: ninebark, shiny-leaf spirea, snowberry, big sagebrush, juniper, rabbitbrush, huckleberry, menziesia, and whortleberry. Associated grass and forb species include bluebunch wheatgrass, Idaho fescue, pinegrass, blue grama, arnica, beargrass, and elk sedge.

Agricultural land, which covers 16 percent of the project area, includes both irrigated and non-irrigated lands (Ecosystem Sciences, 2010). Agricultural fields are typically monocultures of selected crop species or hay.

Wetlands cover 1.5 percent of the project area. The predominant wetland type potentially affected by the project is riparian wetlands. Riparian cover type occurs at two locations where the transmission line crosses the Sun River and at one location where the transmission line crosses the Sun River slope canal (see figures 1 and 2). Limited areas of riverine wetlands are concentrated in a narrow zone along the channels of the Sun River, Pishkun supply canal, and Sun River slope canal. Freshwater emergent wetland concentrations occur 10 miles east of the Rocky Mountain front along the Sun River and the Sun River slope canal. The number and average size of wetlands decreases in the cultivated lands east of the Sun River slope canal.

Special Status Plants

The Forest Service and BLM identify 30 sensitive plant species that could potentially occur in the project area (table 9). GDHC conducted surveys of the project area for sensitive plant species and noxious weeds in mid-July, focusing primarily on areas that would be disturbed by construction activities. None of the potentially occurring sensitive species were encountered during field surveys of the project area. The timing of the surveys should have permitted identification of most sensitive species. Three sensitive species (Macoun's gentian, blunt leaved pondweed, and Northern rattlesnake plantain) flower and set seed during differing periods from late July through early September. Therefore, there is a chance these three species could have been missed during surveys because they would not have yet flowered, but surveyors looked for any indication of their presence (young plants) when probable habitat was encountered. Some species are not expected to occur within the project area due to habitat degradation at the site or because certain species have very specific habitat needs and suitable habitat is not found within the survey area. The species in table 9 represent those plants likely to occur in the area based on their habitat requirements and availability. Much of the grasslands and agricultural lands are not expected to support sensitive species due to disturbance by livestock grazing and other land use practices.

Table 9. Potentially occurring sensitive plant species in the Gibson Dam Project area (Source: Ecosystem Sciences, 2010).

Common Name	Genus	Species	Subspecies (spp.) or variation (var.)
Alpine meadowrue	<i>Thalictrum</i>	<i>alpinum</i>	
Austin's knotweed	<i>Polygonum</i>	<i>douglasii</i>	ssp. <i>Austinae</i>
Barratt's willow	<i>Salix</i>	<i>barrattiana</i>	
Blunt-leaved pondweed	<i>Potamogeton</i>	<i>obtusifolius</i>	
Long-styled thistle	<i>Cirsium</i>	<i>longistylum</i>	
Crawe's sedge	<i>Carex</i>	<i>crawei</i>	
English sundew	<i>Drosera</i>	<i>anglica</i>	
Five-leaved cinquefoil	<i>Potentilla</i>	<i>quinquefolia</i>	
Giant helleborine	<i>Epipactis</i>	<i>gigantea</i>	
Geyer's milkvetch	<i>Astragalus</i>	<i>geyeri</i>	
Hall's rush	<i>Juncus</i>	<i>hallii</i>	
Lackschewitz'	<i>Erigeron</i>	<i>lackschewitzii</i>	
Lackschewitz' milkvetch	<i>Astragalus</i>	<i>lackschewitzii</i>	

Common Name	Genus	Species	Subspecies (spp.) or variation (var.)
Linear-leaved	<i>Drosera</i>	<i>linearis</i>	
Macoun's gentian	<i>Gentianopsis</i>	<i>macounii</i>	
Missoula phlox	<i>Phlox</i>	<i>kelseyi</i>	var. <i>missoulensis</i>
Northern rattlesnake-plantain	<i>Goodyera</i>	<i>repens</i>	
Northern wild-rye	<i>Elymus</i>	<i>innovatus</i>	
Peculiar moonwort	<i>Botrychium</i>	<i>paradoxum</i>	
Round-leaved orchis	<i>Amerorchis</i>	<i>rotundifolia</i>	
Short-styled columbine	<i>Aquilegia</i>	<i>brevistyla</i>	
Slender-branched popcorn flower	<i>Plagiobothrys</i>	<i>leptocladus</i>	
Small clubrush	<i>Trichophorum</i>	<i>pumilum</i>	<i>Scirpus pumis</i> var. <i>rollandi</i>
Small yellow lady's-slipper	<i>Cypripedium</i>	<i>parviflorum</i>	
Sparrow's-egg lady's-slipper	<i>Cypripedium</i>	<i>passerinum</i>	
Square-stem monkeyflower	<i>Mimulus</i>	<i>ringens</i>	
Stalked-pod crazyweed	<i>Oxytropis</i>	<i>podocarpa</i>	
Upward-lobed moonwort	<i>Botrychium</i>	<i>ascendens</i>	
Water bulrush	<i>Scirpus</i>	<i>subterminalis</i>	
Worm moss	<i>Scorpidium</i>	<i>scorpioides</i>	

Noxious Weeds

Nine species of noxious weeds were encountered during field surveys of the project area (Ecosystem Sciences, 2010). Most occurrences were located adjacent to roads and disturbed areas. Weed species observed include: burdock, Canada thistle, common mullein, field bindweed, houndstongue, perennial pepperweed, whitetop, diffuse knapweed, and spotted knapweed. Many of the observed weed occurrences in the Sun River Canyon were single plants or were found in small numbers.

Wildlife

The project area sustains a wide variety and broad distribution of wildlife habitats as a result of geographical and climatological factors that, in tandem with frequent fires, have provided for a diversity of successional stages across the landscape (table 8).

Amphibians and Reptiles

Amphibians that would typically be expected to occur within or adjacent to the project area include the long-toed salamander, tiger salamander, and Columbia spotted frog. Reptiles that would be expected to occur within or adjacent to the project area include the rubber boa, common garter snake, eastern racer, gopher snake, plain garter snake, terrestrial garter snake, painted turtle, and prairie rattlesnake.

Birds

Three species of upland game birds inhabit the foothills and mountains of the project area. These are the blue or dusky grouse, ruffed grouse, and the spruce grouse. These species are found breeding, nesting, and rearing young at lower and mid-elevations from late April through August. During winter, dusky grouse move to conifer stands at high elevations (Montana NHP and Montana FWP, 2010a); ruffed grouse remain close to their April through August habitat (Montana NHP and Montana FWP, 2010b); and spruce grouse occupy dense stands of Douglas fir, ponderosa and lodgepole pine, and larch (Montana NHP and Montana FWP, 2010c).

Four other species of upland game birds are found in the foothills and prairie regions of the project area. Sharp-tailed grouse return to perform breeding displays on fairly specific lek¹² sites each year. These displays begin in early to mid-April and continue into mid-May. Nesting occurs in prairie grasslands from mid-May until mid-June and broods are reared from June to September. Sharp-tailed grouse move to wintering habitat, which consists of areas of dense trees and shrubs, from October to December (Montana NHP and Montana FWP, 2010d). In addition to sharp-tailed grouse, mourning dove, gray or Hungarian partridge, and ring-neck pheasant are found in foothill and prairie habitats. Ring-neck pheasants are typically associated with riparian areas near agricultural crop lands. Breeding occurs during late March to May and nesting peaks in mid-May. Brood rearing is strongly associated with green crops.

Raptors, including hawks, falcons, eagles, and owls, are prominent bird species throughout the project area. Both golden and bald eagles are known to inhabit the lands along the river below the canyon and from the Sun River diversion dam to the Fort Shaw area. This includes the area in which the proposed transmission line would be sited. The

¹² Leks are mating sites where grouse species perform mating rituals.

east slope of the Rocky Mountains in this area serves as a spring/fall migratory corridor for several species of raptors. The cliffs of the Rocky Mountain Front are also used as nesting sites, and the prairie areas in and adjacent to the project area are used by several species of raptors as foraging areas.

The Sun River basin bisects one of the major migration routes for waterfowl on the North American continent. Numerous large and small lakes in the prairie areas below the Sun River Canyon provide resting and nesting areas for numerous species of waterfowl and shorebirds. Freezout Lake WMA—a state waterfowl management area located about 33 miles east of the project near Fairfield, Montana—is a major resting place for as many as 1 million waterfowl during peak migration periods. Eighty-eight species of waterfowl and shorebirds have been sighted at Freezout Lake WMA (Montana FWP, 2010). Twenty-four of these species are rare and would not be expected to visit or occupy the project area.

Numerous species of non-game birds have been documented near the project area. The combined verified bird sightings for the Sun River WMA and Freezout Lake WMA total 96 bird species, of which 33 are described as rare or incidental to the area and would not be expected to be common in the project area. Sun River WMA is a 19,771-acre wildlife area managed by Montana FWP that is located about 5 miles east of the dam, to the south of the project area.

Mammals

Montana FWP lists 34 species of mammals (including 25 species of small mammals) as occurring in the Sun River WMA (Montana FWP, 2010). Given the similarity of topography and proximity of this WMA to the Sun River Canyon and the project transmission line corridor, these same species would be expected to occur within the project area. The most prominent large mammals in the project area are elk, mule deer, white-tailed deer, bighorn sheep, pronghorn antelope, mountain lion, black bear, and grizzly bear. These species are sought by outdoor recreationists.

Elk—Elk are well distributed throughout the Rocky Mountain Division of the Lewis and Clark Forest (Rocky Mountain Division) and are quite abundant in some drainages. The Sun River elk herd is regionally important and attracts hunters and wildlife viewers from around the state and nation. Elk herds in the area are migratory, moving considerable distances from their summer ranges at higher elevations to wintering areas in the foothills and areas east of the Rocky Mountain Front. A 2006 population estimate by Montana FWP showed approximately 2,800 elk in the Sun River herd. Areas adjacent to the project area also include identified elk winter and calving ranges (Forest Service, 2007).

Of primary importance to project development is the annual migration of the Sun River elk herd from summer areas to the Sun River WMA. It is estimated that about

2,500 elk migrate from mountain areas and the Sun River Canyon itself to winter on the Sun River WMA. Fall migration generally takes place in November and elk remain within the area until early May. In some years, a portion of the population migrates easterly along the Gibson reservoir shoreline and cross the Sun River downstream of Gibson dam as they move toward the Sun River WMA. Elk also periodically move into Hannon Gulch and again cross the Sun River at sites downstream of Gibson dam.

Deer—Mule deer and white tailed deer are common throughout the project area. Both species of deer are migratory, moving considerable distances from their summer ranges in the high country and river bottoms in the wilderness areas to winter ranges in the Sun River Canyon and foothills along the Rocky Mountain Front. Migrations generally begin in November and animals remain on winter ranges until early May. Some whitetail deer are found year-round in the project area.

A 2007 Montana FWP population estimate showed that approximately 3,250 mule deer occur in the general area affected by the project. A 2003 population estimate showed approximately 1,830 whitetail deer in the area affected by project.

Bighorn Sheep—The Rocky Mountain Division contains the largest herd of Rocky Mountain bighorn sheep in Montana. The range of this sheep herd, which numbered nearly 850 animals according to a 2007 survey by Montana FWP, is centered on the Sun River drainage. The project area within the Sun River Canyon is within identified bighorn sheep winter and lambing ranges (Forest Service, 2007). Lambs are born in late May and early June and rear in the lower elevations gradually moving to higher country as the snows recede. During summer months, incidental bighorn sheep use of the project area inside the Sun River Canyon may occur.

Black and Grizzly Bears—Both black bear and grizzly bear occur in the project area. Bears make incidental use of the riparian areas throughout the Sun River Canyon and the prairies to the east. Use of these areas is most common during the fall when berries are ripe. The grizzly bear is listed as a Species of Concern by Montana and threatened by FWS. This species is discussed further in section 3.3.4, *Threatened and Endangered Species*.

Mountain Lions—Mountain lion are territorial and can be found within the Sun River Canyon and in the timbered foothills to the east throughout the year. Because their territories are fairly large with little overlap, few if any animals would be expected to use the project area at any one time. Winter concentrations of deer and sheep increase the probability that a mountain lion would be in the vicinity of the project.

Pronghorn Antelope—Antelope are found on the prairies east of the National Forest. The population along the transmission line corridor is small and scattered across the area. Some fawning may take place along the corridor in late May and early June.

Sensitive Wildlife Species

Several wildlife species of concern could occur within or adjacent to the project boundary. These include three amphibians (plains spadefoot, western toad, and northern leopard frog) and one reptile (greater short-horned lizard) listed as a species of concern by the state of Montana and sensitive species by the Forest Service and BLM. The project area lies on the western edge of the range for the plains spadefoot, northern leopard frog, and greater short-horned lizard and on the eastern edge of the range for the western toad. The wetland areas toward the eastern end of the transmission line likely provide suitable habitat for the three amphibians. Greater short-horned lizards are most likely to occur along the plains segment of the transmission line.

The northern goshawk, ferruginous hawk, peregrine falcon, and the bald and golden eagles are listed as species of concern in Montana. While the bald eagle was delisted from the Endangered Species Act in 2007, it and the golden eagle are still federally protected under the Bald and Golden Eagle Protection Act. The Swainson's hawk, also found in this area, is listed in Montana as a potential species of concern.

Northern goshawks in Montana nest predominately in mature, large-tract conifer forests with a high canopy cover, relatively steep slope, and little to sparse undergrowth. They hunt in closed canopy habitats, as well as more open landscapes, and they are generalists in terms of prey selection (Montana NHP and Montana FWP, 2010e). Within the project area, the 34.5-kV canyon segment of the transmission line is the most likely area that could provide suitable goshawk habitat.

Ferruginous hawk habitat consists of mixed-grass prairie, shrub-grasslands, grass-sagebrush complex, and sagebrush steppe (Montana NHP and Montana FWP, 2010f). The area most likely to support ferruginous hawks in the project area is the plains segment of the transmission line.

Peregrine falcons nests typically are situated on ledges of vertical cliffs, often with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey steppe (Montana NHP and Montana FWP, 2010g). The cliffs in the vicinity of Gibson dam and reservoir are the most likely suitable nesting habitat in the vicinity of the project. During the winter, peregrine falcons could be found throughout the project area foraging on waterfowl and other bird species.

The bald eagle is primarily a species of riparian and lacustrine habitats (forested areas along rivers and lakes), especially during the breeding season. Important year-round habitat includes wetlands, major water bodies, spring spawning streams, ungulate winter ranges, and open water areas. Wintering habitat includes upland sites. Nesting sites are generally located within larger forested areas near large lakes and rivers where nests are usually built in the tallest, oldest, large diameter trees. Nesting site selection is

dependent upon maximum local food availability and minimum disturbance from human activity (Montana NHP and Montana FWP, 2010h).

Golden eagles nest on cliffs and in large trees and occasionally on power poles. They forage over prairie and open woodlands (Montana NHP and Montana FWP, 2010i). Golden eagles are likely to occur anywhere in the project area.

Swainson's hawks nest in river bottom forests and brushy drainages, and shelterbelts. They hunt in grasslands and agricultural land, especially along river bottoms (Montana NHP and Montana FWP, 2010j). Swainson's hawks are likely to occupy prairie habitats along the proposed transmission line corridor.

The Montana Natural Heritage Program lists three species of waterfowl and seven species of shorebirds as species of special concern. Waterfowl include common loon, harlequin duck, and trumpeter swan. Shorebird species include black tern, Franklin's gull, black-crowned night heron, American white pelican, white-faced ibis, Forster's tern, and common tern.

3.3.3.2 Environmental Effects

Minimizing Loss of Vegetation

Some loss of vegetation is inevitable due to project construction and operation. GDHC proposes to reduce the potential effects of vegetation losses by implementing the following measures: (1) confine construction activities to areas defined by the plans and specifications and limit construction traffic to established roads and parking areas; (2) preserve vegetation as much as possible in the project area; (3) conduct a field survey, after final design and prior to construction, to locate wetlands in order to avoid and prevent disturbance to wetlands during construction activities; and (4) implement the Erosion and Sediment Control Plan to control soil erosion and minimize adverse effects on vegetation, including revegetating any disturbed areas with a native grass seed mixture within 6 months of project completion. Reclamation 4(e) condition no. 5 stipulates that GDHC revegetate all newly disturbed areas on Reclamation-managed lands with plant species indigenous to the area and approved by Reclamation within 6 months of completion of project construction.

Staff Analysis

Construction laydown areas and staging areas for the powerhouse, transmission line, and substation, plus construction of underground segments of the transmission line, would result in the temporary loss of about 10 acres of vegetation. Most of the vegetation loss would occur along the buried sections of the transmission line, but would only be temporary due to the proposed revegetation of these areas. Facilities, such as the project substation and maintenance building, would result in the permanent loss of less

than 0.5 acre of vegetation. Permanent loss of vegetation along the transmission line right-of-way would only be at the pole locations for a total of less than 1 acre. GDHC's proposed measures would minimize loss of vegetation, avoid sensitive habitats such as wetlands, and would re-establish vegetation that is indigenous to the area and valuable to wildlife. Quickly revegetating all newly disturbed areas with native plant species, as proposed, would prevent erosion and reduce the possibility of invasive plant species colonizing the disturbed sites.

Protection of Sensitive Plants

Although no sensitive plant species were located during surveys conducted in 2008 along the originally proposed transmission line right-of-way, and in 2010 along the most recently proposed right-of-way, these surveys did not occur during critical periods when diagnostic characteristics of Macoun's gentian, blunt leaved pondweed, and northern rattlesnake plantain would be evident. GDHC does not state whether it proposes to conduct additional surveys for these three species during an appropriate time frame, and prior to project construction.

Staff Analysis

The presence of Macoun's gentian, blunt leaved pondweed, and northern rattlesnake plantain in areas that could be disturbed during construction cannot be ruled out based on GDHC's sensitive plant surveys. Conducting surveys during the month of August (when these three species typically flower and/or fruit and identification can be conclusive) at locations with suitable habitat and where ground disturbance during construction would likely occur would enable the need for protective measures, such as avoidance, to be established. We envision that the threatened, endangered, proposed for listing, and sensitive species plan stipulated by Forest Service 4(e) condition no. 12 would provide the means to conduct these surveys and identify protective measures, if needed. Final design and placement of the transmission line could accommodate the need to avoid habitat occupied by sensitive plant species.

Control of Invasive Plants and Noxious Weeds

Areas disturbed by construction activities often create suitable conditions for noxious weed and invasive plants to become established. Seeds and plant materials carried on construction equipment can be a source from which populations are spread or new noxious weed and invasive plant populations are introduced. To prevent and control the spread of noxious weeds, GDHC proposes to implement its Noxious Weed Control Plan, filed with its license application. The plan specifies BMPs that would be implemented prior to, during, and after construction.

