

**Black Canyon Hydroelectric Project
FERC Project No. P-14110
Revised Vegetation Habitat, Rare Plants and Wildlife Study Plan
January 2013**

Prepared for
Black Canyon Hydro, LLC
3633 Alderwood Avenue
Bellingham, WA 98225

Table of Contents

1 INTRODUCTION	1
2 STUDY DESCRIPTION AND OBJECTIVES	3
2.1 Vegetation Habitat Study.....	3
2.2 Rare Plant Study	3
2.3 Wildlife Study.....	4
3 STUDY AREA	4
3.1 Vegetation Habitat Study.....	4
3.2 Rare Plant Study	5
3.3 Wildlife Study.....	5
4 RESOURCE MANAGEMENT GOALS	6
4.1 Vegetation Habitat Study.....	6
4.2 Rare Plant Study	6
4.3 Wildlife Study.....	7
5 EXISTING INFORMATION	7
5.1 Vegetation Habitat Study Plan	8
5.2 Rare Plant Study	8
5.3 Wildlife Study.....	8
6 NEXUS TO PROJECT	9
6.1 Vegetation Habitat Study.....	9
6.2 Rare Plant Study	10
6.3 Wildlife Study.....	10
7 METHODS	10
7.1 Vegetation Habitat Study.....	11
7.1.1 Measure and describe the various plant communities and habitats that occur within the Study Area, including any PHS List habitats such as wetlands or old growth forest. ^{WDFW28 WDFW30}	11
7.1.2 Evaluate the potential effects of project construction and operation on the plant communities	13
7.1.3 Develop a Habitat Management Plan that identifies prevention, mitigation, and enhancement measures that could be used for the project if a license is issued	14
7.2 Rare Plant Study	14
7.2.1 Identify and map rare plants within the study area	14
7.2.2 Evaluate the potential effects of the project on identified rare plants.....	16
7.2.3 Identify PME measures that could be implemented if a license is issued, and incorporate those measures into the HMP	16

7.3 Wildlife Study.....	16
7.3.1 Identify PHS List wildlife that is or may be present within and adjacent to the Study Area ^{WDFW} ³³	16
7.3.2 Evaluate the potential effects of the project on the identified wildlife	18
7.3.3 Identify PME measures that could implemented if a license is issued, and incorporate those measures into the HMP.....	19
8 PROGRESS REPORTING.....	19
9 SCHEDULE.....	19
10 LEVEL OF EFFORT AND COST	20
11 REFERENCES	20
12 APPENDIX A: Vegetation Habitat, Rare Plant and Wildlife Study Area	23

List of Tables

Table 1. Resource Study Schedule.....	20
Table 2. Level of Effort and Cost	20

1 INTRODUCTION

Black Canyon Hydro, LLC, (BCH) ultimately plans to file an application for an original license for the Black Canyon Hydroelectric Project (Project), FERC Project Number P-14110, and associated facilities on the North Fork Snoqualmie River (North Fork), approximately 4 miles northeast of North Bend in King County, Washington. The Project has a proposed generation capacity of 25 megawatts (MW) and would be located entirely on private lands.

Intake Alternative A

Alternative A would consist of the following new facilities: (1) an 8-foot-high, 162.4-foot-long inflatable rubber diversion with an associated water intake structure; (2) a natural or roughened fish passage channel; (3) a variable pooling area behind the diversion with a normal water surface elevation of 971 feet above mean sea level and a maximum pooling of 2.83 acres; (4) a power conduit tunnel consisting of an approximately 450-foot-deep vertical tunnel into an approximately 8,350-foot-long, 9-foot-diameter horizontal tunnel and penstock; and (5) for access, Alternative A would utilize an existing logging road to minimize disturbance, and require only 825-feet of additional road.

Intake Alternative B

Alternative B would consist of the following new facilities: (1) a control sill to maintain a consistent river bottom elevation, which would allow water, fish, sediment, large woody debris, and whitewater recreationists to pass unimpeded, with an associated water intake structure; (2) a power conduit tunnel consisting of an approximately 450-foot-deep vertical tunnel into an approximately 9,175-foot-long, 9-foot-diameter horizontal tunnel and penstock; and (3) for access, Alternative B would utilize an existing logging road to minimize disturbance, and require only 500-feet of additional road.

Powerhouse

The power conduit tunnel and penstock from either Alternative A or B would terminate at the powerhouse proposed upstream of Ernie's Grove. Initially, the PAD described the powerhouse as being a metal building approximately 60-feet-wide by 100-feet-long. However, as a result of construction from the power conduit tunnel, an underground powerhouse of similar dimensions may be feasible. Tailrace dimensions have also been revised from a 60-foot-wide by 100-foot-long tailrace, to a 24-foot-wide by 200-foot-long tailrace. Whether above or below ground, the powerhouse would include two Francis

turbine generator units, one rated at 16 MW and the other rated at 9 MW, as well as appurtenant facilities (switchyard, maintenance building, etc.). Additionally, a temporary, 2,600-foot-long construction access road would extend from the powerhouse to the North Fork Road (while avoiding Ernie's Grove).

Transmission

As presented in the PAD, transmission would consist of a 4.2-mile-long, 115-kilovolt overhead transmission line that transmits project power to the regional grid (transmission line would be an over-build of an existing transmission line with only approximately 0.65 miles of new transmission). However, an additional option, depending on minimum instream flow requirements, land use designations, and cost, may be to have the Project connect to the existing 34 kV transmission line running from the existing Black Creek Hydroelectric Project to Snoqualmie Falls. A transmission line could be run from the powerhouse back through the power conduit to the intake structure. From the intake structure a buried or overhead transmission line would only have to travel approximately 6,745-feet along an existing logging road through clear cuts.

The project would operate in run-of-river mode. The combined maximum hydraulic capacity of the two project turbines would be 900 cubic feet per second (cfs). The project would divert water from a 2.6-mile-section of the North Fork Snoqualmie River.

BCH filed a Notice of Intent (NOI) and the associated Pre-Application Document (PAD) to commence the FERC Integrated Licensing Process on March 27, 2012. In response to the subsequent study requests filed by FERC staff and other stakeholders and as detailed in 18 CFR 5.11, BCH is required to submit relevant resource study plans. This includes a study of vegetation habitat, rare plants and wildlife within the project vicinity which follows the requirements of 18 CFR 5.11(b)-(e).

In this document, BCH proposes to conduct:

- Vegetation Habitat and Priority Habitat Study
- Rare Plant Study
- Wildlife Study

The objectives and methods proposed for the vegetation habitat & priority habitat, rare plant and wildlife studies are described in separate sections of this document. Although presented separately, the tasks and activities comprising the three studies will be carefully coordinated to ensure that available resources are put to best use. The findings and

recommendations of the three studies will be reported in a single document – The Vegetation Habitat, Rare Plants and Wildlife Study Report – when the three studies are completed.

2 STUDY DESCRIPTION AND OBJECTIVES

In accordance with 18 CFR §5.11(d)(1), this section describes the goals and objectives of the study and the information to be obtained. The goal of this study is to identify potential effects of the proposed project on vegetation habitat, rare plants and wildlife in the project area.

2.1 Vegetation Habitat Study

The goal of the Vegetation Habitat Study is to identify, describe and map Priority Habitat types and vegetation within the proposed Study Area. For the purposes of this study, Priority Habitats refers to those habitat types described in the WDFW Priority Habitats and Species List (PHS List).

The study will focus primarily on areas that will be permanently impacted as a result of project construction and operation as well as vegetation and habitat that may be impacted indirectly within the project vicinity. The study will:

- Measure and describe the vegetation habitats that occur within the study area, including Priority Habitats.
- Identify, describe, and map habitats that BCH will permanently impact during construction or operations.
- Identify, describe, and map habitats that BCH may impact through indirect effects from disturbance (noise, people, traffic, etc).
- Develop a Habitat Management Plan (HMP) that identifies prevention, mitigation, and enhancement measures that could be used for the project if a license is issued.

2.2 Rare Plant Study

The goal of the Rare Plant Study is to identify and map the locations of rare plants encountered, if any, within the proposed project area. In the context of this study, rare plants are defined as plants listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA), candidates for possible future listing as threatened or endangered under the ESA, or plants that have been designated as rare-defined as Endangered, Threatened, or Sensitive as well as regionally rare including Washington Natural Heritage Program (WNHP) rankings of G1, G2, G3, S1, S2, or S3 under the Washington Natural Heritage Program (WNHP).