Measures that would be implemented prior to construction include: (1) identifying and mapping noxious weed populations; (2) treating or containing any weed populations

that may be disturbed during construction; (3) flagging weed populations and training construction workers regarding weeds to be avoided; (4) obtaining certification that sources of sand, gravel, rock, mulch, and fiber roll logs used for construction and sediment control are weed-free prior to use onsite; (5) cleaning all equipment before bringing it onsite; (6) draining all water from motors, pumps, bilges or other containers associated with floating or submersible equipment and, if drained less than 7 days prior to arrival onsite, treating with chemicals or heat; and (7) inspecting all floating or submersible equipment for the presence of invasive species (e.g., zebra mussels, hydrilla, Eurasian milfoil).

Measures that would be implemented during construction include: (1) minimizing ground disturbance and vegetation removal to the extent practical; (2) cleaning all vehicles prior to leaving weed-infested areas; (3) stripping and disposing of weed-infested soil in a class II landfill or using as fill beneath impenetrable material, treating with ground sterilant, or burying more than 5-feet deep; and (4) striping and stockpiling weed-free topsoil for future use to enhance revegetation success.

Measures that would be implemented after construction include: (1) re-vegetating following ground-disturbing activities in weed-invaded areas and document success for at least three growing seasons and continue to monitor until reasonably certain that no weeds have appeared; (2) using native species that have a high likelihood of survival to re-vegetate disturbed areas where appropriate and feasible; (3) treating all weeds adjacent to disturbed areas prior to seeding and treat planted areas for weeds during the first growing season; and (4) annually communicating with local weed districts and resource agencies regarding BMPs for prevention.

Forest Service 4(e) condition no. 11 stipulates that GDHC develop an Invasive Plant and Noxious Weed Management Plan that would include the following:

- Identifying methods for prevention and control of noxious weeds within the project area.
- Cleaning all construction equipment before entering areas addressed by the plan to reasonably ensure that seeds of invasive plants and noxious weeds are not introduced.
- Restricting travel to established roads and trails when possible and avoiding entering areas with existing populations of invasive plants or noxious weeds. If entering such areas is required, conducting work in uninfested areas first when possible.
- Minimizing ground disturbance during project operations and maintenance. When ground disturbance is required, disposing of any resulting spoil onsite, grading to match local contours and reseeding with

a mix of native species approved by the Forest Service. If fill is required for operation and maintenance activities, using fill collected onsite whenever possible, and reseeding the disturbed area as described above. Seeding needs to be done in conjunction with proper seedbed preparation, such as harrowing or tilling the soil surface.

- Using certified weed-free straw or rice straw for all construction, erosion control, or restoration needs.
- Developing a monitoring plan to evaluate the effectiveness of re-vegetation, vegetation control (discussed in next section), and invasive plant and noxious weed control measures. Providing specific methods for monitoring and evaluation. At a minimum, conducting surveys every 3 years.
- Developing procedures for identification of additional measures that GDHC would implement if monitoring reveals that re-vegetation and vegetation control is not successful or does not meet intended objectives.

In its comments on the draft EA, EPA states that unauthorized motorized vehicle use on project transmission-line access roads could disturb soil, create weed seedbeds, and disperse weed seeds. EPA recommends that GDHC use gates at access roads to discourage such unauthorized access and reduce associated spread of weeds. EPA also recommends that GDHC use integrated weed management strategies that include cultural and biological methods and education and prevention to reduce weed spread and the use of chemicals.

Staff Analysis

Leaving soils unprotected by vegetation or other means of protection can provide sites suitable for introduction of noxious weeds and invasive plants. GDHC's proposed Noxious Weed Control Plan includes best management practices to reduce weed spread during and after construction. Such measures include training of construction workers and equipment operators on the identification of weeds, provisions to certify that all construction materials are weed-free, use of certified weed-free seeds for revegetation, and numerous other prevention measures. If herbicide use is necessary for vegetation management or noxious weed control, an additional requirement could be included for using only EPA-approved herbicides for the specific application, applied by professional personnel appropriately trained in the use of herbicides, to minimize the risks of adverse health and environmental effects. Implementation of these measures would likely prevent the introduction and spread of noxious weeds and invasive plants, and ensure that appropriate safeguards are in place to minimize any adverse effects on human health or the environment from herbicide application.

However, GDHC's plan does not provide for long-term monitoring of project lands to identify recurrences of previously treated populations of noxious weeds or the establishment of new noxious weed populations, nor does it define procedures that would be used to identify the potential need for additional control measures, as specified in the last two bullets of Forest Service condition no. 11. The Forest Service condition would provide for long-term monitoring and maintenance of vegetation over the life of the project and ensure the control of noxious weeds and the success of re-vegetation efforts. Monitoring at three year intervals, as specified by the Forest Service, would enable timely detection of noxious weeds and implementation of control measures on project-affected lands. Defined long-term noxious weed management strategies could readily be incorporated into an overall Vegetation Management Plan, discussed in the following section, or via revisions to GDHC's proposed Noxious Weed Control Plan.

Vegetation Management

The proposed project includes construction and operation of a 26.19-mile-long transmission line, of which 4.56 miles would be located within the boundaries of Lewis and Clark National Forest. Forest Service 4(e) condition no. 21 stipulates that GDHC develop a Transmission Line Management Plan that includes a Vegetation Management Plan. This plan would address management of trees and other vegetation along the proposed transmission line right-of-way and would be distinct from the previously discussed Noxious Weed Control Plan.

Staff Analysis

Vegetation management along transmission line rights-of-way is required to meet safety and reliability standards specified by NERC and other transmission industry criteria. These standards are different for underground and overhead transmission lines. Typically, vegetation management for overhead lines focuses on maintaining sufficient clearance between the line and vegetation that may interfere with the integrity of the line (i.e., trees and tall growing shrubs). Vegetation management along underground transmission lines typically focuses on maintaining the right-of-way in non-woody vegetation to avoid root interference with the conductor. Developing a Vegetation Management Plan in consultation with the Forest Service and other interested parties would enable the site-specific practices that are planned along the proposed transmission line route to be clearly defined (e.g., areas where herbicides and/or manual vegetation control would be used, the expected frequency of monitoring and vegetation treatment, the timing of vegetative treatments such that adverse effects on wildlife would be avoided or minimized, management practices that would enhance plant species that are beneficial to wildlife, and required clearances between conductors and vegetation) and adjustments considered within the bounds of applicable standards.

Wildlife

Avoidance of Sensitive Wildlife Life Stage Periods

Project construction could disturb elk migration, bighorn sheep lambing, antelope fawning, and big game wintering in the project area. Construction activities could affect spring breeding rituals or nesting of game birds, in particular sharp-tailed grouse if leks occur along the transmission line. Continuous disturbance around a lek may result in its abandonment. To reduce the potential for construction-related disturbance, GDHC proposes to:

- Schedule construction activities to minimize disturbance of migrating elk and bighorn sheep lambing during critical periods by performing transmission line work in the Sun Canyon outside of the critical period of November through April;
- Conduct sharp-tailed grouse lek surveys along the plains segments of the transmission line, if construction is to take place in April and May;
- Complete construction in a timely manner to avoid prolonged disruption of wildlife in the area; and
- Confine construction activities to areas defined by authorized plans and specifications and limit construction traffic to established roads and parking areas.

Forest Service 4(e) condition no. 12 stipulates that GDHC prepare a threatened, endangered, proposed for listing, and sensitive species plan at least 60 days prior to any ground disturbing activity and that the plan include the following::

- Ensuring project-related activities meet restrictions included in site management plans for listed species;
- Developing procedures to minimize adverse effects on listed species;
- Developing implementation and effectiveness monitoring of measures taken or employed to reduce effects on listed species;
- Updating the plan as new information is obtained in consultation with the agencies and submitting the updated plan to the Commission for approval; and
- Identifying required elements contained within a biological assessment and evaluation.

Staff Analysis

Construction activities may disturb wildlife. This disturbance could be particularly harmful if it occurs during periods that could be stressful to animals such as during the winter migration period or during breeding season. Most heavy construction would occur at the powerhouse site and adjacent staging areas. As described in more detail in sections 3.3.1.2, *Geology and Soil Resources*, and 3.3.2.2, *Aquatic Resources*, the primary construction period at Gibson dam would extend from the beginning of September to mid-May, although some construction and related demobilization work would continue through the summer and into early fall. This area is already a center of some degree of activity relating to the operation and maintenance of Gibson dam by Reclamation. Expected types of equipment that would be traveling to the powerhouse construction site and, in some instances, remaining onsite during construction would include cranes, graders, backhoes, bulldozers, cement mixers, flatbed trucks for equipment delivery, dump trucks for delivery of gravel and riprap used for cofferdam construction and hauling surplus cofferdam material offsite following removal of the cofferdam. Construction-related traffic on local roads can cause additional interaction between vehicles and wildlife, resulting in mortality or avoidance of preferred habitats. Some disturbance of fall migratory wildlife (i.e., deer, elk, and bears) by construction-related vehicles would occur. These effects would be short-term (1 year).

Construction of the transmission line would be spread along the linear length of the transmission line route and would limit the amount and duration of activity in any one area. Expected equipment for constructing overhead portions of the line would include small trucks equipped with an auger and backhoe, spools of conductor, and/or trailers to transport new poles to the work sites and remove the 7.2-kV and 12.5-kV distribution poles that the new poles would replace. Some work sites may have existing access roads used to maintain the distribution lines, which would minimize potential effects on wildlife habitat.

Construction of underground segments of the transmission line would be more disruptive due to the need for excavation, resulting in the temporary loss of vegetation cover and displacement of species present. However, as discussed in GDHC's May 24, 2010, filing, of the proposed 6.0 miles of underground transmission line, 4.7 miles would be either along the edge or within existing roadways (GDHC, 2010a), and as such would have little if any effect on wildlife and associated habitat. Expected equipment for constructing underground segments of the line would include trenching machines, backhoes, small trucks with spools of conductor and conduit material, and dump trucks to bring in sand bedding to be placed around the conduits.

GDHC proposes to construct the transmission line in the plains segment of the route (where 17 miles of the proposed 20 miles of overhead line and 5 miles of the proposed 6 miles of underground line occur) from July through November. This would

avoid the breeding and nesting season for grouse (which typically is over by mid-June). GDHC proposes to construct the transmission line in the canyon section of the route from April to July. This would overlap with the breeding and nesting period for canyon dwelling grouse species, but would avoid disturbance of fall migrating animals (elk, deer, and bear) that use the canyon—a migratory corridor from high country to the plains. Once outside the confined canyon, migratory wildlife would have ample space to disperse and avoid localized transmission line construction sites on their way to over-winter destinations.

The Threatened, Endangered, Proposed For Listing, and Sensitive Species Plan, stipulated by the Forest Service, includes provisions for GDHC to consider the effects of any future ground-disturbing activity on federally threatened, endangered, proposed or Forest Service sensitive species. The distribution of sensitive species can change over time, and species not considered sensitive now may be classified as sensitive at some time during the term of a new license. Establishing protocols for developing and implementing protective measures if populations of sensitive plants or wildlife become established within the project boundary would ensure appropriate measures are in place to protect these species from future project-related operation and maintenance activities requiring ground-disturbing activity.

Raptor Protection at Project Transmission Lines

Raptors likely forage along the area proposed for the transmission line, and are thus susceptible to potential collision and electrocution. GDHC proposes to implement its Avian Protection Plan, which includes the following measures:

- Develop the final design of the transmission line, in consultation with state and federal resource agencies, to include adequately spaced and configured conductors consistent with current Avian Power Line Interaction Committee (APLIC) guidelines (APLIC, 2006; APLIC and FWS, 2005).
- Revise and update the Avian Protection Plan in consultation with state and federal resource agencies to include final design details.
- Require the selected line operator and maintenance subcontractor to adopt the final Avian Protection Plan, or provide its own avian protection plan, to ensure proper policy and training programs are initiated.
- Make every attempt to schedule tree-trimming activity to avoid riparian areas during the nesting season.
- If tree trimming during the nesting season is necessary, inspect trees for nests prior to tree trimming and avoid any trees with active nests.

- Post a public notice sign at an appropriate location along the transmission line route that explains the Avian Protection Plan and provides information for the public to notify GDHC of any avian mortalities discovered by road users.
- Record all raptor and non-raptor electrocutions and collisions on forms included in the plan, and report them to Montana FWP within 24 hours of discovery of notification of a carcass.
- Record any active or inactive nests found on any project-related pole structure on forms included in the plan and contact Montana FWP.
- Provide completed forms to Reclamation, the Forest Service, Montana FWP, and FWS, and determine the need for and type of mortality reduction measures that would be developed in cooperation with state and federal resource agencies.
- Consult with Montana FWP a minimum of once each year to determine the effectiveness of its avian reporting format.

FWS recommends that GDHC develop and implement an Avian Protection Plan in consultation with FWS that is consistent with the current APLIC guidelines. FWS, by letter dated May 5, 2009, informed GDHC that its draft Avian Protection Plan was found to be consistent with 2005 APLIC guidelines.

In its comments on the draft EA, EPA recommends that GDHC conduct annual spring and fall bird mortality surveys during the nesting and migration periods to locate birds that have been electrocuted or collided with transmission lines or structures to aid in the process of identifying and modifying problem areas.

Staff Analysis

The above-ground segments of the transmission line could represent an electrocution hazard to birds if spacing between conductors is less than 60 inches. The potential for avian collisions with power lines is greatest in areas where there is a high concentration of birds (i.e., major bird flight paths), during periods of poor visibility such as morning and evening hours; at night; during foggy or stormy weather; and when overhead ground wires are used. In the 34.5-kV Canyon Segment, burial of portions of the existing 7.2-kV overhead distribution line together with portions of the project's transmission line would improve conditions for raptors along 1.27 miles of transmission line. The remaining 3.3 miles of overhead line within the 34.5-kV Canyon Segment are designed to have the existing 7.2-kV line relocated to the project's new, larger transmission-line poles, thus retaining a single pole line. Minimization of pole lines is

consistent with the APLIC guidelines regarding minimization of potential collision risks for raptors.

The entire 4.71-mile-long, 34.5-kV Plains Segment of the transmission line would be underground; thus there would be no effects on raptors along this portion of the line.

Along the 16.91-mile-long, 69-kV Plains Segment, all existing 7.2-kV and 12.5-kV distribution-line poles along the proposed transmission-line alignment would be removed and the 7.2-kV and 12.5-kV single-phase lines would be relocated onto the project's larger transmission-line poles (GDHC, 2010a), again retaining the existing single pole-line configuration along this segment. The APLIC guidelines, which GDHC proposes to use in the final design of overhead portions of the transmission line, are generally considered by agencies and utilities to represent BMPs for designing transmission lines to minimize the potential for raptor collisions and electrocutions. Using these guidelines to develop the final design the proposed transmission line would represent the state of the art for avoiding potential effects on raptors. FWS' letter dated May 5, 2009, and included in the Avian Protection Plan, stated that it had reviewed the plan and found it consistent with the current APLIC guidelines. We, therefore, interpret this to mean that GDHC's proposed Avian Protection Plan would fulfill the requirements of FWS' recommended Avian Protection Plan.

As noted above, the APLIC guidelines represent the state-of-the-art for minimizing avian transmission line-related mortality from collision and electrocution. Consequently, any transmission line-related mortalities should be rare, if they occur at all. Conducting multiple targeted mortality surveys of overhead portions of the transmission line each year, as EPA suggests, would be unlikely to provide meaningful data that could be used to identify problem areas. APLIC states that monitoring by way of carcass counts is not a reliable means of determining avian mortality because carcass removal rates by scavengers can vary greatly, and the detection of carcasses is influenced by habitat, season, observer bias, and carcass species (APLIC, 2006). Any transmission line-related avian mortalities are most likely to be detected by chance encounters during line maintenance or by the public.

GDHC's proposed Avian Protection Plan includes provisions for reporting any avian mortalities or avian nests discovered along the transmission line to resource agencies and for requesting assistance from the public in reporting potential project-related avian mortalities. The Avian Protection Plan also includes provisions for consulting with Montana FWP regarding the effectiveness of its avian reporting format and provisions for consulting with state and federal agencies throughout the final design, construction, and operation of the transmission line to ensure avian protection. These consultation provisions would enable resource agencies to comment on whether the proposed monitoring and reporting protocols require adjustments.

GDHC's Avian Protection Plan proposes to notify Montana FWP within 24 hours of the discovery of any avian carcass along the transmission line. The plan also proposes to notify Montana FWP of any nests discovered on pole structures along the transmission line; however, the plan does not provide a time period for which the notification would occur. An additional provision could be included in the Avian Protection Plan to ensure timely notification of nests along the transmission line. We envision that 24 hours would be a reasonable amount of time to notify Montana FWP so appropriate actions could be timely implemented to protect the nest site.

Grouse Predation along Transmission Line

In his comments on the draft EA, Zachary Winestine requests an analysis of whether the increased height of the transmission line might lead to higher rates of grouse mortality because of the taller perches it would afford raptors, enabling them to more easily spot and hunt grouse.

Staff Analysis

Species such as sharp-tailed grouse that gather at specific locations (leks) during breeding seasons can be vulnerable to predation by mammalian and avian predators. This is due to the increased opportunity created by several individuals gathering at one location and the open courtship displays that take place. It is possible that placing the project's taller poles in or near leks may increase predation by raptors because the taller poles may provide a greater vantage point for avian predators. However, this would depend on many factors, including the proximity to a lek, topography, type and density of vegetation, and availability of other prey species. Any increased potential for raptor predation would likely occur during the spring mating season, with predation-potential likely declining during the remainder of the year when grouse enter less-vulnerable life stages and disperse into other habitats.

Perch preventers could be installed on transmission lines to discourage raptors from perching, if doing so is considered appropriate. APLIC (2006) recommends that, when considering whether or not to install perch preventers on transmission structures, consideration should be given to whether doing so would increase the risk of avian electrocution; if perch preventers may move birds from a safe location to an unsafe location; whether raptors are more likely to prey on mammalian prey or sensitive species, such as sharp-tailed grouse; and the level of raptor predation in the vicinity regardless of the presence of the transmission line.

GDHC proposes to consult with federal and state resource agencies regarding the final design of the transmission line. If the resource agencies consider the potential risk of increased predation on sharp-tailed grouse populations to be unacceptable, then the final design could incorporate perch preventers on poles to eliminate this risk. An additional provision could be added to the Avian Protection Plan that would require

Commission approval of transmission-line final design. Such a provision would enable the Commission to consider any potential discrepancies between the applicant's proposed final design and agency recommendation's for avian protection.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

By letter filed on August 5, 2010, FWS identified four federally listed species that are known to occur in Lewis and Clark or Teton counties: the threatened bull trout (*Salvelinus confluentus*), grizzly bear (*Ursus arctos horribilis*), and Canada lynx (*Lynx canadensis*), and the endangered black-footed ferret (*Mustela nigripes*). Critical habitat for the bull trout and Canada lynx also occurs in these counties. There are no federally listed endangered, threatened, or candidate plant species known to occur in the project area.