The study will:

- Identify and map rare plants within the project area.
- Evaluate the potential effects of the project on the identified rare plants.
- Identify PM&E measures that could be implemented if a license is issued, and incorporate those measures into the HMP.

2.3 Wildlife Study

The purpose of the wildlife study will be to collect baseline information on the potential occurrence and distribution of certain wildlife within the study area. This study will conduct species-specific surveys for any threatened, endangered or Washington State PHS List species or Priority Habitat that may exist within the study area. For the purposes of this study, these species will be collectively referred to as the PHS List of habitats and species of concern (PHS List).

The study will:

- Identify PHS List wildlife that is or may be present within and adjacent to the project area.
- Perform species- specific surveys for PHS list species based on the results of the vegetation habitat and PHS habitat study.
- Evaluate the potential effects of the project on the identified PHS List wildlife.
- Identify PME measures that could be implemented if a license is issued, and incorporate those into the HMP.

3 STUDY AREA

3.1 Vegetation Habitat Study

Vegetation habitat units that occur within the Study Area (Appendix A) will be delineated on maps and aerial photographs based on discernible plant associations. This information will be used to preliminarily classify habitat units by habitat type.

The study area for vegetation habitat will include:

- Areas of direct project impacts resulting from clearing, grading, construction, maintenance and operation of new structures and facilities.
- Land areas within ½ mile of areas of direct project impacts described above.
- Land areas within ¼ mile of the river project-reach shorelines.

- Land areas within ¼ mile of any new road extension.
- Land areas within 300 feet of existing power line corridors that will be upgraded or overbuilt to serve the project.

Particular attention will be paid to vegetation habitat units within the Study Area that are representative of PHS List habitat types. Some of these important habitats include cliffs, caves, seeps, wetlands, riparian areas, and springs.

3.2 Rare Plant Study

The study is intended to document whether rare plant species are present within or immediately adjacent to the project footprint, or within other areas that may potentially be disturbed as a result of construction and operation of the project. The study area tentatively includes areas directly impacted by and within 200 feet of aboveground clearing limits for construction of project features. These features include the intake structures, fish passage facilities, control buildings, power tunnel, powerhouse, tailrace, access roads, transmission lines and construction staging areas. Those portions of the Project reach that may be affected by fluctuating water levels will also be surveyed, provided they can be safely accessed on foot.

Rare plants encountered within the Project Area during the course of other project-related activities, including studies not described in this report, will be documented.

3.3 Wildlife Study

The overall study area will include all of the same areas identified for the vegetation habitat study, which includes the direct project area and the surrounding vicinity as described in section 3.1.

PHS List species specific surveys will occur within any subarea of the overall study area that is deemed to contain appropriate useable habitat for the subject species. Special consideration will be given to riparian areas adjacent to the North Fork and upland areas traversed by roads and transmission lines. The exact location and extent of the areas to be surveyed for wildlife will be determined after evaluation of the vegetation habitat survey results and screening for the potential presence of or use by PHS list species. The final species list for survey and boundaries for species specific surveys will be determined in consultation with the Washington Department of Fish and Wildlife.

4 RESOURCE MANAGEMENT GOALS

In accordance with 18 CFR §5.11(d)(2), this section describes resources management goals of agencies or Indian tribes with jurisdiction over the resources to be studied.

4.1 Vegetation Habitat Study

Most of the land in the vicinity of the proposed project is privately owned and has historically been managed as timberland, which will likely continue to be the case following project construction.

The Washington Department of Fish and Wildlife (WDFW) has established fishing and hunting regulations and encouraged stewardship of public and private lands for the benefit of native fish and wildlife species in the Snoqualmie River basin.

The Northwest Power and Conservation Council designated a segment of the North Fork that includes the proposed Project Reach as a “Protected Area.” Protected Areas are those stream reaches and associated terrestrial habitats where hydroelectric development is deemed to pose risks to fish and wildlife resources. The designation of the North Fork occurred in late 1980’s. The specific evaluation of the criteria and any supporting documentation used to establish this section of the North Fork that comprises the Project Reach as “Protected,” have not been found.

The 13,363-acre Mount Si Natural Resources Conservation Area (NRCA) lies adjacent to the eastern boundary of the project area. The NRCA is managed to protect a variety of unique habitats and features, including old-growth Douglas-fir, mountain hemlock, and western hemlock forests; outstanding geologic features; a high-elevation Sitka spruce forest; wetlands and lakes; rock outcrops; cliffs; grasslands; and riparian areas (WDNR 2012).