Bull Trout

Within the state of Montana, bull trout are known to occur in the Kootenai River and Clark Fork River basins. As noted by Montana FWP in its comments on the draft license application, bull trout are not found east of the continental divide in the Missouri River drainage. The Sun River is located on the east slope of the continental divide and is a tributary of the Missouri River drainage; therefore, bull trout do not occur in the project area. The project area does not include any areas designated as bull trout critical habitat (50 CFR Part 17).

Table 10 provides information regarding the status of each of the terrestrial species by FWS, state of Montana, and Forest Service, as well as range information in Montana.

Table 10. Project area threatened and endangered animal list (Source: GDHC, 2009).

Common Name	Scientific Name	FWS	State Status	Forest Service Status	Range—Montana
Grizzly bear	<i>Ursus arctos horribilis</i>	Threatened	Species of concern	Threatened	Resident, transient; alpine/subalpine coniferous forest
Canada lynx	<i>Lynx canadensis</i>	Threatened	Species of concern	Threatened	Resident; western Montana—montane spruce/fir forests
Black-	<i>Mustela</i>	Endangered	Species of	Endangered	Prairie dog

Common Name	Scientific Name	FWS	State Status	Forest Service Status	Range—Montana
footed ferret	<i>nigripes</i>		concern		complexes— eastern Montana

Grizzly Bear

Grizzly bears may be found in the Sun Canyon area year-round; however, activity in the area is generally confined to spring and fall foraging and possibly denning. Areas surrounding the Sun River Canyon have both denning and spring foraging habitat for grizzly bears, both activities that are considered of extreme importance to the grizzly bear populations in the Lewis and Clark Forest (Forest Service, 2007). Grizzly bears are active between April and November of most years and enter a state of semi-hibernation during the winter months. Winter dens are usually dug on steep slopes where wind and topography cause an accumulation of deep snow and where snow is unlikely to melt during warm periods. Den sites are generally at higher elevations than the Gibson Dam Project well away from development and human activity (Servheen, 1982).

Grizzly bears emerge from their dens in spring to feed on grasses, sedges, and forbs. Spring foraging areas may also include big game ranges and private land to the east of the Rocky Mountain Front, which provide winter-killed deer, elk, and livestock. Based on Forest Service maps included in the license application, spring foraging areas include portions of the project area west of the proposed substation. As the active season progresses, grizzlies shift to higher elevations north, south, and west of the project area. In late summer and fall, there is a transition to fruit and nut sources, as well as herbaceous materials (Montana NHP and Montana FWP, 2010k).

As opportunistic feeders, grizzly bears prey or scavenge on almost any available food, including ground squirrels, insects, ungulates, carrion, and garbage. Grizzly bears prefer to have access to dense forest for cover.

Canada Lynx

Canada lynx inhabit conifer and conifer-hardwood habitats that support its primary prey, snowshoe hares. In the contiguous United States, lynx occur in the Northeast, western Great Lakes, northern and southern Rockies, and northern Cascades. The more southern forests in this range generally support lower snowshoe hare and lynx densities than those farther north (Nordstrom, 2005; Forest Service and FWS, 2005).

Canada lynx east of the Continental Divide in Montana inhabit subalpine forests at elevations between 5,400 and 7,900 feet (Ruediger et al., 2000). While the western, forested portion of the project area occurs within the Rocky Mountain Ranger District-

defined range for the lynx, project-related disturbances would be at elevations well below normal lynx habitat. Critical habitat maps developed by FWS do not depict Gibson reservoir, the Sun River Canyon, or the proposed transmission line route as being included in designated critical habitat for Canada lynx (74 FR 36, February 25, 2009, modifying 50 CFR Part 17).

Black-footed Ferret

Black-footed ferrets are intimately tied to prairie dogs (*Cynomys* spp.) throughout their range and have only been found in association with prairie dogs. They are therefore limited to the same open habitat used by prairie dogs: grasslands, steppe, and shrub steppe. Only large complexes (several thousand acres of closely spaced prairie dog colonies) can support and sustain a breeding population of black-footed ferrets.

Black-footed ferrets are not known to inhabit any portion of the project area (Montana NHP and Montana FWP, 2010). Prairie dogs, the main food source for the black-footed ferret, also do not inhabit any portion of the project area.

3.3.4.2 Environment Effects

The project area does not provide suitable habitat for the bull trout, Canada lynx, or the black-footed ferret, and these species are not known to occur in the project area. We, therefore, conclude that the project would have no effect on the bull trout, the Canada lynx, or the black-footed ferret.

Grizzly Bear

In the spring when grizzly bears emerge from their dens, they often move to the lower elevations of the Rocky Mountain Front where they forage on grasses and herbs and scavenge the carcasses of winter-killed animals. Construction during this period could disturb bears seeking sources of food. Disturbance during this period could result in increased energetic costs and movement to less favorable areas. To minimize disturbance during this period, GDHC proposes to implement construction schedule control measures that consider grizzly bear life history requirements. For example, the majority of powerhouse construction would be completed prior to the spring foraging period and all of the plains portion of the transmission line would be constructed after the spring foraging period. In addition, to reduce the potential risk of conflict between humans and bears during construction, GDHC prepared a Bear Safety Plan. The Bear Safety Plan provides information and guidance on bear safety to all persons associated with the proposed project to regulate their behavior while working or recreating in the project area. Measures in the Bear Safety Plan include: restrictions on food storage and disposal of food and other garbage that might attract bears; guidelines for conduct while working in the area, which includes not feeding the bears, making as much noise as possible when hiking to alert bears to your presence, and maintaining vigilance while in

the area; actions to be taken in the event of a bear attack; and procedures for problem bears. All construction personnel at the site would be required to read and sign this plan prior to engaging in onsite activities, including supervisors, workers, and subcontractors.

Staff Analysis

Project construction could disturb grizzly bears during the spring when bears emerge from their dens and move to lower elevations to forage and scavenge for food. GDHC's proposed construction schedule would minimize this potential disturbance. Much of the material required for construction of the powerhouse and transmission line would be transported to the site during non-sensitive time periods and stockpiled at the proposed staging areas, thus avoiding disturbance by large truck traffic. In addition, GDHC's proposed Bear Safety Plan would avoid human-bear conflicts if bears wander into the project area during construction. These measures would adequately protect grizzly bears from any potential project effects.

With implementation of the measures included in GDHC's Bear Safety Plan, potential adverse effects of the project on grizzly bears should be insignificant and discountable. We, therefore, conclude that licensing the project would not be likely to adversely affect the grizzly bear.

3.3.5 Recreation and Land Use

3.3.5.1 Affected Environment

Recreation

The Gibson Dam-Sun River area, located in Lewis and Clark National Forest's Rocky Mountain Ranger District, is one of the most popular recreational areas in the District. District-wide activities include big game hunting, fishing, viewing scenery, dispersed and campground camping, horseback riding and packing, backpacking, hiking, wildlife viewing, winter sports, and cabin rentals. Among the various Districts in this national forest, Sun River Canyon, which includes Gibson reservoir, ranks third in terms of recreational use at 71,700 recreational visitor days based on Forest Service data presented in the license application.

According to the Forest Service visitor use monitoring data, annual visitation to the Lewis & Clark National Forest was estimated at 436,100 site visits in 2007. Developed day-use sites received 144,500 visits, and developed overnight sites received 60,600 visits. These statistics include the Rocky Mountain District, in which the Sun River Canyon is located, as well as the Little Belt, Big Snowy, Little Snowy, Highwood, Castle, and Crazy mountain ranges, to the east of Great Falls, Montana. General forest areas within the Lewis & Clark National Forest received 183,600 visits, while wilderness areas received 44,400 visits. Recreation use accounts for approximately 70 percent of all

visitors' reasons for visiting the Lewis & Clark National Forest. The most popular activity of visitors to the national forest is hunting (23.7 percent), followed by viewing scenery (15.8 percent) and downhill skiing (12.6 percent). However, nearly half of all visits to the area for one of the primary reasons noted above also include viewing scenery, and more than 30 percent include viewing wildlife (Forest Service, 2009).

Primary public access to the Sun River Canyon, Gibson dam, and a heavily used trailhead to the Bob Marshall Wilderness is via the Sun Canyon Road (also known as FDR 108) from the town of Augusta, Montana. FDR 108 is also used to access campgrounds, fishing and hunting areas, Mortimer Gulch residences, recreational residences on national forest lands, boat launch facilities, wildlife viewing areas (specifically the watchable wildlife interpretive site located near the Sun River diversion dam just north of FDR 108), and trailheads within the Sun Canyon area. Additionally, FDR 8973, located off of FDR 233, leads to a turnaround area used by visitors to view Gibson dam.

Trails

Trail 201 offers access to the Bob Marshall Wilderness. According to the Forest Service, 580 hikers registered to access the Bob Marshall Wilderness at the trailhead in 2005. This narrow trail with steep cliffs extends along the hillside on the north side of the Sun River and Gibson dam. Trail 201 is popular for horseback riding, and provides scenic vistas of Gibson dam.

A short foot trail extends south from the FDR 8973 turnaround and follows along Beaver Creek, then turns west and crosses the bridge on the existing road that accesses Gibson dam and related facilities. This trail is used to access the tailrace area of the dam for viewing and fishing opportunities.

The Beaver Trailhead, located about 0.5 mile northeast of Gibson dam, is most heavily used by hunters in the fall to access the Beaver Creek drainage and for overnight camping throughout the summer. The dam is visible from the Beaver Trailhead.

Camping

The Forest Service manages two campgrounds in the vicinity of Gibson dam: Home Gulch and Mortimer Gulch. Home Gulch campground is located a little over 2 miles downstream of Gibson dam and has 15 campsites with picnic tables and fireplaces. Its principal features include fishing access, trail access, nearby horse-back riding facilities, interesting geological formations, and boating. Mortimer Gulch campground is located upstream of Gibson dam on the north shore of Gibson reservoir. It is a larger site than Home Gulch, with 28 campsites that include picnic tables and fireplaces. Activities at this campground include fishing and boating access to the reservoir, with nearby facilities for horseback riding and viewing interesting geological formations. Both

campgrounds are open from May 25 through September 15 and offer convenient access to several hiking trails in the canyon and forest.

There are also several dispersed campsites located between FDR 108 and the Sun River, near the south bank of the river between Hannan Gulch and the Forest Service boundary to the east.

Fishing

Fishing in both Gibson reservoir and the Sun River are popular activities. Gibson reservoir is managed as a coldwater fishery, primarily for rainbow trout, by Montana FWP. In general, Gibson reservoir is rated as a fair fishery because of the extreme fluctuation of reservoir levels over the course of the year. Montana FWP data indicate that fishing pressure in Gibson reservoir is less than that in other similar coldwater reservoirs that do not experience the same severe pool fluctuations. The extreme drawdown of the reservoir during summer also restricts boat launching access. The Sun River from Gibson dam to Diversion Lake is classified as a moderate coldwater fishery by Montana FWP.

Hunting

Hunting is a major recreational activity within the Sun River Canyon and the Bob Marshall Wilderness, located just west of the reservoir. Game hunted in the area includes elk, deer, bighorn sheep, and bear. Hunting and related activities occur from mid-October until just after Thanksgiving.

Wildlife Watching

Wildlife viewing in the Sun River Canyon attracts many visitors. A variety of animal and bird species may be viewed throughout the year because major migration patterns occur through this area. Large numbers of elk can usually be observed during the winter months, while peak time for birding includes spring and fall. The different species within the canyon are discussed further in section 3.3.3, *Terrestrial Resources*. A watchable wildlife interpretive site is located near the Sun River diversion dam to the north of FDR 108, near the entrance to the Sun River Canyon.

Residences and Resorts

There are approximately 20 private residences located north of Gibson reservoir on private lands within the National Forest boundary. In 1984, there were 43 special use recreation residences located within the canyon. These recreation residences are typically used as summer homes and dispersed throughout the canyon. There are also three commercial outfitters operating in the canyon including the Sun Canyon Lodge, K-L Dude Ranch, and the Triple J Wilderness Ranch. The Blacktail Corrals, located

approximately 0.5 mile northeast of Gibson dam, is used for horse boarding during trail rides and hunting activities offered by the Sun Canyon Lodge.

Land Use

The primary land uses in the project area are recreation, livestock grazing, and agriculture. Recreation use is associated primarily with Forest Service lands in the Sun River Canyon and around Gibson reservoir. Agricultural land use dominates the plains area east of the Rocky Mountain front, which includes most of the proposed transmission line route. Principal crops grown in the area include wheat (winter, spring, and durum wheat), barley, oats, alfalfa, hay, and corn for silage. Crops are grown on both non-irrigated and irrigated croplands. Livestock raised are primarily cattle, hogs, and chickens.

The Sun River Canyon portion of the project area consists of Forest Service lands with about 300 acres of private inholdings located along Mortimer Gulch, north of Gibson dam. The inholdings have been developed mainly for private summer homes. The lands around Gibson dam are owned by the United States. Administration of the lands is delegated to both Reclamation and the Forest Service. All lands and waters within the Gibson reservoir area that are needed or used for the operation of the Sun River Project or for other Reclamation purposes are administered by Reclamation. Administration of these lands for recreation and other National Forest purposes is delegated to the Forest Service. Reclamation has primary administration over the areas actually occupied by its structures and works and the areas required to administer, maintain, operate, and protect these structures and works.

The transmission line corridor crosses Forest Service lands withdrawn for Reclamation purposes within the canyon and several miles of BLM land, Montana State lands east of the Rocky Mountain Front, and private lands. Portions of the corridor would be within county road right-of-ways.

The transmission line crosses properties encumbered by FWS perpetual conservation easements (GDHC, 2010b). These easements require that official documentation of a senior, unrecorded, pre-existing right-of-way easement on such properties be filed and approved by FWS before the proposed transmission line can cross such easements. No right-of-way would be approved unless it is determined by the FWS Regional Director to be compatible with the refuge purposes, pursuant to the National Wildlife Refuge System Improvement Act of 1997. The procedures for filing applications and the terms and conditions under which rights-of-way over and across the lands administered by FWS are provided in 50 CFR 29.21-1.

3.3.5.2 Environmental Effects

Recreation

Issues identified with respect to recreation apply primarily to the project construction period. Noise and dust associated with construction activities could diminish the quality of the recreation experience in the vicinity of the proposed construction site. There could also be safety concerns where recreational users and construction vehicles use the same roadways to access areas near the dam.

To minimize the effects of construction activities on nearby recreation users, GDHC proposes to implement its Recreation During Construction Plan. The Recreation During Construction Plan includes project construction mitigation measures for the following nearby features: Trail 201, FDR 8973 Turnaround and trail, Beaver Trailhead, Blacktail Corral, FDR 108, Home Gulch Campground and boat launch, dispersed campsites, and the watchable wildlife interpretive site.

Along Trail 201, GDHC proposes to post one sign upstream and one sign downstream of the dam warning recreational users of construction activities at the base of the dam. GDHC also proposes to prepare a Blasting Plan, should blasting be required, prior to any blasting activities, which would include trail closures above and below the dam. GDHC also proposes to monitor dust and noise on a daily basis from Trail 201 during the construction period in consultation with the Forest Service. If dust were to become a problem, water would be applied to the work area creating the dust. If ongoing noise is deemed by the Forest Service to be a hazard to horse riders that use this trail, GDHC would first work with the construction contractor to attempt to reduce the noise levels to acceptable levels. If noise levels remain unacceptable to trail users, GDHC would work with the Forest Service to establish a temporary detour trail that would avoid areas of high noise levels.

To minimize construction effects at the FDR 8973 turnaround, GDHC proposes to post a sign warning the public of the construction activity at the dam, to temporarily close and fence off the foot trail leading from the turnaround to the tailrace area, to restrict access to the Sun River between Gibson dam and Beaver Creek, and to continue to restrict public access to areas fenced by Reclamation for current dam operations. In addition, GDHC proposes to monitor dust from construction on a daily basis.

In regard to FDR 108, GDHC proposes in its Recreation During Construction Plan to prepare a detailed Traffic Control Plan in coordination with the construction contractor prior to the start of any project construction and after final design. GDHC also proposes to impose a reduced speed limit for construction equipment using FDR 108, post signs warning the public of construction vehicles and equipment in the road, restrict use of air brakes, use pilot vehicles when hauling oversized loads, and encourage carpooling to reduce construction traffic.

The construction of the new transmission line in the canyon generally follows FDR 108 (Sun Canyon Road). To minimize effects on recreational visitors and other public users of this road, GDHC proposes to: (1) perform transmission line work in early spring, prior to the heaviest summer recreational use in Sun Canyon; (2) apply spray water to minimize dust from construction; (3) limit work hours to begin no earlier than 7 a.m. and end no later than 6 p.m.; (4) limit road closures to weekdays unless approved by the Forest Service; (5) post signs describing the construction period, traffic delays, and any road closures; (6) publish road closures with a 2-week notice in the local newspaper if the road must be closed longer than 4 hours; (7) maintain traffic delay and road closure information on the project website; (8) make a best effort to keep one lane open; and (9) provide prior notice to any residences of planned power outages.

To minimize effects on Home Gulch Campground and boat launch, GDHC proposes to: (1) post signs at the campground exit warning the public of large vehicles in the road; (2) prohibit use of campground by the project workforce unless approved by the Forest Service; (3) limit work activities during Memorial Day and Independence Day weekends; and (4) restrict parking or storage of construction equipment that would block access to the boat ramp.

GDHC also proposes to: (1) post a caution sign warning the public of construction activities and monitor noise and dust from construction on a daily basis at Beaver Trailhead; (2) provide prior notice to the Blacktail Corral of construction occurring near Blacktail Gulch Bridge; and (3) forbid parking or storing construction equipment in a way that would restrict access to dispersed campsites.

Forest Service 4(e) condition no. 16 stipulates that GDHC file a Recreation Plan that includes provisions for conducting the work agreed to by the Forest Service and GDHC, as described in the Recreation During Construction Plan at the following facilities: Home Gulch Campground and boat launch, Beaver Creek Trailhead, Gibson Overlook, the viewing turnaround below the dam, and the existing fishing access trail along the river to the dam. Forest Service 4(e) condition no. 16 also stipulates that the Recreation Plan include: (1) a description of GDHC's and Forest Service's share of the construction, operation, and maintenance of recreation facilities and sites on national forest lands affected or associated with the project; (2) specific mitigation measures for existing recreation facilities and sites, including compliance with the Americans with Disabilities Act; and (3) plans for future development or rehabilitation of recreation facilities or sites. The Forest Service provides no specific information about which recreation sites would be included in these three elements of its condition.

Finally, GDHC proposes to develop and implement a Traffic Control Plan, after completion of final design of the powerhouse and transmission line.

Staff Analysis

Short-term construction activities have the potential to adversely affect public access to recreation facilities in the project area. While the majority of construction activities would be limited to the dam site, where public access is already restricted, recreation use of two trails would be affected by project construction. The foot trail to the tailrace would be temporarily closed during construction, and use of Trail 201 by equestrians may be temporarily restricted due to construction-related noise.

Trenching for underground transmission line segments could cause lane closures along Sun Canyon Road, FDR 108, thus causing minor, short-term traffic delays. Hauling materials to and from the staging areas, or to disposal areas could also result in short-term traffic delays. Including provisions in GDHC's proposed Traffic Control Plan to avoid transmission line construction and limiting materials movement along FDR 108 on all weekends from Memorial Day through Labor Day would minimize effects on visitors on this road during peak recreation use times. Under typical conditions, there would likely be sufficient time between snowmelt in the area and the start of the recreation season on Memorial Day weekend to complete transmission line construction in the canyon prior to needing a weekend restriction. Snowmelt at similar elevations on the east slope of the Rocky Mountains has been highly variable from 2003 to 2010. During most years, snowmelt occurred between late March and mid-April (NRCS, 2010). Regardless, snow cover would not necessarily preclude construction of the transmission line because existing roads would be kept open to facilitate Reclamation access to Gibson dam for maintenance purposes.

Noise and dust could also contribute to negative effects of project construction on the overall recreational experience around the project area. The area's natural topography and vegetation are expected to attenuate construction noise such that adverse noise effects would be limited to the area between Gibson dam and the major topographic ridge located about 3,000 feet to the east of the dam. Construction dust would be limited to the powerhouse construction site and the staging area because FDR 108 is paved eastward beginning several hundred feet east of Beaver Creek. Transmission line trenching operations could also cause localized, short-term increases in airborne dust; however, GDHC's proposal to apply spray water would help to control the dust and minimize any related effects.

Trail 201, located adjacent to the dam at a higher elevation, traverses narrow steep cliffs with viewpoints overlooking the dam. This trail is popular for horseback riding, thus there is concern of the effects of noise on horses and trail users navigating the steep terrain. GDHC proposes, as part of its Recreation During Construction Plan, to close Trail 201 0.25 mile from the dam both upstream and downstream during blasting activities and to coordinate with the Forest Service to daily monitor noise (the need for blasting will not be determined until after excavation has begun). If needed, GDHC would coordinate with the construction contractor to reduce noise associated with

construction activities. If the Forest Service still thinks construction noise is a hazard to trail users after noise reduction measures have been implemented by the construction contractor, then GDHC would work with the Forest Service to close Trail 201 and detour users to a temporary trail near the Gibson reservoir public boat launch (approximately five miles deeper into the canyon). These proposed noise mitigation measures on Trail 201 would minimize the effects of construction-related noise on recreational users, provide for daily monitoring of the noise during the construction period, and provide for routine coordination with the other parties involved.

GDHC provides no specific information on the measures that would be included in its proposed Traffic Control Plan. However, such a plan would typically include locations where lane restrictions would occur, temporary detours that may be needed to maintain the flow of traffic, locations where flaggers would be used to direct traffic, any temporary trench covering to protect the public during times when active underground transmission line construction is not occurring, and construction vehicle use restrictions to avoid periods when peak recreational use typically occurs. A Traffic Control Plan developed by GDHC (or its construction contractor) in coordination with Reclamation and the Forest Service would provide a framework for minimizing effects of project construction traffic on public use of roads near the project, including FDR 108.

GDHC's Recreation During Construction Plan would address likely effects on visitors during construction. In the long term, project lands are not expected to encroach on any camping area, picnic area, parking area, trailhead, trail system, or other public or private recreational facility. Project construction would not result in the removal or alteration of existing roadways. Roadway access to Mortimer Gulch, recreation facilities on Gibson reservoir, and trails that access the Bob Marshall Wilderness (Trail 201) would not be changed by the project. Based on these considerations, and because project operations would not modify existing flow releases to the Sun River or create additional demands on existing recreational facilities, we find that long-term project operation would not affect recreation use in the project area.

The Forest Service's 4(e) condition no. 16 stipulates that GDHC develop a Recreation Plan that would require it to share responsibility for construction, operation, maintenance, or plans for future development or rehabilitation at Forest Service lands affected by project development. Because no specific measures or sites are specified in the condition, we are unable to analyze the benefits of these additional elements that go beyond the agreed-upon protective measures during project construction. Moreover, it is unclear why such measures would be needed or what relationship they would have to the project, as the project would not have any long-term effects on recreation resources.

Interpretive Displays

Forest Service 4(e) condition no. 17 stipulates that GDHC file with the Commission an Interpretive Display Plan that is approved by the Forest Service.

Displays and signs included in the plan would at a minimum provide a history of the hydropower facility, describe its operation and benefits, as well as measures taken to mitigate environmental effects related to project facilities and operations. It would also provide general information about recreation opportunities and other information of interest to the public. The Interpretive Display Plan would apply to three existing interpretive displays: (1) at Gibson Overlook, (2) at the viewing turnaround below the dam, and (3) near the Sun River diversion dam. Finally, the Forest Service's specified plan may also include the development of additional interpretive displays.

Staff Analysis

The Forest Service condition stipulates that GDHC be responsible for updating and maintaining three existing interpretive displays. Two of the displays are located near the dam: one at Gibson Overlook (along FDR 108 before it reaches Mortimer Gulch Campground), and one at the viewing turnaround below Gibson dam. Both the Gibson Overlook and the viewing turnaround below the dam offer visitors different perspectives of the dam and the powerhouse site. Providing interpretive displays at Gibson Overlook and the viewing turnaround below Gibson dam would enable visitors to learn about the history of the dam and the hydroelectric project, as well as other nearby features of public interest, while actually viewing the dam, thereby ensuring a relationship between the displays and the project.

The Forest Service condition also specifies that GDHC be responsible for updating and maintaining a third interpretive display at the mouth of Sun River Canyon near an existing "watchable wildlife" sign in the vicinity of the Sun River diversion dam. This site would be located along the 34.5-kV Canyon Segment of the project's transmission line and an interpretive display at this location would provide an opportunity to inform visitors of the hydropower project's protective measures for wildlife (e.g., avian protection measures).

An Interpretive Display Plan would enable the messages associated with the displays to be vetted with the Forest Service and Reclamation to ensure consistency with the Lewis and Clark National Forest Plan prior to being filed with the Commission for approval.

The Forest Service condition suggests that GDHC may also need to be responsible for additional interpretive displays. The Forest Service 4(e) condition does not explain why more than three interpretive displays should be the responsibility of GDHC to develop and maintain, nor are potential locations for additional signs identified.

Land Use

In its July 16, 2010, filing, Interior states that the proposed alignment of the transmission line would cross properties encumbered by FWS perpetual conservation

easements. As such, Interior states that the FWS Regional Director must determine that the right-of-way is compatible with the refuge purposes, pursuant to the National Wildlife Refuge System Improvement Act of 1997.

Staff Analysis

GDHC would be required to work with FWS and provide the necessary information for the FWS Regional Director to make a determination regarding whether or not the proposed transmission line would be compatible with the affected FWS conservation easements.

Fire Control

GDHC states in its Recreation During Construction Plan that it would supplement this plan with a number of other plans, including a Fire Control Plan. No details are provided regarding what specific information would be included in the Fire Control Plan.

Staff Analysis

A standard BMP for facilities in areas that may be susceptible to wildfires is to have a plan in place that defines measures that would be taken to prevent fires and emergency procedures that would be implemented in the event of a fire. Having clearly defined measures that would be taken to control potential fire fuels, specific equipment that would be available onsite to fight fires and the location of that equipment, and emergency notification procedures would enable fire prevention and control to be effectively implemented. Developing this plan in consultation with Reclamation and the Forest Service, at a minimum, would ensure that fire control measures are developed in a coordinated manner.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

NHPA section 106 requires that the Commission evaluate the potential effects on properties listed or eligible for listing in the National Register. Such properties listed or eligible for listing in the National Register are called historic properties. In this document, we also use the term “cultural resources” for properties that have not been evaluated for eligibility for listing in the National Register. Cultural resources represent things, structures, places, or archaeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic. Section 106 also requires that the Commission seek concurrence with the Montana State Historic Preservation Officer (Montana 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 effects on historic properties.

If Native American (i.e., aboriginal) properties have been identified, section 106 also requires that the Commission consult with interested Indian tribes that might attach religious or cultural significance to such properties. In this case, the Commission must take into account whether any historic property could be affected by a proposed license within the project's APE, and allow the Advisory Council on Historic Preservation an opportunity to comment prior to issuance of any license for the project.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by the issuance of a proposed new license within a project's APE. The APE is determined in consultation with the Montana SHPO and is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[3]). In its draft license application and draft HPMP (GDHC, 2010c), GDHC described the APE for the project as consisting of lands within the proposed project boundary.

On July 7, 2008, Interior stated that the APE should be expanded to include the geographic area beyond the narrow band along the right-of-way for the transmission line to take into account the visual effects that may be caused by the proposed project on Native American sacred areas, such as vision quest areas and rock art.

The APE was subsequently revised and maps of the APE provided in the final HPMP (GDHC, 2010d) now include all areas where the proposed project may have visual or other effects on cultural or historic properties. In its comments on the HPMP (letter from S. Wilmoth, State Archaeologist/Deputy SHPO, Montana Historical Society, Helena, MT, to S. Marmon, GDHC, Bellingham, WA, February 2, 2010), the Montana SHPO had no comments on the APE.

Cultural History Overview

The following text is a summary of the cultural overview provided in the final license application and project HPMP (GDHC, 2010d).

The project area is at the northwest extremity of the North American Great Plains province and is characterized by the large and small inter-montane basins of the northern Rocky Mountains from the Colorado border to the Yellowstone River Basin. The project area is not isolated culturally from adjacent areas nor is there any indication of one area that might be considered a cultural center.

Culturally, early human users of the upper Missouri River Basin were band-level hunters and gatherers who shifted constantly in response to available food supply. There is no evidence of early villages or other population centers in this region. It is believed

that prehistoric hunter-gatherers on the Plains were territorial and moved regularly to find subsistence. Because a typical family group may have moved camp as often as 50 to 100 times a year, these early cultures left a large number of campsites of different duration and purpose.

The Rocky Mountain Front lies within the traditional territory of the Blackfoot, Kootenai, and Salish tribes, dating to as early as 1500 years ago. The Kootenai and Salish have been present in the area since at least 700 years ago. Briefly, during the early 1700s, Shoshonean peoples controlled the area. The Metis and Chippewa-Cree moved into the area in the 1800s.

Prior to 1750, the Shoshone were the principal occupants of the Rocky Mountain Front area including seasonal use of the project vicinity. During the 1800s, the Blackfeet controlled the territory east of the Rockies and north of the Yellowstone River. In the mid-1800s, the U.S. government had the Montana tribes sign their first treaties. The entire project area lay within the lands assigned to the Blackfeet under the original Fort Laramie Treaty of 1851. All or part of the project area remained under Blackfeet control until 1874 when the southern limit of Blackfeet treaty lands was moved north to the Marias River.

The major topographic feature of the unit, the Rocky Mountains, is known to the Blackfeet as the Backbone of the World. According to the Blackfeet, any mountain in this area with a distinct profile/unique topographic form is a sacred mountain and was probably used in the past for vision questing. Medicine Hot Springs at the confluence of the North and South Forks of the Sun River had medicinal properties and were used for curing by the Blackfeet.

The Sun River is considered sacred, noted to contain Underwater Beings, supernaturals to whom offerings are made. Isolated, secluded locations along this river are suitable locations for vision questing.

According to Blackfeet tradition, various bands of Blackfeet traveled from Alberta, Canada, as far south as New Mexico following the "Old North Trail." This trail or travel corridor parallels the Rocky Mountain Front. The most recent systematic examination of the Old North Trail indicates that it is a complex north to south network of trails running parallel to the Rocky Mountain Front. The Trail consists of an Outer Trail running northwest from Choteau, more or less parallel to today's Highway 89, and an Inner Trail up against the mountains.

The earliest known Euro-Americans in the area were probably French, English, and Spanish trappers as well as explorers looking for the fabled "Northwest Passage" that was believed to exist in this part of the country. The Lewis and Clark Expedition passed through the area in 1805, while exploring the newly acquired Louisiana Purchase. Trappers and traders, such as Auguste Chouteau and his son Pierre, operated the

American Fur Company throughout the region until the failure of the fur trade. Pierre, for whom the town of Choteau is named, is credited with bringing the first steamboat up the Missouri to Montana.

On February 26, 1906, the Secretary of the Interior authorized the construction of the Sun River Irrigation Project. The authorization was prompted in part by intense lobbying by local farmers for federal sponsorship of an irrigation system that they deemed essential to ensure successful farming operations in the area. There had been numerous, unsuccessful attempts to construct irrigation facilities using water from the Sun River. These efforts clearly indicated that success could not be achieved without government assistance.

Reclamation completed the first phase of the project, the Forth Shaw Unit, in 1908. Completion of the remainder of the Sun River Irrigation Project facilities occurred between 1908 and 1936 and included the construction of Pishkun supply canal, several other major canals, hundreds of miles of laterals, and a number of water storage facilities, including Diversion Lake and Gibson reservoir.

The Sun River Irrigation Project illustrates a significant period in the development of the agricultural economy of the area. Also, the site illustrates the successful completion of what local and national reclamation advocates envisioned as the answer to the problems of agricultural production on the arid Plains.

Prehistoric and Historic Archaeological Resources

In its license application, GDHC relied primarily on a previous 1986 survey conducted for the Grisdale Hill Hydroelectric Project (FERC No. 6863) for the identification of cultural resources within the APE. However, in 2008, GDHC conducted a cultural resources inventory of additional portions of the project APE. The results of this study were presented in *A Class III Cultural Resource Inventory of the Proposed Gibson Dam Hydroelectric Transmission Line, Lewis & Clark and Teton Counties, Montana* (Ferguson, 2008). On July 10, 2008, the Commission determined that the earlier 1986 report was comprehensive, systematic, and thorough, and that to the extent that it overlapped the project APE, the data from the study could be incorporated into survey efforts for the current project. However, given that time had elapsed and due to changes in criteria for National Register eligibility, GDHC was directed to re-evaluate some of the prehistoric sites identified in the 1986 study.

These combined cultural studies resulted in the documentation of 16 prehistoric or historic archaeological sites and 12 historical features or structures within the APE. One additional resource is not a cultural resource but is a paleontological locale. Table 11 provides a summary of all prehistoric, historic, and paleontological resources identified within or adjacent to the APE to date.

Table 11. Archaeological, historic, and paleontological resources within or directly adjacent to the Gibson dam APE (Source: GDHC, 2010d, as modified by staff).

Trinomial	Site Type	Description	National Register Eligibility
24LC174	Prehistoric	Tipi ring	Eligible
24LC175	Historic	Historic dump	Undetermined
24LC176	Prehistoric	Seven tipi rings	Eligible
24LC181	Prehistoric	Tipi ring	Eligible
24LC188	Prehistoric	Rock alignment	Eligible
24LC189	Prehistoric	Tipi ring / camp site	Eligible
24LC190	Prehistoric	Rock alignments	Eligible
24LC615	Prehistoric	Lithic scatter	Eligible
24LC797	Historic	Gibson dam	Eligible
24LC798	Historic	Gibson dam construction camp and irrigation operations	Eligible
24LC799	Historic	Historic recreational cabin	Undetermined
24LC800	Historic	Norwegian Gulch historic recreational cabins	Undetermined
24LC801	Historic	Historic dump	Not eligible
24LC804	Historic	Lower Home Gulch historic recreational cabins	Not eligible
24LC805	Historic	Sun River Project diversion dam	Eligible
24LC806	Historic	Diversion construction camp (remnant buildings) and recreational cabins	Eligible
24LC808	Historic	Pishkun canal	Eligible
24LC1087	Prehistoric	Lithic scatter	Not eligible
24LC1246	Historic	Historic Beaver-Willow Road	Not eligible
24LC1781	Paleontological	Paleontological locale	n/a

Trinomial	Site Type	Description	National Register Eligibility
24LC2144	Prehistoric	Prehistoric rock alignment (possible drive line)	Eligible
24LC2145	Prehistoric	Prehistoric stone circle (possible tipi ring)	Eligible
24LC2146	Prehistoric	Prehistoric rock alignment (possible drive line)	Eligible
24LC2147	Historic	Willow Creek Feeder canal	Eligible
24LC2170	Historic	Middle Home Gulch Tract recreational residences	Eligible
24TT0006	Prehistoric	Pre-historic pictographs	Eligible
24TT177	Historic	Sun River slope canal	Eligible
24TT583 / 24TT584	Historic/Prehistoric	Hannan Tract historic residential residences; two prehistoric lithic scatters and tipi ring	Eligible
	Historic	Historic Hannan Bridge	Undetermined

In December 2008, the Montana SHPO concurred that resources 24LC2144, 24LC2146, 24LC1247, 24LC0798, 24LC0805 are eligible for the National Register (letter from J.J. Warhank, Review and Compliance Officer Montana Historical Society, Helena, MT, to S. Marmon, GDHC, Bellingham, WA, February 2, 2010). In our April 7 2010, letter, staff determined that sites 24LC174, 24LC176, 24LC181, 24LC188, 24LC189, 24LC190, 24LC615, 24LC2145, 24TT0006, and 24TT0583 are also eligible for the National Register and requested the Montana SHPO's concurrence with staff's determination (letter from J. Hill, Chief, West Branch 1, Division of Hydropower Licensing, Federal Energy Regulatory Commission, to S. Marmon, GDHC, Bellingham, WA, April 7, 2010). Sites 24LC175, 24LC799, 24LC800, and the Historic Hannan Bridge remain unevaluated. On April 15, 2010, the Montana SHPO concurred with our findings (see Montana SHPO "Concur" stamp, dated April 15, 2010, on our April 7, 2010, letter, filed on November 3, 2010).

As it is not considered to be a "cultural resource" addressed under section 106 of the NHPA, the paleontological locale (24LC1781) has also not been evaluated.

Traditional Cultural Properties

In 2009, and at the request of the Blackfoot Tribe, a study to identify areas of traditional or spiritual importance to the tribe was undertaken. The results of the study were presented in a report titled *Blackfoot Traditional Cultural Property Assessment, Gibson Dam Hydroelectric Project, Sun River, MT (FERC Project No. 12478-003)* (Zedeno and Murray, 2009). The study found that the project APE encompasses an area of traditional cultural importance that includes a prehistoric pedestrian hunting and camping complex. This complex is represented by archaeological sites and features associated with a large-scale bison drive operation. For the Blackfoot Tribe, these sites represent a larger bison hunting complex associated with an overall subsistence pattern within the Sun River watershed that lasted for several thousand years and persisted into the Euro-American period. Notwithstanding further investigations, the probable period of significance for these sites would be the Middle and Late Prehistoric periods and, perhaps, the Protohistoric and Historic periods. Archaeological resources specifically identified in the Traditional Cultural Property assessment report include 24LC188, 24LC189, 24LC190, 24LC615, 24LC2144, 24LC2145, and 24LC2146. As mentioned previously, these resources have been determined to be eligible for listing on the National Register. Tribal elders also stressed that access to this area for spiritual purposes was important.