4.2 Rare Plant Study

Many agencies and organizations are working to protect rare native plants in Washington. The Washington Natural Heritage Program (WNHP), established by the Department of Natural Resources in 1981, develops and maintains a list of rare plants in Washington State. The primary mission of the WNHP (WDNR 2012b) is to:

- Identify which species and ecosystems are priorities for conservation effort;
- Build and maintain a database for priority species and ecosystems; and

- Share the information with others so that it can be used for environmental assessments and conservation planning purposes.

The United States Fish and Wildlife Service (USFWS) is the federal agency that is primarily responsible for administering the ESA for federally listed plant species. Under the ESA, all federal agencies are to use their existing authorities, in consultation with the USFWS, to conserve species listed as threatened and endangered under the ESA. These authorities extend to the management of federal lands, federal actions, and federally approved private actions (USFWS 2012b).

4.3 Wildlife Study

The mission of the WDFW is to “preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities” (WDFW 2012b). To this end, the WDFW maintains a comprehensive database of species and habitats of conservation and management concern known as the Priority Habitats and Species List. Priority species include State Endangered, Threatened, Sensitive, and Candidate species; animal aggregations (e.g., heron colonies, bat colonies) considered vulnerable; and vulnerable species of recreational, commercial, or tribal importance. The PHS list currently contains 152 vertebrate species, including fish, mammals, birds, amphibians, and reptiles (WDFW 2012a).

Threatened and endangered wildlife species in Washington State are regulated by the Threatened and Endangered Species section of the WDFW, which oversees the listing and recovery of those species in danger of extirpation (WDFW 2012b). The USFWS is the principal federal agency for administering the ESA for federally listed wildlife species. Under the ESA, all federal agencies are to use their existing authority, and in consultation with the USFWS, to conserve species listed as threatened and endangered under the ESA. This authority applies to the management of federal lands, federal actions, and federally approved private actions (USFWS 2012b).

5 EXISTING INFORMATION

In accordance with 18 CFR §5.11(d)(3), this section describes existing information on wildlife, vegetation, and sensitive habitats at the Project. The additional information needed regarding wildlife, vegetation, and sensitive habitats is discussed in the “Study Description and Objectives” section above.

5.1 Vegetation Habitat Study Plan

The PAD for the proposed Project (BCH 2012) summarized information from terrestrial resource studies conducted for the nearby Calligan Creek and Hancock Creek Hydroelectric Projects (Snohomish PUD 2011a,b). Both projects are located within 3 miles of the proposed Project, and have similar land-use histories and habitat types. Results from these studies will be used to assess what conditions may be encountered within the study area during field surveys.

Other relevant information available for areas within and near to the study area includes:

- National Wetland Inventory (NWI) database and maps (USFWS 2012a);
- Priority Habitats and Species (PHS) database (WDFW 2012a);
- Maps, aerial photos and satellite imagery; and
- Information published for the Mount Si NRCA (WDNR 2012a).

5.2 Rare Plant Study

Rare plant species in Western Washington that are currently listed under the ESA include:

- Marsh sandwort (*Arenaria paludicola*),
- Golden paintbrush (*Castilleja levisecta*),
- Water howellia (*Howellia aquatilis*),
- Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*),
- Nelson's checker-mallow (*Sidalcea nelsoniana*), and
- Bradshaw's desert parsley (*Lomatium bradshawii*).

The WNHP lists an additional 21 rare plant species that are known to occur within King County (WDNR 2012b; Appendix A). WNHP plant distribution data will be reviewed to determine if a prior record exists of rare plants occurring within the Project Area. Other relevant information on the distribution and abundance of rare plants in the vicinity of the project will be gleaned from terrestrial resource study reports prepared for the Hancock Creek and Calligan Creek Hydroelectric Projects (Snohomish PUD 2011a,b), which are located within three miles of the proposed project and have similar land-use histories and habitat types.