3.3.6.2 Environmental Effects

The project would affect certain components of the historic Sun River Project, specifically those at Gibson dam. New penstocks and bifurcations would be attached to the existing lower outlet pipes on Gibson dam and the existing jet-flow valves would be relocated to the ends of the new penstocks. A new concrete and prefabricated metal powerhouse would be constructed at the base of the historic dam and a new maintenance building constructed near the existing historic Reclamation buildings. Additionally, construction of the proposed transmission line could affect prehistoric or historic resources and/or traditional cultural properties that are eligible for listing on the National Register.

GDHC proposes and Forest Service 4(e) condition no. 22 stipulates that GDHC implement its final HPMP (GDHC, 2010d). The HPMP was crafted in consultation with the Commission, Reclamation, BLM, Forest Service, and Blackfoot Tribe. The HPMP includes procedures for: (1) the inadvertent discovery of human remains or other cultural materials during construction or operation activities; (2) public interpretation; (3) employee education with regard to cultural resources; and (4) coordination and consultation with resource agencies and the Blackfoot Tribe. Further, while the entire proposed APE has not yet been completely surveyed for historic properties, the HPMP calls for additional inventories to be undertaken with study results incorporated into a revised HPMP. GDHC proposes that the HPMP would become effective immediately upon its acceptance by the Commission and the Montana SHPO.

In its HPMP, GDHC indicates that construction of the new transmission line would not affect cultural sites 24LC174, 24LC175, 24LC176, 24LC181, 24LC188, 24LC189, 24LC190, 24LC799, 24LC800, 24LC2147, 24LC2170, 24TT177 or paleontological site 24LC1781 because the line would either be buried within the adjacent county road, would replace an existing overhead transmission line, or would be located greater than 0.5 mile away. Additionally, effects on sites 24LC805, 24LC808, 24LC2144, 24LC2145, 24LC2146, and 24TT0006 would not be adverse because steps, such as monitoring, exclusion fencing, and other measures, would be undertaken to ensure these resources are avoided during adjacent construction activities.

GDHC concludes that construction of the new powerhouse and installation of two penstocks would have no adverse effect on historic Gibson dam (24LC797) because construction of the new powerhouse would be consistent with the continuous upgrade and development of the Sun River Project. Further, GDHC contends that construction of the proposed maintenance building would have no adverse effect on the historic Gibson Dam Construction Camp (24LC798) because the proposed building would be in keeping with the historic character of the camp site.

The proposed transmission line would bisect the Sun River Diversion Dam Construction Camp (24LC806). For this reason, and at the request of the Commission, GDHC proposes to coordinate with the Forest Service and Reclamation to monitor ground disturbing activities within the site boundaries. GDHC acknowledges that additional mitigation measures may be appropriate, including a thorough recordation of the camp and/or installation of a public interpretive sign.

With regard to the Hannan Tract (24TT583), GDHC's HPMP notes that installation of the proposed transmission line would have no effect on this resource because it would be located on the other side of the river. Additionally, to avoid potential impacts on the prehistoric component of the site (identified as 24TT584), the HPMP requires GDHC to consult with the Forest Service prior to any ground-disturbing activities for this project within the Hannan Tract. Further, the transmission line would be attached to a conduit installed underneath the Historic Hannan Bridge. GDHC contends that installation of the line on the bridge would not adversely affect the structure unless irreversible changes to the structure are necessary. For this reason, GDHC proposes to consult with the Forest Service regarding the final design of the conduit attachments.

There would be no project effects on sites 24LC801, 24LC804, 24LC1087, and 24LC1246 because these sites are not eligible for listing on the National Register.

Comments on a draft HPMP were received from the Commission, Forest Service, Montana SHPO, Reclamation, BLM, and Blackfeet Tribe. In March 2010, GDHC filed a revised HPMP that also included data regarding traditional land use gathered through

consultation with the Blackfeet Tribe (GDHC, 2010c). By letter dated April 7, 2010, we requested additional revisions to the document with maps of an expanded APE that included areas where visual effects could affect historic properties, clarification of measures for the Sun River Diversion Dam Camp, depiction of the Black Reef paleontological locale on the APE maps, and clarification regarding references to the Hannan tract and Hannan Bridge.¹³ Further, we requested that the HPMP be revised to include our determinations of National Register eligibility for several archaeological sites associated with the Blackfeet Tribe bison drive complex. On May 17, 2010, GDHC filed a revised *Gibson Dam Hydroelectric Project, FERC No. P-12478-003, Historic Properties Management Plan* (GDHC, 2010d). In a letter filed with GDHC's May 2010 HPMP, the Montana SHPO stated that it had no substantive comments on the draft HPMP (letter from S. Wilmoth, State Archaeologist/Deputy SHPO, Montana Historical Society, Helena, MT, to S. Marmon, GDHC, Bellingham, WA, February 2, 2010). The Montana SHPO also concurred with our April 7, 2010, letter, directing GDHC to file a revised HPMP within 45 days from the date of our letter.

Staff Analysis

GDHC's May 2010 HPMP addresses the comments received from the Commission, Montana SHPO, Reclamation, and Blackfeet Tribe, and contains measures for the protection of historic properties within the defined project APE. In our April 7, 2010, letter to GDHC, staff concluded that the proposed project would not have an adverse effect on historic Gibson dam. Further, implementation of the measures within the HPMP for other individual resources would ensure that unevaluated or significant historic properties are not adversely affected by project construction and operation activities.

GDHC's proposed measures for staff training would ensure that employees are informed of the historic significance of the project area and are aware of the specific requirements of the HPMP with regard to the treatment of human remains and the inadvertent discovery of cultural materials. Implementation of these measures would ensure that significant cultural resources are not inadvertently harmed by activities associated with the project, and that human remains are appropriately treated. Further, consultation with the Blackfeet and BLM with regard to monitoring during ground-disturbing construction activities would also ensure adequate protection of human remains and unanticipated cultural materials.

¹³ Our April 2010 review of the HPMP also considered whether GDHC had adequately addressed other comments made by the Montana SHPO, Blackfeet Tribe, Reclamation, BLM, and Forest Service, and a few additional modifications to the HPMP were made based on these comments.

Consultation and coordination with agencies and the Blackfoot Tribe on the status of overall cultural resources management during construction and HPMP implementation and would provide a forum for parties to discuss the HPMP and provide recommendations about the current and future management of cultural resources.

Finally, as specified in the HPMP, completion of additional cultural resources inventories in portions of the APE that have not been previously surveyed, and the requisite section 106 consultation prior to the initiation of construction activities, including revisions to the HPMP, would ensure that any newly identified properties would be appropriately addressed and protected.

3.3.7 Aesthetic Resources

3.3.7.1 Affected Environment

Aesthetic resources within the project area are in four major viewsheds related to topography and vegetation. Approaching the project area from the east, these areas involve views of: (1) plains areas visible from Sun Canyon Road and from roads which access various plains private property and recreation areas; (2) the Rocky Mountain Front; (3) Sun River Canyon; and (4) Gibson dam and the adjacent area.

Views from Sun Canyon Road across the plains are relatively uninterrupted, except by the road itself and nearby fences. Upon reaching the NFS boundary, the landscape changes from rolling arid grass plains to a rugged, mountainous landscape that is sparsely covered with pine and fir trees.

From approximately within 6 miles of the Sun River Canyon on Sun Canyon Road, views of the Rocky Mountain Front dominate the viewshed and provide highly significant scenery values. Rock strata in the face of the escarpment increase its visual diversity and interest. The entrance to Sun River Canyon establishes a cleft in the front which draws the eye and enhances the scale of surrounding features.

Nearer the Front itself on Sun Canyon Road are ranches and residences, some of which are included in the view of the Front. These buildings are of low density and do not appear to significantly diminish this broad viewshed. The existing roads, fences, and power lines are also of low density and do not significantly alter the view.

In Sun River Canyon, views along FDR 108 are primarily territorial; however, there are several dramatic views, especially at locations where the rock reefs meet the river. At several points in the canyon, especially looking east, high crags are visible above the road. Canyon views also include recreational cabins, and the power poles and wires of the electric distribution and communication system which runs the entire length of the canyon. There are several campgrounds and viewing pull-offs.

Views nearer Gibson dam are dominated by the concrete dam itself and Reclamation buildings near its base. Several access roads cross the area and maintenance and residential cabins are evident from the road system.

3.3.7.2 Environmental Effects

Issues identified with respect to aesthetic resources apply primarily to the short-term and long-term effects of the 26.19-mile-long transmission line and other project facilities on views of the Rocky Mountain Front and Sun River Canyon area. The visual resources design report (Sandscape and Whitewater, 2009) addressed the potential aesthetic effects of project features, and recommended measures to avoid or minimize these effects. The report resulted in proposed transmission-line routing characteristics for each of the three transmission-line segments. Recommendations from the report included measures to: remove existing distribution-line poles; reconstruct existing lower voltage distribution lines onto the project's new, larger transmission-line poles; and bury approximately 6 miles of transmission line within the 34.5-kV Canyon Segment (1.27 miles) and 34.5-kV Plains Segment (4.71 miles). GDHC proposes to locate the powerhouse downstream of, centered on, and constructed of the same motif as the existing valve house and have final colors approved by Reclamation and the Forest Service. The maintenance building also would be constructed of materials and colors approved by Reclamation and the Forest Service and designed consistent with existing Reclamation facilities in the area.

Forest Service 4(e) condition no. 21 stipulates that GDHC develop a Transmission Line Management Plan that includes a description of how the visual resources and scenic values in the project area, at the dam site, and along FDR 108/Sun Canyon Road and Willow Creek/Beaver Creek Road 233 would be protected or enhanced in accordance with the Forest Plan.

Staff Analysis

Construction of the proposed powerhouse, switchyard, substation, and portions of the transmission line within the 34.5-kV Canyon Segment and 34.5-kV Plains Segment would temporarily detract from the existing aesthetic resources of the project area due to the presence of small work crews, equipment activity, dust, and storage of materials. Construction of the above-ground 69-kV Plains Segment of the transmission line would be located away from publicly accessed viewpoints and would involve work on individual poles by small work crews. Some staged pole material would be visible prior to its emplacement, as would other materials, vehicles, and equipment necessary for construction. Work would proceed quickly at each pole and surface disturbance at the sites would be re-graded and prepared for revegetation, where necessary. Thus, construction effects would be temporary and localized.

In the long term, the addition of project facilities could affect the aesthetics resources of the project area. The proposed powerhouse would minimize visual contrast with existing features, including the use of concrete walls, gray or tan metal panels, and a similar motif as the existing gatehouse. The proposed powerhouse would be larger than the existing gatehouse but would not significantly alter the view when compared to the mass of Gibson dam.

The proposed architecture of the maintenance building was modified during pre-filing consultation in response to stakeholder concerns about the visual effects of the building. The concerns were addressed by GDHC in its Visual Resources Design Report and the current proposal¹⁴ could provide an enhancement to existing conditions. The proposed maintenance building would partially shield the existing corrugated metal Reclamation structure on the property from view by recreational visitors to the FDR 8973 turnaround, located about 65 yards to the northwest of the maintenance building. The maintenance building would be located in an area that is presently closed to public access and within an existing fenced area. The maintenance building would also be visible to recreational visitors using the tailwater access trail from the turnaround, although vegetation along Beaver Creek would screen views of the proposed building along much of the trail. As proposed, the maintenance building would be consistent with the size, use, and purposes necessary to support project operation, and the proposed architectural treatment of the building would minimize the effects of new construction on the surrounding aesthetic environment.

Within the 34.5-kV Canyon Segment of the transmission line, 1.27 miles of existing distribution line would be buried together with 1.27 miles of the project's new transmission line, which would represent a substantial enhancement to aesthetic resources along portions of the Sun River Canyon. The remainder of the existing distribution-line poles would be removed and 3.3 miles of the line would be reconstructed on the project's new, larger transmission-line poles, thereby preventing the need for two separate transmission lines within the Sun River Canyon. The 34.5-kV Canyon Segment would require 50- to 55-foot-tall poles, which would be about 20 feet taller than the existing distribution line; however, siting the poles in areas to minimize aesthetic effects on viewing opportunities along FDR 108 as proposed in the visual resources design report would minimize adverse effects and enhance the existing aesthetic character of the canyon.

¹⁴ The proposed exterior architecture of the 3,000-square-foot building is based on similar bungalow structures constructed at other dams by Reclamation in the 1920s when Gibson dam was constructed. Such structures often had overhangs and porches similar to the porches that are part of the current proposal and provide architectural interest beyond a simple box-type square building.

Within the 34.5-kV Plains Segment of the transmission line, the entire 4.71 miles of line would be buried below ground. Therefore, there would be no long-term effects from the 34.5-kV Plains Segment on the viewshed of the Rocky Mountain Front.

The 69-kV Plains Segment of the transmission line could affect aesthetics. The new poles would be 25 to 30 feet taller than the 7.2-kV and 12.5-kV distribution-line poles within or in proximity to the existing alignments (55- to 65-feet tall versus about 35-feet tall). Therefore, they would likely be visible to the public from greater distances. The primary location where the public would be most likely to see project-related transmission structures would be along Sun Canyon Road. GDHC's proposal calls for the line from the Sun River Canyon to the proposed substation to be placed underground. The first overhead 69-kV structure would be nearly 2 miles from Sun Canyon Road and not readily seen by most persons using this road. From the substation east to the vicinity of the crossing of the Sun River Slope Canal, the proposed line would be visible primarily to residents and visitors to a ranch near the Sun River (both from the ranch and the road leading to the ranch).

East of the Sun River Slope Canal to the intersection with West Spring Valley Road, the proposed line would be visible to viewers from three ranches as well as the public that uses Pishkun Boadle Road, which provides ranch access and recreational visitor access to Pishkun reservoir. As indicated in *Sandscape and Whitewater* (2009), the transmission line in this area is intended to minimize visual effects both on the ranches (by providing nearly a mile of spatial separation) and on the public using Pishkin Boadle Road (by enabling use of shorter structures than would be required if the existing 12.5-kV line was to be under-built on the new line).

To mitigate for the increased visual effect of the new, taller transmission-line poles, GDHC proposes in its Additional Information Request response filed on March 24, 2011, to remove existing portions of nearly 3 miles of existing overhead distribution lines east of the Sun River in the vicinity of the project's transmission-line alignment. The existing distribution lines provide electricity to private properties in the area and would either be buried by GDHC to completely eliminate aesthetic effects, or the lines would be reconstructed on the project's new, larger transmission-line poles in areas where overlap would occur. Modifying the existing distribution lines and burying or reconstructing the lines on the project's new, larger transmission-line poles would prevent the need for multiple transmission lines within the proposed alignment. We note, however, that the Commission only has jurisdiction over the licensee and its licensed project facilities, and therefore would not be able to enforce a license requirement for modifying non-project facilities that are owned by a third party.

Overall, implementation of GDHC's proposed measures included in the visual resources design report would minimize the effects of the proposed project's larger poles along the 69-kV Plains Segment of transmission line.

The proposed substation would not be visible from Sun Canyon Road but would be visible from certain private lands or other access roads in the area. The substation would be similar to other substations already visible in the region and would have only minimal effects on private views of the Rocky Mountain Front.

Forest Service condition no. 21 stipulates that GDHC develop a Transmission Line Management Plan within 6 months of license issuance; it should include a map showing above- and below-ground sections, identification of transmission line access points and roads, and a description of how visual resources would be protected or enhanced. Although GDHC's proposed measures included in the visual resources design report address protection of visual resources, the alignment of the proposed transmission line has shifted since that report was issued. The current proposed transmission-line alignment is combined in two separate filings: the visual resources design report filed with the final license application, and Alternative A of the applicant's March 24, 2010, Additional Information Request response filing (GDHC, 2010b). A Transmission Line Management Plan would provide a concise summary of the proposed location of the transmission line and an accurate description of the proposed aesthetic resources measures. Such a plan would enable review and comment by the Forest Service on the current transmission-line alignment, prior to the plan being filed with the Commission for final approval. If necessary, this consultation could lead to transmission-line final design modifications that would further reduce visual effects.

3.3.8 Socioeconomics

3.3.8.1 Affected Environment

The project powerhouse and transmission line are located in both Teton and Lewis and Clark counties, Montana. General population and housing statistics for Teton and Lewis and Clark counties are shown in tables 12 and 13.

Table 12. General population, housing and employment statistics for Teton County, 2000 (Source: U.S. Census Bureau, 2010).

Item	Number	Percentage
Population		
1950	7,232	NA
1960	7,295	NA
1970	6,116	NA
1980	6,491	NA
1990	6,271	NA
2000	6,445	NA

Item	Number	Percentage
2010 (est.)	6,450	NA
Housing		
Owner Occupied Housing Units	1,914	65.8
Renter Occupied Housing Units	624	21.4
Vacant	372	12.8
Total	2,910	100
Employment		
Agriculture, forestry, fishing and hunting, and mining	561	20.6
Construction	139	5.1
Manufacturing	78	2.9
Wholesale trade	95	3.5
Retail trade	258	9.5
Transportation and warehousing, and utilities	165	6.1
Information	148	5.4
Finance, insurance, real estate, and rental and leasing	122	4.5
Professional, scientific, management, administrative, and waste management services	106	3.9
Educational, health, and social services	635	23.4
Arts, entertainment, recreation, accommodation and food services	165	6.1
Other services (except public administration)	136	5.0
Public administration	111	4.1
Total	2719	100
Unemployed	104	2.1
Income		
Average earnings per capita	\$18,799	NA

Table 13. General population, housing and employment statistics for Lewis and Clark County, 2000 (Source: U.S. Census Bureau, 2010).

Item	Number	Percentage
Population		
1950	24,540	NA
1960	28,006	NA
1970	33,281	NA
1980	43,039	NA
1990	47,945	NA
2000	55,716	NA
2010 (est.)	59,816	NA
Housing		
Owner Occupied Housing Units	16,008	62.4
Renter Occupied Housing Units	6,482	25.3
Vacant	2,822	11
Total	25,672	100
Employment		
Agriculture, forestry, fishing and hunting, and mining	857	3.0
Construction	1,870	6.5
Manufacturing	1,073	3.7
Wholesale trade	661	2.3
Retail trade	3,086	10.8
Transportation and warehousing, and utilities	1,011	3.5
Information	1,052	3.7
Finance, insurance, real estate, and rental and leasing	2,185	7.6
Professional, scientific, management, administrative, and waste management services	2,405	8.4
Educational, health and social services	5,418	18.9

Item	Number	Percentage
Arts, entertainment, recreation, accommodation and food services	2,540	8.9
Other services (except public administration)	1,559	5.4
Public administration	4,934	17.2
Total	28,651	100
Unemployed	1,538	3.5
Income		
Average earnings per capita	\$18,763	NA

According to the 2000 census, Teton County had a total population of 6,445 in that year. With a total area of 2,294 square miles, the overall population density of Teton County is 2.8 persons/square mile. Teton County had very little change in population between 1950 and 2000, with little change anticipated between 2000 and 2010.

According to the 2000 census, Lewis and Clark County had a total population of 55,716 in that year, with most of those people living in and near Helena, MT. With a total area of 3,461 square miles, the overall population density of Lewis and Clark County is 16.1 persons/square mile. Lewis and Clark County experienced steady population growth from 1950 to 2000, with an estimated population gain of 7.4 percent between 2000 and 2010.

Population in the project area consists primarily of farmers, ranchers, and persons employed in agricultural services with the major population center being Fairfield (2000 population of 659), located approximately 35 miles east of the project in Teton County. The city of Great Falls, with a 2000 population of approximately 56,690, is located approximately 70 miles east of the project in Cascade County.

3.3.8.2 Environmental Effects

Construction and operation of the proposed Gibson Dam Project would benefit the local economy by providing a reliable source of power and local employment opportunities. GDHC did not propose any measures specifically associated with socioeconomic resources, and no entity recommended that they do so.

Staff Analysis

Construction of the project facilities would require about 15 to 25 construction workers, many of whom would be recruited from the local area. These workers are

expected to be active in the area, seasonally, during a 2-year period and would spend a portion of the estimated \$4 to \$5 million in wages earned during construction in the vicinity of the project. Most construction workers and management personnel either live permanently or would be housed temporarily in nearby towns during the most intensive construction season(s). It is likely that project construction would create a short-term demand for local goods and services through the spending of workers and for equipment parts and maintenance. This would contribute an estimated \$1 million to local material suppliers and other businesses.

Long-term operation of the project would require periodic employment of between one and five individuals for operations and maintenance of generation facilities, the maintenance building, transmission line, the substation, and for implementation of environmental resource measures. However, it is unlikely that long-term staffing would provide much, if any, discernible economic benefit to the region.

Operation of the project would provide an economical source of power to the region, helping to support future economic growth. Transmission facilities between the project site and Jackson's Corner would improve the efficiency and reliability of the power grid throughout the transmission corridor by stabilizing the existing voltage drops that occur in the distribution system and replacing existing, aging wood poles with more robust poles designed to modern standards (GDHC, 2010e). Continued operation would also lessen dependence on fossil-fuel based power production. However, it is unlikely that power generation from the proposed project would have any significant effect on local power prices, which would be set by the purchasers of project power based on the overall power market and influenced by supply and demand.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would not be constructed. There would be no changes to the geologic and soils, aquatic, terrestrial, threatened and endangered species, recreation and land use, aesthetics, or socioeconomic resources, 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 Gibson Dam Project's use of the Sun 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.*,¹⁵ 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 14 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by GDHC in its license application. We find that the values provided by GDHC 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; normal operation and maintenance cost; and Commission fees.

¹⁵ 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 14. Parameters for economic analysis of the Gibson Dam Hydroelectric Project (Source: staff and GDHC, 2009).

Economic Parameter	Value
Period of analysis	30 years
Interest/discount rate	6.0 percent ^a
Federal tax rate	35 percent ^b
State tax	3 percent ^b
Insurance rate	0.25 percent ^b
Average annual generation (MWh)	40,000 ^a
Energy value (\$/MWh)	\$41.58 ^c
Term of financing	20 years
Construction cost	\$29,081,375 ^a
License application cost	\$812,500 ^{a,d}
Operation and Maintenance, \$/year	\$721,000 ^a
Commission fees, \$/year	\$28,220 ^e

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

^b Assumed by staff.

^c Based on Energy Information Administration's Annual Energy Outlook for 2010 (EIA, 2010).

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

^e Commission fees are calculated by staff and represent an estimated administrative charge of \$27,280 for installed capacity of 15 MW, and \$940 annual charge for use of federal lands.

4.2 COMPARISON OF ALTERNATIVES

Table 15 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: applicant's proposal, staff alternative, and staff alternative with mandatory conditions.

Table 15. Summary of the annual cost of alternative power and annual project cost for the action alternatives for the Gibson Dam Hydroelectric Project (Source: staff).

	GDHC's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Installed capacity (MW)	15.0	15.0	15.0
Annual generation (MWh)	40,000	40,000	40,000
Annual cost of alternative power (\$/MWh)	\$1,663,200 41.58	\$1,663,200 41.58	\$1,663,200 41.58
Annual project cost (\$/MWh)	\$3,600,330 90.01	\$3,579,630 89.49	\$3,585,220 89.63
Difference between the cost of alternative power and project cost (\$/MWh)	(\$1,937,130) ^a (48.43) ^a	(\$1,916,430) ^a (47.91) ^a	(\$1,922,020) ^a (48.05) ^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.

4.2.2 GDHC's Proposal

Under GDHC's proposal, the project would be constructed at the existing Gibson dam and use releases dictated by GID through its formal agreement with Reclamation. The project would require construction of generating facilities, a maintenance facility, and a transmission line. GDHC proposes various environmental measures to protect, mitigate, and enhance existing environmental resources in the vicinity of project features.

Under GDHC's proposed alternative, the project would generate an average of 40,000 MWh annually. The average annual cost of alternative power would be \$1,663,200, or about \$41.58/MWh. The average annual project cost would be

\$3,600,330 or about \$90.01/MWh. Overall, the project would produce power at a cost which is \$1,937,130, or \$48.43/MWh, more than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative would have the same capacity and energy attributes as GDHC's proposal. Table 16 shows the staff-recommended additions, deletions, and modifications to GDHC's proposed environmental protection and enhancement measures, and the estimated cost of each.

Based on a total installed capacity of 15 MW and an average annual generation of 40,000 MWh, the cost of alternative power would be \$1,663,200, or about \$41.58/MWh. The average annual project cost would be \$3,579,630, or about \$89.49/MWh. Overall, the project would produce power at a cost which is \$1,916,430, or \$47.91/MWh, more than the cost of alternative power.

4.2.4 Staff Alternative with Mandatory Conditions

This alternative is similar to the staff alternative with the exception of Forest Service provisions for additional as-yet unidentified Recreation Plan measures, as specified by 4(e) condition no. 16; and as-yet unidentified interpretive displays, as specified by 4(e) condition no. 17. This alternative would have the same average annual generation of 40,000 MWh, and an average annual cost of alternative power of \$1,663,200, or about \$41.58/MWh. The average annual project cost would be \$3,585,220, or about \$89.63/MWh. Overall, the project would produce power at a cost which is \$1,922,020, or \$48.05/MWh, more than the cost of alternative power. This alternative would annually cost \$15,110 less than the project proposed by GDHC and \$5,590 more than the staff alternative.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 16 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.

Table 16. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of construction and operation of the Gibson Dam Hydroelectric Project (Source: staff).

Enhancement/Mitigation Measures	Entities	Capital (2010\$)^a	Annual (2010\$)^a	Levelized Annual Cost (2010\$)^b	Notes
1. Implement the Erosion and Sediment Control Plan	GDHC, Reclamation, Forest Service, Staff	\$137,390	\$0	\$9,520	
2. Develop and implement a Stormwater Pollution Prevention Plan	GDHC, Staff	\$0	\$0	\$0	c
3. Develop and implement a Hazardous Substance Plan	GDHC, Forest Service, Staff	\$0	\$0	\$0	c, d
4. Implement the Construction Water Quality Monitoring Plan	GDHC, Montana DEQ, Staff	\$23,040	\$0	\$1,600	
5. Implement the Post-Construction Water Quality Monitoring Plan	GDHC, Montana DEQ, Staff	\$1,000	\$800	\$860	
6. Install passive aeration on the turbine draft tube to enhance DO and monitor the effectiveness of DO enhancement measures	GDHC, Montana DEQ, Staff	\$48,000	\$4,780	\$8,110	e
7. Implement the Noxious Weed Control Plan	GDHC, Forest Service, Staff	\$10,000	0	\$690	f

Enhancement/Mitigation Measures	Entities	Capital (2010\$)^a	Annual (2010\$)^a	Levelized Annual Cost (2010\$)^b	Notes
8. Implement the Avian Protection Plan	GDHC, FWS, Forest Service, Staff	\$15,800	\$1,710	\$2,800	
9. Implement visual resources measures as modified by March 24, 2010 Additional Information Request response filing, including measures for both project and non-project facilities.	GDHC	\$2,786,000	\$0	\$193,000	g
10. Implement visual resources measures for project facilities.	Staff	\$2,346,000	\$0	\$162,520	h
11. Develop and implement a Transmission Line Management Plan with provisions for managing vegetation, identifying visual resources measures, and developing a map of transmission line locations, with identification of above and below ground sections, gates, access points, and roads	Forest Service, Staff	\$20,000	\$940	\$2,330	b

Enhancement/Mitigation Measures	Entities	Capital (2010\$)^a	Annual (2010\$)^a	Levelized Annual Cost (2010\$)^b	Notes
12. Develop and implement a Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan	Forest Service, Staff	\$10,000	\$0	\$690	b
13. Implement the Bear Safety Plan	GDHC, Staff	\$5,000	\$0	\$350	
14. Conduct wetland field survey prior to transmission line construction	GDHC, Staff	\$9,430	\$0	\$650	b, i
15. Conduct sensitive plant survey prior to transmission line construction	GDHC, Staff	\$9,430	\$0	\$650	b, i
16. Implement the Recreation During Construction Plan	GDHC, Forest Service, Staff	\$10,000	\$0	\$690	
17. Develop a recreation plan with additional as-yet unidentified measures as stipulated by Forest Service 4(e) condition no. 16	Forest Service	\$5,000	\$0	\$350	j
18. Develop and implement a Traffic Control Plan	GDHC, Staff	\$10,000	\$0	\$690	b

Enhancement/Mitigation Measures	Entities	Capital (2010\$)^a	Annual (2010\$)^a	Levelized Annual Cost (2010\$)^b	Notes
19. Develop and implement a Fire Control Plan	GDHC, Staff	\$10,000	\$0	\$690	b
20. Develop and implement an Interpretive Display Plan with measures to enhance interpretive displays at three specific sites	Forest Service, Staff	\$40,000	\$4,000	\$6,770	b
21. Include in the Interpretive Display Plan other as-yet unidentified interpretive displays as stipulated by Forest Service 4(e) condition no. 17	Forest Service	\$37,000	\$2,680	\$5,240	k
22. Implement the May 2010 HPMP	GDHC, Forest Service, Staff	\$130,000	\$25,000	\$34,000	b
23. Conduct avian mortality surveys along transmission line	U.S. Environmental Protection Agency	\$0	\$10,000	\$10,000	l

^a Costs were provided by GDHC unless otherwise noted.

^b Cost estimated by staff.

^c The cost of this measure is included in item 1.

^d As part of its Erosion and Sediment Control Plan, GDHC proposes to develop a Spill Prevention, Control, and Countermeasures Plan, which includes measures for handling hazardous materials consistent with the specifications of Forest Service 4(e) condition no. 15.

- ^e Staff assumes that this measure would be needed because our analysis in section 3.3.2.2 indicates that the project would cause a reduction in DO levels below state standards in the summer months. However, Montana DEQ would ultimately determine whether supplemental aeration is needed based on the results of the Post-Construction Water Quality Monitoring Program.
- ^f Staff assumes no additional costs for its recommended modifications to the Noxious Weed Control Plan to incorporate herbicide application restrictions.
- ^g Estimate includes costs for all of applicant's proposed visual resources measures, including measures for the project transmission line and proposed modifications to non-project distribution lines.
- ^h Estimate only includes costs for transmission-line visual resources measures for project facilities.
- ⁱ Assumes a \$10,000 capital cost in year 2.
- ^j Staff has insufficient information to determine a cost for the additional as-yet unidentified recreation measures; therefore, staff's estimate only includes cost to consult with the Forest Service on developing additional measures.
- ^k Staff estimates that the levelized annual cost of one additional interpretive display would be \$2,620. Based on Forest Service 4(e) condition no. 17, we assume that two additional interpretive displays would be necessary.
- ^l Staff assumes that, because EPA did not specify such requirements in its comments, the avian mortality surveys would be conducted along the entire length of the transmission line.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

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

We estimate the annual generation of the project under the three action alternatives would be 40,000 MWh. Under the no-action alternative, the project would not be built, and there would be no project-related generation.

We summarize the environmental effects of the different alternatives in table 17.

Table 17. Comparison of alternatives for the Gibson Dam Project (Source: staff).

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Geology and Soils	No effect	Temporary erosion where vegetation is disturbed at the powerhouse construction site and along the proposed transmission line route during and immediately following construction.	Same as proposed action	Same as proposed action

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Water Quality	No effect	Temporary increase in turbidity in the Sun River during construction. DO concentrations may decrease by 1.0 to 1.5 mg/L for 3 miles downstream of dam during operation.	Same as proposed action with additional benefits to water quality through herbicide application restrictions	Same as proposed action
Fisheries	Mortality rate of 60 to 90 percent for entrained fish.	Mortality rate of 31 to 36 percent for entrained fish	Same as proposed action	Same as proposed action
Vegetation	No effect	Temporary loss of 10 acres of vegetation and permanent loss of 1 acre of vegetation.	Same as proposed action, but increased noxious weed control through long-term noxious weed monitoring at 3 years intervals.	Same as staff alternative

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Wildlife	No effect	Increased potential for wildlife disturbance and avian collisions and electrocution.	Same as proposed action, but additional benefits to wildlife through herbicide application restrictions, and 24-hour notification procedures for avian nest discovery on any transmission line facilities.	Same as proposed action
Threatened and Endangered Species	No effect	Increased potential for human-grizzly bear interactions.	Same as proposed action	Same as proposed action

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Recreation and Land Use	No effect	Temporary disturbance to recreational visitors during construction.	Same as proposed action, except long-term enhancement of recreational experience through implementation of an Interpretive Display Plan that includes construction and maintenance of three interpretive displays.	Same as staff alternative, except there would be additional unspecified Recreation Plan measures and the Interpretive Display Plan would potentially include additional unspecified interpretive displays.
Cultural	No effect	Implement HPMP to protect cultural resources.	Same as proposed action	Same as proposed action

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Aesthetics	Ongoing adverse effects of existing transmission line views along FDR 108 in Sun River Canyon.	Enhanced aesthetics along FDR 108 through removal of existing non-project distribution line poles in Sun River Canyon. Minor short-term effects from dust, equipment, and work-crew presence during construction. Minor long-term effects from larger transmission-line poles between the substation and interconnect point. Minor aesthetic enhancement through modification of existing non-project distribution line poles on private properties east of the substation.	Minor short-term effects from dust, equipment, and work-crew presence during construction. Long-term adverse effects from presence of 50 to 65-foot-tall transmission line poles along FDR 108, and between the substation and interconnect point.	Same as staff alternative

Resource	No action	Proposed Action	Staff Alternative	Staff Alternative with Mandatory Conditions
Socioeconomics	No effect	Economic benefit through employment of up to 25 construction workers and a local increase in spending on equipment and supplies during construction. Minor long-term economic effect.	Same as proposed action	Same as proposed action

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, we consider the aquatic, terrestrial, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions a hydropower project should be licensed, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing the waterway. We weigh the costs and benefits of our recommended alternative against other proposed measures. This section contains the basis for, and a summary of, our recommendations for relicensing the Gibson Dam Project.

A. Recommended Alternative

Based on our independent review and evaluation of the environmental and economic effects of the proposed action, the proposed action with additional staff-recommended measures, the proposed action with additional staff-recommended measures and mandatory conditions, and no-action, we recommend the proposed action (with the exception of GDHC's proposed visual resources measures for non-project

distribution lines; as discussed below in section 5.2.B), with the addition of six staff-recommended measures as the preferred alternative.

We recommend the staff alternative because: (1) issuing a new license would allow GDHC to operate the project as a beneficial and dependable source of electric energy; (2) the 15 MW of electric capacity 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 geologic and soils, terrestrial, cultural, and aesthetic resources, and would enhance recreation, aquatic, and socioeconomic resources.

Measures Proposed by GDHC

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

- Operate the project in run-of-release mode.
- Schedule project construction activities to minimize conflicts with wildlife (specifically elk migration, bighorn sheep lambing, grizzly bear foraging, and sharp-tailed grouse courtship/mating), recreation use, and access.
- Implement the Erosion and Sediment Control Plan filed with the license application, which includes provisions for: implementing BMPs during construction to minimize sedimentation, erosion, and vegetation loss; and developing and implementing a Stormwater Pollution Prevention Plan; a Spill Prevention, Control, and Countermeasures Plan; and a Blasting Plan.
- Implement the Construction Water Quality Monitoring Plan filed with the license application.
- Implement the Post-Construction Water Quality Monitoring Plan filed with the license application, which includes provisions for monitoring water quality for 3 years following initial project operations, and implementing measures for DO enhancement and additional water quality monitoring based on the results of the initial monitoring program.

- Conduct field surveys, after final design and prior to construction, to locate and avoid wetlands and sensitive plant species during transmission-line construction activities.
- Implement the Noxious Weed Control Plan filed with the license application.
- Implement the Avian Protection Plan filed with the license application.
- Implement the Bear Safety Plan filed with the license application.
- Implement the Recreation During Construction Plan filed with the license application.
- Develop and implement a Fire Control Plan.
- Develop, after final design of the project, and implement a Traffic Control Plan to minimize delays, hazards from wide loads, and construction equipment effects on recreational visitor use of FDR 108.
- Implement the HPMP filed with the Commission on May 17, 2010 (GDHC, 2010d).
- Implement visual resources protection measures at project facilities that are specified in the applicant's visual resources design report as modified by Alternative A of the applicant's March 24, 2010, Additional Information Request response filing, including burying 5.98 miles of the project's transmission line.