5.3 Wildlife Study

The results of several wildlife studies undertaken during the licensing of the Hancock Creek Hydroelectric Project (Snohomish PUD 2011b) were incorporated into the Black

Canyon Hydroelectric Project PAD (BCH 2012). These studies yielded the following information:

- A list of mammals that could possibly be present in the Project area based on species distribution;
- A list of birds that could possibly be present in the Project area based on species distribution and broad habitat requirements; and
- A list of reptiles and amphibians that were detected during field surveys or that could possibly occur within the Project area.

48 species of concern (or groups of species) are known to occur in King County. Several species of concern are known to occur within or near the Project area, including Columbian black-tailed deer (*Odocoileus hemionus columbianus*), which was identified as a species of management concern to project stakeholders during the scoping process.

Species of concern that are known to occur near the Project area (within 2 miles) include western toad (*Anaxyrus boreas*), northern goshawk (*Accipiter gentili*), marbled murrelet (*Brachyramphus marmoratus*), Northern spotted owl (*Strix occidentalis*), and mountain goat (*Oreamnos americanus*) (WDFW 2012a).

6 NEXUS TO PROJECT

In accordance with 18 CFR §5.11(d)(4), this section describes any nexus between Project operations and effects on wildlife, vegetation, and sensitive habitats.

6.1 Vegetation Habitat Study

The proposed project may affect terrestrial habitat through vegetation removal and soil disturbance resulting from construction of the road extensions and transmission line; boring of the tunnel; and construction of the diversion, intake, powerhouse, and tailrace. Reducing flows in the Project reach and altering flows at the proposed tailrace area could also affect riparian habitat.

This study will help determine project effects on habitats comprising different vegetation types; identify sensitive habitats such as wetlands or old growth forest; identify habitats that support or could conceivably support threatened, endangered, and rare species; and provide a basis for the development of a Habitat Management Plan for the project.

6.2 Rare Plant Study

The proposed project has the potential to negatively impact rare plants within the study area as a result of vegetation removal and soil disturbance associated with construction of project features and facilities. Hydrologic and geomorphic changes resulting from the withdrawal of water for hydroelectric power generation could conceivably affect rare plants that may be present in the riparian corridor. Maintenance procedures during the operational phase of the project may introduce invasive species to the area, which may also cause adverse effects to rare plants, if present. This study will help to determine the project effects on rare plants, and provide a basis for developing appropriate PME measures to implement before, during, and following construction.

6.3 Wildlife Study

The proposed project could have both direct and indirect impacts on wildlife. Potential direct effects may include displacement of individuals due to temporary and permanent habitat loss associated with construction of the road extensions and transmission line; boring of the proposed tunnel sections; construction of the diversion, intake, and powerhouse; and altering flows in the Project Reach and at the proposed tailrace area. Indirect impacts to wildlife could result from disturbance associated with construction and operation of project facilities (e.g., noise, increased human presence). This study will identify wildlife PHS List species of concern that may be affected by the proposed Project, assess the overall impacts to wildlife that may result from construction and operation of the Project, and make recommendations and provide a framework for developing PMEs and the Habitat Management Plan.

7 METHODS

In accordance with 18 CFR §5.11(d)(1) and §5.11(d)(5), this section provides a detailed description of the proposed study methodology, including data collection and analysis techniques, or objectively quantified information, sampling strategy, and a schedule including data collection and analysis techniques, or objectively quantified information, sampling strategy, and a schedule including appropriate field season(s) and the duration (see “Schedule” heading below for schedule).

7.1 Vegetation Habitat Study

7.1.1 Measure and describe the various plant communities and habitats that occur within the Study Area, including any PHS List habitats such as wetlands or old growth forest.

This objective will be addressed by compiling available information on local plant communities from published and unpublished sources, and conducting field investigations where necessary to confirm and supplement this information.

7.1.1.1 Review of Available Information

Prior to conducting any field surveys, biologists will gather and review available information to determine the types of vegetation communities that are likely to be present and to identify PHS List habitats.

The background review will include retrieval and review of published and unpublished material, including:

- Research papers, thesis, and reports;
- Maps, aerial photos, and satellite images;
- PADs for the Calligan Creek and Hancock Creek Hydro Projects (Snohomish PUD 2011a,b);
- NWI online mapper (USFWS 2012a); and
- PHS database (WDFW 2012a).

Additional information may be gathered through interviews and documents retrieved from local, state, tribal, and federal land managers, including representatives of King County, Tulalip and Snoqualmie Indian Tribes, WDFW, Washington Department of Natural Resources (WDNR), the US Forest Service (USFS), Weyerhaeuser, and Hancock Forest Management.