Additional Staff-Recommended Measures

We recommend the measures described above, and six additional staff-recommended measures. The additional staff-recommended measures include: (1) modification of the Noxious Weed Control Plan to include additional provisions for herbicide application restrictions, and for monitoring invasive plants and noxious weeds within the project boundary at three year intervals (Forest Service condition no. 11); (2) modification of the Erosion and Sediment Control Plan to include a requirement to file the proposed Stormwater Pollution Prevention Plan; Spill Prevention, Control, and Countermeasure Plan; and Blasting Plan with the Commission for approval, prior to implementation; (3) a Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan that would be developed 60 days prior to any ground-disturbing activity

(Forest Service condition no. 12);¹⁶ (4) an Interpretive Display Plan that provides for three interpretive displays, one each at Gibson Overlook, the viewing turnaround below Gibson dam, and near the Sun River diversion dam at the mouth of the Sun River Canyon (Forest Service condition no. 17), and includes provisions for filing a schedule, site drawings, specifications, interpretive display contents, and maps showing the location of the interpretive displays in relation to the project boundary; (5) a Transmission Line Management Plan that includes measures for protecting vegetation during construction and operation of the project's transmission line, a description of proposed visual resources protection measures, and a map of transmission line locations with identification of above-ground and below-ground sections, access points, gates, and roads (Forest Service condition no. 21); and (6) modification of the Avian Protection Plan to include additional provisions for notifying Montana FWP within 24 hours of discovering an avian nest on any project transmission-line facilities, and filing the final updated Avian Protection Plan with the Commission for approval, prior to implementation.

Below, we discuss the basis for our additional staff-recommended measures.

Noxious Weed Control Plan

GDHC proposes to implement a Noxious Weed Control Plan to ensure that the spread of noxious weeds is controlled for three years following project construction, and for longer unspecified time periods for portions of the project requiring ongoing operations and maintenance. Forest Service 4(e) condition no. 11 stipulates that GDHC develop and implement an Invasive Plant and Noxious Weed Management Plan. Based on our analysis in section 3.3.3, *Terrestrial Resources*, it appears as though many of the elements included in GDHC's plan would also be included in the plan stipulated by the Forest Service, with one exception being that the Forest Service's condition includes long-term noxious weed monitoring at a minimum of three year intervals, while GDHC's plan does not propose any long-term noxious weed monitoring. Our analysis in section 3.3.3 indicates that a minimum of a three year interval would be a reasonable timeframe for early detection and management of noxious weed infestations resulting from project operation and maintenance. Routine operations and maintenance actions (e.g., vegetation management within the transmission line corridor) could result in soil disturbance and promote noxious weed establishment. Routine inspections of the transmission line corridor as part of a Vegetation Management Plan stipulated by Forest Service 4(e) condition no. 21, discussed below, could serve multiple purposes of inspecting the transmission line corridor for vegetation control, monitoring for noxious

¹⁶ This requirement would include conducting surveys for the presence of Macoun's gentian, blunt leaved pondweed, and northern rattlesnake plantain at the appropriate times of year and in suitable habitats along the transmission line alignment.

weeds, and implementing corrective actions. Additional requirements for using only EPA-approved herbicides that are applied by professional personnel appropriately trained in their use would help ensure that adverse effects from herbicide application on human health, wildlife, and other environmental resources are minimized.

We do not anticipate any additional costs for staff's recommended minor modifications to the Noxious Weed Control Plan, and conclude that the benefits of clearly defined weed monitoring and herbicide application restrictions would be justified.

Erosion and Sediment Control Plan

GDHC's proposed Erosion and Sediment Control Plan includes provisions for preparing a Stormwater Pollution Prevention Plan; a Spill Prevention, Control, and Countermeasure Plan; and a Blasting Plan. All of these plans would be prepared after final project design, and prior to the start of construction. As noted above, we are recommending that Gibson Hydro implement its Erosion and Sediment Control Plan; however, we also recommend that GDHC file the three additional post-licensing plans with the Commission for approval, prior to implementation. Including these filing and approval requirements would assist the Commission in administering compliance with the conditions of the plans. We estimate that there would be minimal costs for these additional requirements, and conclude that the compliance benefits would justify the costs.

Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan

We recommend Forest Service 4(e) condition no. 12, which stipulates that GDHC develop and implement a Threatened, Endangered, Proposed for Listing, and Sensitive Species Plan at least 60 days prior to any ground-disturbing activity. Our analysis in sections 3.3.3.2, *Terrestrial Resources*, and 3.3.4.2, *Threatened and Endangered Species*, suggests that constructing and operating the project with staff's recommended measures would have no effect or would not be likely to adversely affect any federally listed or Forest Service sensitive species; however, our analysis also indicates that the abundance and distribution of sensitive species can change over time, and species not currently identified as federally listed or sensitive may be categorized as such during the term of a new license. Such a plan could be used to ensure that appropriate measures are in place to adequately protect sensitive species during any long-term project-related activities that may require ground disturbance. We estimate that the levelized annual cost of developing the plan would be \$690, and conclude that the benefits of the plan would be justified by the cost.

Interpretive Displays

Forest Service 4(e) condition no. 17 stipulates that GDHC develop an Interpretive Display Plan with provisions for enhancing and maintaining existing interpretive displays at three locations, including: Gibson Overlook, the viewing turnaround below Gibson dam, and near the Sun River diversion dam at the entrance to the Sun River canyon. In addition, the Forest Service's 4(e) condition also stipulates that GDHC enhance and maintain "additional interpretive displays" at unspecified locations.

We recommend the portions of Forest Service 4(e) condition no. 17 that pertain to enhancement of interpretive displays at the three specific sites identified in condition no. 17. Our analysis in section 3.3.5.2 indicates that the three specific locations for interpretive displays specified by the Forest Service would be in proximity to the primary destinations for recreational visitors to the project vicinity: Gibson Overlook, the viewing turnaround below Gibson dam, and Home Gulch Campground near Sun River diversion dam. We envision that the interpretive displays would provide a history of the hydropower facility, describe its operation and benefits, as well as environmental measures at the project. We recommend that the Interpretive Display Plan also include provisions for filing a schedule, site drawings, specifications, interpretive display contents, and maps showing the location of the interpretive displays in relation to the project boundary. These additional staff recommended items would enable the Commission to identify and enforce GDHC's specific responsibilities for constructing and maintaining the interpretive displays.

We find that interpretive display enhancements at these three locations would provide a reasonable level of enhancement to the recreational experience of the project area. We estimate that the levelized annual cost for developing and implementing the plan with interpretive displays at the three specific locations would be \$6,770, and conclude that the benefits of public education about the Gibson Dam Project would be justified by the cost.

Transmission Line Management Plan

Forest Service 4(e) condition no. 21 stipulates that GDHC develop a Transmission Line Management Plan. As specified by the Forest Service, the plan would include: (1) a map of the final transmission line alignment and identification of above and below-ground sections; (2) identification of transmission line access points and roads; (3) a description of how the visual resources in the project area would be protected or enhanced in accordance with the Forest Plan; (4) a Vegetation Management Plan to control vegetation along the transmission line corridor; and (5) measures necessary to protect birds and other wildlife.

As discussed in section 3.3.7.2, *Aesthetic Resources*, the current proposed transmission-line alignment is described in two separate documents: the visual resources design report filed with the final license application, and Alternative A of the applicant's March 24, 2010, Additional Information Request response filing. A map of the final proposed transmission-line alignment, with identification of access points and roads, would provide a concise description of the proposed location of the transmission line and proposed protection and enhancement measures for aesthetic resources along the entire 26.19-mile-long transmission line route. The map would assist the Commission in identifying transmission line access points and roads that would be necessary to fulfill the project purpose of constructing and maintaining the transmission line.

Several of the measures that are stipulated by the Forest Service's 4(e) condition are already included in GDHC's proposed action (e.g., Avian Protection Plan for protecting birds) and are already recommended by staff as noted above. While the Forest Service did not specifically describe the measures that would be necessary to protect wildlife, we envision that the plan would address this item by including provisions in the Vegetation Management Plan for vegetation treatment measures and timing restrictions to avoid or minimize adverse effects on wildlife.

The Forest Service also did not specifically state that GDHC should identify the location of existing and proposed new gates at transmission line access points. As discussed in section 3.3.3.2, *Terrestrial Resources*, unauthorized recreational off-highway vehicle access to transmission line rights-of-way can disturb soil, create weed seedbeds, and disperse weed seeds. At appropriate locations, gates can serve to deter unauthorized off-highway vehicle access to transmission-line access roads and are typically shown on transmission-line final design plans. We recommend an additional provision in the plan that the maps identify the location of all existing and proposed gates along transmission-line access roads.

We estimate that the levelized annual costs of these additional staff-recommended measures would be \$2,330, and conclude that the benefits to environmental resources would justify the cost.

Avian Protection Plan

GDHC's Avian Protection Plan includes reporting provisions for reporting any avian mortalities or nests that are discovered along the transmission line. The plan proposes that avian mortalities would be reported to Montana FWP within 24 hours of discovery; however, the plan does not include a similar timeframe for nest reporting. Our analysis in section 3.3.3.2, *Terrestrial Resources*, indicates that 24 hours would be a reasonable timeframe for notifying Montana FWP of any avian nest sites located

along the transmission line so that appropriate actions could be timely implemented to protect the nest site.

The Avian Protection Plan also includes a provision to consult with state and federal resource agencies on the final design of the transmission line and update the plan after final design and prior to construction. We recommend an additional requirement that GDHC file its updated plan with the Commission for approval, prior to implementation. Including these filing and approval requirements would enable the Commission to ensure that agency comments are considered in the final design of the transmission line, and would assist the Commission in administering compliance with the conditions of the final Avian Protection Plan.

We do not anticipate any additional costs for these recommended minor modifications to the Avian Protection Plan, and conclude that the compliance benefits would be justified.

B. Measures Not Recommended

Some of the measures proposed by GDHC and recommended or stipulated by other entities do not exhibit sufficient nexus to 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 such measures.

Non-Project Visual Resource Measures

GDHC proposes to implement visual resource measures specified in its visual resources design report as modified by Alternative A of its March 24, 2010, Additional Information Request response filing. The measures include burying 5.98 miles of the transmission line, siting the line within existing distribution-line corridors, and modifying non-project distribution lines to avoid or minimize aesthetic effects and enhance existing aesthetic values. In section 3.3.7.2 of the final EA, we acknowledge that there would be benefits to the aesthetic environment of the project area by removing existing distribution-line poles and burying or relocating the lines together with the project's new, larger transmission line. However, the Commission only has jurisdiction over a licensee and would not have the jurisdiction to require a licensee to modify or remove a third party's distribution line. For this reason, we have no basis for recommending these measures in any license issued for the project. Instead, we encourage GDHC and the owner of the existing distribution lines to enter into an off-license agreement to implement any proposed visual resources measures at non-project facilities.

Avian Mortality Surveys

We do not recommend EPA's recommendations for GDHC to conduct annual spring and fall avian mortality surveys to locate birds that have been electrocuted or have struck transmission lines. EPA recommends these surveys to aid in the process of identifying and modifying problem areas of the transmission line. As discussed in section 3.3.3.2, *Terrestrial Resources*, the APLIC guidelines that would be implemented according to GDHC's Avian Protection Plan represent the state-of-the-art for minimizing avian transmission line-related mortality from collision and electrocution. Consequently, any transmission line-related mortalities should be rare, if they occur at all. Moreover, our analysis indicates that monitoring by way of carcass counts is not a reliable means of determining avian mortality because of the probability that scavengers may have removed any additional carcasses prior to the count being conducted. For these reasons, we conclude that EPA's recommended avian mortality surveys would provide few, if any, benefits to avian resources. We estimate that the levelized annual costs of the recommended avian mortality surveys would be \$10,000, and conclude that the lack of benefits to avian resources would not justify the cost. The Avian Protection Plan proposed by GDHC and recommended by staff would include reporting protocols for all raptor and non-rapture collisions or electrocutions and a minimum annual consulting requirement with the Montana FWP to determine the effectiveness of the reporting format.

Additional Interpretive Displays

We do not recommend the provision of Forest Service 4(e) condition no. 17 that stipulates that GDHC construct additional as-yet unidentified interpretive displays at unspecified locations. The Forest Service provides no specific information in its condition on the number or location of the as-yet unidentified additional interpretive displays. We therefore assume that at least two additional interpretive displays would be constructed, and we estimate that the levelized annual costs would be \$5,240. Our analysis in section 3.3.5.2, *Recreation Resources*, indicates that staff's-recommended three specific interpretive displays stipulated by Forest Service condition no. 17 would provide a reasonable level of enhancement in describing the project and information on its effects on environmental resources in the project vicinity, and conclude that we have insufficient justification to require any additional interpretive displays.

Additional Recreation Measures

To address project effects on recreation resources, Forest Service 4(e) condition no. 16 stipulates that GDHC file a Recreation Plan with the Commission that includes, in part, the work agreed to by the Forest Service and GDHC, as described in GDHC's proposed Recreation During Construction Plan. In addition to the measures for protecting recreation during construction, Forest Service 4(e) condition no. 16 stipulates

that GDHC develop additional provisions for: (1) sharing construction, operation, and maintenance of recreation facilities and sites on NFS lands affected by or associated with the project; (2) specific mitigation measures for existing recreation facilities and sites, including compliance with the Americans with Disabilities Act; and (3) plans for future development or rehabilitation of recreation facilities or sites.

We do not recommend the measures stipulated by Forest Service 4(e) condition no. 16 that are in addition to the measures proposed by GDHC in its Recreation During Construction Plan. Our analysis in section 3.3.5.2, *Recreation Resources*, indicates that project operations would have no long-term adverse effects on existing recreation use or access in the project area, and we are already recommending enhancements to recreation, including interpretive displays in the project area. Moreover, based on the record provided, we cannot determine what specific measures would be implemented, the location of the measures in relation to the project, or why the contemplated measures would be needed. We, therefore, are unable to analyze the benefits and costs of the measures or the relationship of the measures to project effects or purposes. For these reasons, we conclude that we have insufficient justification for recommending any of the additional non-construction-related recreation measures stipulated by Forest Service 4(e) condition no. 16.

C. Conclusion

Based on our review of the agency and public comments filed on the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the Gibson Dam Project, as proposed by GDHC (with the exception of the visual resources measures for non-project distribution lines), with additional staff-recommended measures, would be best adapted to a plan for improving or developing the Sun River waterway.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Construction of the proposed project would result in a temporary increase in sedimentation and turbidity in the Sun River during installation and removal of the cofferdam required for construction of the powerhouse. However, any potential adverse effects would be minor and short-term in nature. Water discharged to the Sun River through the project's Francis turbines may have a lower DO concentration as compared to existing conditions where all water exits the reservoir under turbulent conditions via jet-flow valves. Water quality monitoring measures would ensure that there are no adverse effects on Sun River aquatic resources. There would be continued mortality to fish entrained into the intake facilities on the dam; however, mortality rates from the project's Francis turbines would be improved compared to existing conditions from the jet-flow valves. There would be a permanent loss of low-quality aquatic habitat at the

powerhouse site due to construction of the powerhouse and fill and riprap placement in the tailrace around the powerhouse.

Construction of the maintenance facility, proposed substation, and transmission line would result in the temporary loss of about 10 acres of vegetation and the permanent loss of about 1 acre of vegetation. Vegetation over underground portions of the proposed transmission line would need to be kept in low-growing, primarily herbaceous forms, thus precluding the establishment of most woody vegetation following construction. Operation of the proposed transmission line could result in avian collisions and possibly electrocutions, and the potential exists for increased human-bear interactions because there would be more people in the vicinity of Gibson dam to operate and maintain the powerhouse and project-related facilities.

Construction of the powerhouse could result in short-term disturbance of recreational visitors to the project area, including Mortimer Gulch and Home Gulch campgrounds and several trails and scenic vistas. Negative effects could include exposure to noise and dust, and traffic delays on FDR 108 as equipment and construction material are transported to the construction site. Additional recreational visitor traffic delays could occur during construction of underground portions of the proposed transmission line that are within or adjacent to public roadways.

There would be short-term aesthetic effects due to the presence of small work crews, equipment activity, dust, and materials storage along the transmission line route during construction. Long-term aesthetic effects would result from the construction of 50 to 60-foot-high transmission line poles along the proposed transmission-line alignment.

5.4 SUMMARY OF SECTION 10(J) RECOMMENDATIONS, SECTION 4(e) CONDITIONS, AND SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS

5.4.1 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, and 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 will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. In response to our notice requesting comments, recommendations, terms and conditions, and prescriptions, FWS

filed a letter on July 16, 2010, with one section 10(j) recommendation. The recommendation calls for GDHC to develop and implement an Avian Protection Plan prior to the construction of any transmission-related facility. This recommendation is within the scope of section 10(j); GDHC has already developed the plan, which would have an estimated levelized annual cost of \$2,800. As discussed in section 5.2, we find that the benefits of avian protection would be justified by the cost. We recommend including this measure as a condition of any license issued for the project.

5.4.2 Land Management Agencies' Section 4(e) Conditions

In section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*, we list the preliminary 4(e) conditions submitted by the Forest Service and Reclamation, and note that section 4(e) of the FPA provides that any license issued by the Commission “for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation.” Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our staff alternative. Of Reclamation's 11 conditions, we consider 9 of the conditions (i.e., condition nos. 1-4, 6-9, and 11) to be administrative or legal in nature and not specific environmental measures. We, therefore, do not analyze these conditions in this EA. Of the Forest Service's 22 conditions, we also consider 14 of the conditions to be administrative or legal in nature (i.e., condition nos. 1-10, 14, and 18-20) and not specific environmental measures. We, therefore, do not analyze these conditions in this EA.

Table 18 summarizes our conclusions with respect to the ten 4(e) conditions that we consider to be environmental measures. We include in the staff alternative eight conditions as specified by the agencies, and recommend modifying two of the Forest Service's conditions (condition nos. 16 and 17) to exclude the provisions for as-yet unidentified non-specific measures. We discuss the basis for modifying the conditions in more detail in section 5.2, *Comprehensive Development and Recommended Alternative*.

Table 18. Reclamation and Forest Service section 4(e) conditions for the Gibson Dam Hydroelectric Project (Source: staff).

Agency	Condition	Annualized Cost	Adopted?
Reclamation	Revegetation of disturbed areas (condition no. 5)	\$0 ^a	Yes
Reclamation	Timing, quantity, and location of water releases from the dam at	\$0	Yes

Agency	Condition	Annualized Cost	Adopted?
	the sole discretion of Reclamation (condition no. 10)		
Forest Service	Invasive Plant And Noxious Weed Management Plan (condition no. 11)	\$690	Yes
Forest Service	Threatened, Endangered, Proposed For Listing, And Sensitive Species Plan (condition no. 12)	\$690	Yes
Forest Service	Erosion and Sediment Control Plan (condition no. 13)	\$9,520	Yes
Forest Service	Hazardous Substances Plan (condition no. 15)	\$0 ^a	Yes
Forest Service	Recreation Plan (condition no. 16)	\$1,040 ^b	Yes, for specific measures identified in GDHC's Recreation During Construction Plan. No, for additional as-yet unspecified measures.
Forest Service	Interpretive Display Plan (condition no. 17)	\$12,010 ^c	Yes, for interpretive displays at three specific sites identified in the condition. No, for additional as-yet unspecified interpretive displays.
Forest Service	Transmission Line Management Plan (condition no. 21)	\$2,330 ^d	Yes
Forest Service	Implement the HPMP (condition no. 22)	\$34,000	Yes

^a Included in the cost to implement the Erosion and Sediment Control Plan (condition no. 13).