Based on the review of available information, a map of vegetation communities and sensitive habitats will be created using ArcMap. The map will be based on the most recent aerial imagery available. The boundaries of discrete habitat units will be delineated on the map and used for reference during field investigations.

7.1.1.2 Field Survey

A field survey will be conducted as may be necessary to accurately identify and describe vegetation communities within the study area, and to confirm the boundaries of discrete vegetation habitat units identified during the background review. Up to ten biologist days for field work are allocated for this task.

7.1.1.3 Habitat Type Classification

Vegetation habitat types within the Study Area will be classified using the Field Guide to the Forested Plant Associations of the Mount Baker-Snoqualmie National Forest (Henderson et al. 1992), based on current climate and site conditions and the absence of new disturbance. Priority Habitat determination and descriptions will be based on the PHS List descriptions. Vegetation habitat types will also be classified by cover type, as described by Hall et al. (1985), which takes into account characteristics that contribute to wildlife habitat by considering seral stages.

7.1.1.4 Habitat Unit Delineation

The physical boundaries of discrete vegetation habitat units within the Study Area that cannot be reliably determined from aerial photographs or satellite images will be delineated in the field using a global positioning system (GPS) device. The location and extent of vegetation habitat units will be determined by changes in vegetation composition (i.e., plant associations) and structure across the landscape. To be considered discrete, a vegetation habitat unit must comprise a vegetation community comprised of similar plant species and vertical spacing throughout a given area.

7.1.1.5 Habitat Unit Sampling

All habitat units that are representative of Priority Habitat types will be sampled. A rapid vegetation assessment will be conducted for selected vegetated habitat units following methods described in the California Native Plant Society — Vegetation Rapid Assessment Protocol (California Native Plant Society [CNPS] 2004). For each sampled habitat unit, biologists will collect the following information:

- Representative photographs;
- Plant species and estimated percent cover for dominant and subdominant trees and shrubs;
- Substrate;
- Presence and condition of large woody debris;
- Estimated average diameter at breast height of dominant trees;

- Estimated percent canopy cover;
- Estimated slope; and
- Estimated age of dominant vegetation.

If wetlands are found within the Project Area, they will be classified further according to the Cowardin wetland classification system (Cowardin et al. 1979). To aid in the classification, field staff will obtain more detailed measurements of the boundaries, extent, and plant species composition of each wetland.

The vegetation habitat field survey will be conducted between mid-April and mid-July, 2012, which is within the growing season for native plants in the vicinity of the Project (NRCS 2012).

7.1.2 Evaluate the potential effects of project construction and operation on the plant communities

The project will be comprised of several structures, including an intake diversion, fish passage, water conveyance tunnel, powerhouse, tailrace, roads, and transmission lines. Following construction, the project will be operated as a run-of-river hydroelectric generation facility. The potential for adverse effects to vegetation and wildlife will need to be evaluated over the entire life cycle of the project. The direct, indirect, and cumulative effects of constructing, operating, maintaining, and decommissioning these facilities will be evaluated after the Vegetation Habitat survey has been completed and the final configuration and design of the proposed project have been established. Potential direct effects include habitat fragmentation and loss, changes in habitat structure such as increased edge habitat, and ongoing disturbances to vegetation following construction. The potential for perturbing sensitive habitats such as riparian areas and old growth forests is of special concern.

Potential indirect effects on vegetation habitat include introduction of invasive species and other issues related to increased human presence in the area. Potential cumulative effects of the project will be evaluated by considering the direct and indirect effects of project components or activities in association with the effects of other human activities in the area. The effects analysis will determine whether the ecological impacts of the project accumulate or interact to propagate additional impacts over space and time. If

deemed significant, these impacts will require special management, mitigation, or consideration in decision making.

7.1.3 Develop a Habitat Management Plan that identifies prevention, mitigation, and enhancement measures that could be used for the project if a license is issued

The effects analysis described will be applied to the results of the Vegetation Habitat Study, Rare Plant Study, and Wildlife Study. If that analysis determines that the project is likely to adversely affect Priority Habitats and Wildlife Species in the project area, then specific measures to manage or mitigate those effects will be recommended. Potential mitigation measures include (Council on Environmental Quality 2011):

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- Compensating for the impact by replacing or providing substitute resources or environments.