- b We have insufficient information to estimate the cost of any additional as-yet unidentified recreation measures; therefore, staff's estimate includes the cost to implement the applicant's Recreation During Construction Plan, and the cost to conduct the consultation necessary to develop additional measures stipulated by Forest Service condition no. 16.
- c Estimate includes the cost of staff's-recommended three interpretive displays, and two additional interpretive displays that we assume would be necessary based on Forest Service condition no. 17.
- d Staff's estimate includes the cost to develop the plan, including a transmission line map and additional provisions for vegetation management that would not otherwise be included under GDHC's proposed action.

5.4.3 Montana DEQ's Section 401 Water Quality Certification

In section 2.2.5, *Modifications to the Applicant's Proposal—Mandatory Conditions*, we list the certification conditions submitted by Montana DEQ, and note that these conditions must be included in any license issued by the Commission, regardless of whether we include the conditions in our staff alternative.

Of Montana DEQ's nine conditions, we consider six (conditions 4-9) to be administrative or legal in nature and not specific environmental measures. We, therefore, do not analyze these conditions in the EA. We include in the staff alternative all three of the remaining conditions specified in the certification, as discussed in more detail in section 5.2, *Comprehensive Development and Recommended Alternative*.

Table 19. Montana DEQ section 401 water quality certification conditions for the Gibson Dam Hydroelectric Project (Source: staff).

Condition	Annualized Cost	Adopted?
Implement the Construction Water Quality Monitoring Plan	\$1,600	Yes
Implement the Post-Construction Water Quality Monitoring Plan	\$860	Yes
Develop a DO Monitoring Plan if water quality monitoring indicates that DO enhancement is necessary to protect fishery resources	\$8,110 ^a	Yes

^a Staff's estimate includes the cost to construct and operate a passive turbine aeration system and conduct additional water quality monitoring.

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 14 comprehensive plans that are applicable to the project, located in Montana.¹⁷ No inconsistencies were found.

¹⁷ U.S. Forest Service. 1986. Lewis and Clark National Forest plan. Department of Agriculture, Great Falls, Montana. June 4, 1986. Montana Department of Environmental Quality. 2004. Montana water quality integrated report for Montana (305(b)/303(d)). Helena, Montana. November 24, 2004. Montana Department of Environmental Quality. 2001. Montana non-point source management plan. Helena, Montana. November 19, 2001. Montana Department of Environmental Quality. Montana's State water plan: 1987-1999. Part I: Background and Evaluation. Part II: Plan Sections – Agricultural Water Use Efficiency; Instream Flow Protection; Federal Hydropower Licensing and State Water Rights; Water Information System; Water Storage; Drought Management; Integrated Water Quality and Quantity Management; Clark Fork Basin Watershed Management Plan; Upper Clark Fork River Basin Water Management Plan; and Montana Groundwater Plan. Helena, Montana. Montana Department of Fish, Wildlife, and Parks. 2003. Montana Statewide Comprehensive Outdoor Recreation Plan (SCORP), 2003-2007. Helena, Montana. March 2003. Montana Department of Fish, Wildlife and Parks. 1993. Water rights filings under S.B.76. Helena, Montana. February 8, 1993. 6 pp. Montana Department of Fish, Wildlife and Parks. 1997. Montana warm water fisheries management. Helena, Montana. March 1997. 137 pp. Montana State Legislature. 1997. House Bill Number 546. Total Maximum Daily Load. Helena, Montana. 11 pp. U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986. U.S. Fish and Wildlife Service. 1995. U.S. Prairie Pothole joint venture implementation plan - update. Department of the Interior, Denver, Colorado. January 1995. U.S. Fish and Wildlife Service. 1989. U.S. Prairie Pothole joint venture implementation plan: A component of the North American waterfowl management plan. April 1989. U.S. Fish and Wildlife Service. 1986. Whooping Crane recovery plan. Department of the Interior, Albuquerque, New Mexico. December 23, 1986. U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

6.0 FINDING OF NO SIGNIFICANT IMPACT

Construction of the Gibson Dam Project with our recommended measures would cause short-term increases in soil erosion and sedimentation during construction of the powerhouse, maintenance facility, and the transmission line. Project operations would result in some mortality to entrained fish; however, mortality rates would be improved compared to existing conditions. There may be some minor adverse effects on dissolved oxygen concentrations in the Sun River, but staff's recommended water quality monitoring and protective measures would ensure that any reduced concentrations of dissolved oxygen do not adversely affect aquatic resources. Construction and operation of the transmission line would cause some adverse effects on the aesthetic and terrestrial resources of the project area. Aesthetic, vegetation, and wildlife resources protection measures would minimize these effects.

On the basis of our independent analysis, we find that issuance of a license for the Gibson Dam Project, with our recommended environmental measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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Appendix A – Responses to Comments on the Draft EA

The draft environmental assessment (EA) was issued on May 3, 2011. Comments on the draft EA were due on June 2, 2011. The following entities filed comments on the draft EA: Montana Historical Society (May 23, 2011); U.S. Environmental Protection Agency (EPA) (May 24, 2011); U.S. Department of the Interior, Bureau of Reclamation (Reclamation) (June 3, 2011); U.S. Department of Agriculture, Forest Service (Forest Service) (June 3, 2011); and Zachary Winestine (June 6, 2011).

We summarize below the comments received; provide responses to those comments; and indicate, where appropriate, how we modified the text of the EA. The comments are grouped by topic for convenience.

Procedural

Comment: Zachary Winestine comments that the draft EA fails to address many of the inadequacies cited in the comments on the preliminary draft EA submitted by the Alliance for the Wild Rockies in its letter dated July 9, 2008. He believes that a full environmental impact statement is necessary for this proposed project.

Response: GDHC responded to the comments made by the Alliance for the Wild Rockies et al. on the draft license application in the final license application. GDHC made many changes to its proposed project and developed numerous plans that respond to concerns made by various stakeholders, and these changes are included in the final license application and subsequent filings that refine the proposed project. The EA assesses the current project proposal using information provided by GDHC, resource and land management agencies, and other stakeholders. As stated in Chapter 6 of the final EA, we continue to find that the proposed action would not significantly affect the quality of the human environment, and we conclude that an environmental impact statement is not necessary.

Project Facilities and Operation

Comment: In response to our description of proposed project operations in section 2.2.3 of the draft EA, Reclamation states that the final design of the powerhouse and jet flow valves, and final spillway operations would be made through the design review process. Reclamation also states that the final capacity of the temporary flow bypass system would need to be determined during the design review process.

Response: Articles 1 and 2 of Reclamation's 4(e) conditions stipulate that the licensee shall contact Reclamation within 60 days of license issuance and enter into an agreement with Reclamation 90 days prior to the start of construction to provide for Reclamation review and approval of all project designs, construction, operation, and maintenance activities. Moreover, Article 8 specifies that the Commission shall not authorize

construction of any project works until receipt of Reclamation's written acceptance of construction plans and specifications. These articles are mandatory under section 4(e) of the FPA and would ensure that Reclamation approves the final design and operation of project facilities.

Comment: Zachary Winestine states that given the negative effects of the proposed above-ground transmission line, as much of the line as possible should be buried. He suggests several technical approaches that he believes would potentially enable more of the transmission line to be buried than is currently proposed (placement of reactors and/or surge arresters along the proposed 34.5-kilovolt portion of the line, upgrading the low flow turbine to address resonance issues, and producing and transmission of direct current rather than alternating current electricity). He believes the EA should analyze these options that could enable more of the proposed transmission line to be placed underground.

Response: We address Zachary Winestine's recommended alternative for burying as much of the transmission line as possible in section 2.5 of this final EA.

Cumulative Effects

Comment: Zachary Winestine states that the draft EA should evaluate as a reasonably foreseeable cumulative visual effect of the project, the potential for the project's transmission line to promote industrial-scale wind farm development along the transmission-line alignment.

Response: Zachary Winestine does not provide any information about specific wind farms that are proposed along the transmission line alignment and information in the project record does not indicate that there are any specific proposals for wind farm development along the project's transmission-line alignment. We, therefore, do not consider wind farm development along the project's transmission-line alignment to be a reasonably foreseeable future action.

Aquatic Resources

Comment: Reclamation recommends that we provide some level of qualitative discussion regarding climate change in the EA, as climate change could have potential effects on the flows in the Sun River. This would have a bearing on the generation capability of the proposed powerhouse.

Response: Attempting to predict future flow scenarios that may occur due to climate change would be too speculative given the state of the science at this time. GDHC's proposed powerhouse configuration was selected to maximize generation at the project given the historic flow record of the Sun River and should take into consideration high and low water years. If there is a future need to modify project facilities to accommodate

changes to the flow regime because of climate change or other factors, GDHC would be required to file an application to amend any license issued prior to modifying any approved project facilities or operations.

Comment: EPA comments that the statement on page 32 of the draft EA that “no waters within the project area are listed as being water quality-impaired by Montana DEQ” is not accurate. EPA states that the Sun River below Gibson dam remains designated as “water quality impaired” by Montana Department of Environmental Quality (Montana DEQ), even though Montana DEQ has prepared and EPA has approved a Sun River total maximum daily load.

Response: Sun River from Gibson dam to Muddy Creek is listed as water-quality impaired for both aquatic life and coldwater fisheries in appendix A of the 2010 final water quality integrated report, also available on the Montana DEQ website. We corrected section 3.3.2.1 of the EA, *Aquatic Resources*, accordingly.

Comment: EPA states that the draft EA did not disclose the probable need to obtain a Clean Water Act section 404 permit from the U.S. Army Corps of Engineers (Corps) to implement the proposed project. Construction of the powerhouse would occur along the banks and within the tailrace pool at the base of the dam. EPA believes the EA should address section 404 permit requirements as well as any other federal, state, and local regulatory requirements that may be needed to implement the recommended alternative. This would enable the Commission’s National Environmental Policy Act process to run concurrently with other required planning and review processes rather than consecutively.

Response: We encourage licensees to obtain all permits and approvals that are necessary to construct, operate, and maintain all licensed project facilities. While we agree that the applicant will likely need a 404 removal/fill permit authorization prior to project construction and operation, the EA only identifies those statutory obligations that FERC must comply with prior to issuing a license, and we do not discuss all other potential post-licensing permit and approval requirements that would be the responsibility of the licensee to obtain.

Terrestrial Resources

Comment: In regard to our discussion of minimizing loss of vegetation in section 3.3.3.2 of the draft EA, Reclamation clarifies that it would only provide approval for areas revegetated on Reclamation-managed lands.

Response: We have modified the text of the EA to clarify Reclamation’s intent.

Comment: EPA recommends that we ensure that the weed control plan include a requirement to wash vehicles and construction equipment before entering construction sites, including the transmission line right-of-way, to reduce the spread of weed seeds.

Response: This requirement is already included on page 4 of GDHC's Noxious Weed Control Plan included in the final license application and referenced on page 57 of the draft EA. In the EA, we recommend implementation of the plan, which would include the measure recommended by EPA.

Comment: EPA recommends that GDHC use gates on transmission line access roads to discourage all-terrain vehicle/recreational vehicle travel on these roads because such motorized uses disturb soil, create weed seedbeds, and disperse weed seeds.

Response: We revised section 3.3.3.2, *Terrestrial Resources*, to evaluate the potential for transmission line access roads to contribute to the spread of noxious weeds. In section 5.2, we are now recommending that GDHC identify all existing and proposed gates on transmission line access roads.

Comment: EPA recommends that GDHC use integrated weed management strategies that include cultural and biological methods and education and prevention to reduce weed spread, as well as the use of chemicals. EPA states that when herbicides are used it is important that adequate measures be incorporated into herbicide applications to mitigate risks of adverse health and environmental effects (e.g., avoid drift of potentially toxic herbicides to aquatic areas or other sensitive areas).

Response: GDHC's proposed Noxious Weed Control Plan includes best management practices to reduce weed spread during and after construction. Such measures include training of construction workers and equipment operators on the identification of weeds, provisions to certify that all construction materials are weed-free, use of certified weed-free seeds for revegetation, and numerous other prevention measures. Our recommended vegetation management plan, which would be a component of the transmission line management plan, would specify site-specific vegetation treatment methods; this would include identification of the circumstances under which manual methods or herbicides would be used to control noxious weeds and vegetation in the transmission line right-of-way. If herbicide use is necessary for vegetation management, we expect GDHC to use only EPA-approved herbicides for the specific application, applied by professional personnel appropriately trained in the use of herbicides, to minimize the risks of adverse health and environmental effects. We are recommending herbicide application restrictions in section 5.2.A of the final EA.

Comment: EPA recommends that GDHC conduct annual bird mortality surveys to ensure that transmission line marking devices are functioning properly. It also recommends field surveys during the spring and fall migratory period and the spring

nesting period to locate birds that have been electrocuted or have struck transmission lines to aid in the process of identifying and modifying problem areas.

Response: We revised section 3.3.3.2, *Terrestrial Resources*, to include more detail about what is included in the proposed Avian Protection Plan and an analysis of EPA's suggested targeted bird mortality surveys. We make our final recommendation for EPA's additional avian mortality surveys in section 5.2.B.

Comment: Zachary Winestine comments that, although the draft EA recognizes that there would be increased potential for wildlife disturbance and avian collisions and electrocution because of the construction of the new transmission line, there is no analysis of the effects of this increased danger of raptor collisions and electrocutions from the increased height of the proposed transmission line east of the Sun River Canyon.

Response: The risk of avian mortality depends on the species. Shorter poles would likely pose more of a risk to some species of birds, and taller poles pose more of a risk to other species (APLIC, 2006). GDHC's approach for avian mortality reporting as outlined in the Avian Protection Plan would provide additional information on any transmission line and avian interactions.

Comment: Zachary Winestine states that the draft EA includes no discussion of whether the increased height of the transmission line might lead to higher rates of grouse mortality because of the taller perches it would afford raptors, enabling them to more easily spot and hunt grouse.

Response: We updated section 3.3.3.2, *Terrestrial Resources*, to address this issue.

Cultural Resources

Comment: The Forest Service states that our discussion of National Register of Historic Places (National Register) evaluations is not comprehensive for all sites listed in table 11 of the draft EA. It suggests that we add a statement regarding evaluations that were completed prior to this analysis to help clarify the status of these sites.

Response: Table 11 has been updated to accurately reflect all National Register determinations. A total of four sites remain unevaluated; all others have either been determined eligible or ineligible for listing. The paleontological resource is also unevaluated because the National Register criteria for evaluation do not apply to this site.

Comment: The Forest Service notes that our discussion of National Register eligibility does not include site 24TT0006, Pictographs, and recommends that this site be added to the discussion as either unevaluated or as potentially eligible for listing in the National Register.

Response: Table 11 and the text of the EA have been updated to indicate that this site is eligible for listing on the National Register.

Comment: The Forest Service comments that, although site 24TT0583, Hannan Tract, is listed in table 11 of the draft EA as “recommended eligible,” it is not included in the eligibility discussion that follows table 11. The Forest Service and Montana State Historic Preservation Officer evaluated this site in 2010 and found it to be eligible for National Register listing.

Response: Table 11 and the text of the EA have been updated to indicate that this site is eligible for listing on the National Register.

Comment: Regarding staff’s conclusion that there would be no effect on the Hannan Tract, the Forest Service points out that the HPMP assumes that no ground-disturbing activity would occur at this location. However, the Forest Service asserts that there would be disturbance. The Forest Service notes that if the proposed transmission line that passes through this property would be buried or if overhead transmission lines would require placement of new poles within this site, the proposed action would require additional cultural resource review, including monitoring and potential mitigation, because the property contains a prehistoric component.

Response: The HPMP states that consultation with the Forest Service would be undertaken prior to any ground-disturbing activities within the Hannan Tract area. In our April 7, 2010, letter to GDHC, we agreed with the approach outlined in the HPMP that any needed additional surveys could be conducted after any original license has been issued, but that such surveys and the requisite section 106 consultation would be completed prior to beginning any ground-disturbing activities for this project. This approach is consistent with that presented in the Forest Service comment. By letter filed on August 26, 2010, the Montana State Historic Preservation Officer concurred with our assessment. We clarified this survey and consultation requirement in section 3.3.6.2 of the EA.

Comment: The Forest Service comments that the prehistoric component of the Hannan Tract is designated 24TT0584.

Response: Where the EA refers to the prehistoric component of the Hannan Tract, we have inserted this site number (24TT0584). However, because the prehistoric materials associated with this resource are contained within the boundaries of the larger Hannan Tract site (24TT0583) and are described in the HPMP as a *component* of that site, these materials are not discussed in the EA as a resource separate from the larger Hannan Tract site.

Comment: The Forest Service comments that our designation of the Historic Hannan Bridge as site 24TT0584 in table 11 and the effects analysis in the draft EA is incorrect.

The Forest Service also states that the bridge has not yet been formally recorded as a cultural resource, and no site number has been assigned to this bridge.

Response: References to the Hannan Historic Bridge as site 24TT0584 in table 11 and the effects analysis in section 3.3.6.2 of the EA have been corrected.

Comment: The Forest Service comments that, on page 83 of the draft EA, it is not listed as an agency that was consulted and provided comments on the HPMP. It states that it was consulted and provided comments on the HPMP and its comments have been incorporated into the HPMP. The Forest Service states that its participation in this consultation is required and should be documented in the EA.

Response: We revised the indicated text in section 3.3.6.2 of the EA to reflect that the Forest Service provided GDHC with comments on a draft version of the HPMP.

Aesthetic Resources

Comment: Zachary Winestine comments that the draft EA fails to adequately analyze the effects of the 69-kV transmission line east of the Sun River Canyon. He states that this transmission line would be nearly twice the height of the existing distribution line but the draft EA only states that measures would be taken to minimize the visual effects of the taller line without actually analyzing the effects.

Response: We added discussion of these aesthetic effects to section 3.3.7.2 of the final EA.

Comment: Zachary Winestine states that the draft EA failed to analyze whether the size of the proposed maintenance building is justified and whether a separate garage building is necessary. He comments that both new structures would have a significant visual effect and the applicant has an obligation to minimize the size of the maintenance building and prove that a new garage is essential.

Response: We modified the text in section 3.3.7.2 of the EA to include this analysis of the visual effects of the proposed maintenance building.

Comment: Zachary Winestine notes that the draft EA includes no analysis of the potential to reduce visual impacts by removing the existing Reclamation shop building and including this facility in the proposed new maintenance building.

Response: GDHC consulted with Reclamation on the proposed layout of project facilities, including the proposed maintenance building and its effects on visual resources. Reclamation did not request that its existing shop building be removed and reconstructed as part of GDHC's proposed maintenance building. Without such a request or agreement

between GDHC and Reclamation, the Commission would not have the authority to require modifications to Reclamation's facilities.

Document Content(s)

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