Prevention, mitigation, and enhancement measures will be recommended that address the environmental impacts of constructing, operating, and decommissioning the project on terrestrial resources, in particular plant and wildlife species of concern. The recommendations and their underlying basis will be discussed with agency, tribal, and stakeholder project participants and, to the extent practicable, incorporated into the Habitat Management Plan.

7.2 Rare Plant Study

7.2.1 Identify and map rare plants within the study area

This objective will be addressed by a combination of background literature review and field surveys as needed to confirm and refine the information obtained during the background review.

7.2.1.1 Review of Available Information

Existing information on the potential occurrence of rare plants in the project area will be compiled and reviewed prior to conducting field surveys. The background review will determine if rare plant species and associated habitats are likely to be present in the

project area. As part of the review, biologists will review the Hancock and Calligan Creek project reports, the WNHP database, and other information that will be located through a search of published and unpublished documents. Agency and tribal biologists who are familiar with the project area will also be consulted.

A current list will be compiled in consultation with the U.S. Fish and Wildlife Service and WDFW, of all threatened, endangered, and sensitive plants that may occur in the project area.

7.2.1.2 Field Surveys

Field surveys to search for rare plants in the Project Area will be conducted in conjunction with the Vegetation Habitat Study to provide thorough coverage of potential impact areas. Habitats known to support populations of rare plants, if any, as determined from a review of available information, will be intensively surveyed. If rare plants are encountered, their locations will be mapped using GPS techniques, and the associated habitat conditions will be described in detail

In areas where it is not known if rare plants are present, a reconnaissance survey will be conducted by a qualified botanist to assess the overall diversity and structural complexity of vegetation present. This information will be used to establish the appropriate survey method and level of effort to be used to sample the study area. It is anticipated that the “Intuitive-Controlled Methodology” for sampling vascular plants (Whiteaker et al. 1998) will be used in the field surveys. This sampling methodology is designed so that there is a high probability of finding populations of rare plant species, if present. During the survey, a botanist will traverse the selected cross sections, recording the species and mapping the location of any rare plants encountered.

Floristic inventories will be conducted throughout the project area, with additional focus on habitat types that are most likely to support particular rare plants, i.e. using the "intuitive-controlled methodology" to distribute inventory time among habitat types. Plant surveys will also follow the WNHP "Suggested Guidelines for Conducting Rare Plant Surveys for Environmental Review, Washington State ", located at: <http://www1.dnr.wa.gov/nhp/refdesk/pubs/rareplantsurveyguidelines.pdf>.

Field surveys will be conducted during May through August, when rare plant species in the vicinity of the project are most likely to be detected (NRCS 2012). Multiple surveys

may be required to identify plants that display characteristics (e.g., flowers or fruit) at different times of the year. It is anticipated that two surveys will be conducted during the growing season; one in spring to early summer (i.e., May through June) and one in the late summer (i.e., July through August).

7.2.2 Evaluate the potential effects of the project on identified rare plants

The evaluation of potential project effects on rare plants in the project area will include consideration of direct, indirect, and cumulative impacts caused by the construction, operation, maintenance, and decommissioning of project facilities. The effects analysis will be completed after the final configuration and design of the project have been established. Potential direct effects include the destruction of rare plants and the reduction or modification of their habitat due to project construction, or exposure to herbicides during facility maintenance. Potential indirect effects to rare plants include the introduction of invasive plant species, and other impacts associated with increased human presence in the project area. These impacts will be evaluated both individually and collectively, and in combination with impacts caused by other human activities in the vicinity of the project, to determine the potential cumulative effects of the project on rare plants.

7.2.3 Identify PME measures that could be implemented if a license is issued, and incorporate those measures into the HMP

Informed planning, mitigation, monitoring, and adaptive management will be necessary to avoid and minimize adverse impacts to rare plant species. The implications of the Rare Plant Study, in terms of potential project impacts and opportunities for mitigation, will be addressed in the Habitat Management Plan. Specifically, the HMP will detail the various effects the project might have on rare plants, along with appropriate measures to mitigate for those impacts that would have negative consequences. Prevention, mitigation, and enhancement measures will be discussed with agency, tribal, and stakeholder project participants before a project license application is filed by the project proponent.

7.3 Wildlife Study

7.3.1 Identify PHS List wildlife that is or may be present within and adjacent to the Study Area

This objective will be addressed by a combination of analysis of a literature search and the presence or absence of PHS List Priority Habitats within the Study Area in order to

develop species specific field surveys as needed to confirm any presence of PHS List wildlife within the Study Area.

7.3.1.1 Review of available information

Prior to any field investigation, biologists will perform a literature review of published and unpublished information to determine which WDFW PHS List wildlife species may be present within approximately two miles of the project. A review of WDFW PHS management recommendations and buffers for potentially present species will be performed. Additional information may be gathered through interviews with and material provided by local, state, Tribal, and private land managers, including representatives of King County, Tulalip and Snoqualmie Indian Tribes, WDFW, WDNR, USFS, Weyerhaeuser, and Hancock Forest Management.

Biologists will then determine whether any PHS habitat types occur within the Study Area and compile a potential list of PHS species that will be surveyed for during the field investigation.

7.3.1.2 Field Surveys

PHS List habitats identified entirely or partially within the study area will be mapped. A list of potentially present PHS species will be identified based on potentially suitable habitat, prior documented presence and other credible reports and information gathered as described in 7.3.1.1.

A draft list of potentially present or affected PHS species will be presented to the WDFW for field survey consideration on or before March 1st, 2013. WDFW is asked to review and approve this list for field study by March 15th, 2013. The project applicant will then present specific field survey methodology for each species identified on the list for field survey follow up to WDFW on or before March 29th, 2013. All species-specific field survey methodology shall be consistent with WDFW survey protocols for initial species presence determinations. For this list of species, the field study effort may include designating any of the remaining listed species as “presumed present” and the project applicant may elect to provide Preservation, Mitigation and Enhancement measures outright or otherwise follow and abide by WDFW management recommendations for the PHS species. The purpose for this provision is for the project applicant to accept the probable presence of the listed species without further analysis in cases for which there is prescriptive management that is achievable and compatible with the project establishment and operation.

WDFW will issue a determination of approval and concurrence of methodology, with revisions as may be directed, for the proposed list of PHS species for field survey, with any amendments as necessary, by April 12th, 2013. The applicant will then initiate and undertake the specified surveys in accordance with the WDFW reviewed and approved survey methodology.

The project applicant will perform raptor nest surveys in a manner consistent with WDFW protocols for each PHS listed raptor species and any other raptor species of specific interest to WDFW likely to occur within the Study Area. The exact methods, frequency of survey and probable dates of survey will be submitted to WDFW by March 1st, 2013 and confirmed as appropriate or amended by WDFW prior to March 15th, 2013. All potential raptor surveys are anticipated to occur between March 15th, 2013 and August 31st, 2013.

7.3.1.3 Reporting

The list of PHS Species to be field surveyed and the specific methodology approved by WDFW will be filed with the FERC and on the BCH website on the submittal and determination dates indicated in Section 7.3.1.2.

The objectives, methods, and results of the Wildlife Study will be incorporated into the Vegetation Habitat, Rare Plants and Wildlife Report, which will be released as a draft in late 2013, then presented and reviewed as follows:

Black Canyon	Initial Study Report	2/6/14	5.15(c)(1)
All stakeholders	Initial Study Report Meeting	2/21/14	5.15(c)(2)
Black Canyon	Initial Study Report Meeting Summary	3/10/14	5.15(c)(3)

7.3.2 Evaluate the potential effects of the project on the identified wildlife

Evaluating the potential impact of project construction and operation on wildlife identified in and near the project area will include an analysis of both direct and indirect effects. Potential direct effects include the displacement of individuals as a result of habitat loss due to project construction. Potential indirect effects to wildlife include issues associated with habitat fragmentation, including loss of travel corridors; changes in habitat structure, such as increased edge habitat; noise; and other issues related to

increased human presence in the area. Particular attention will be given to assessing the potential impacts to PHS wildlife species within and adjacent to the Project area.

7.3.3 Identify PME measures that could implemented if a license is issued, and incorporate those measures into the HMP

The potential project impacts on key wildlife species and mitigation measures to avoid, minimize, or counteract those effects will be evaluated and discussed further in the Habitat Management Plan. The purpose of the HMP will be to identify negative effects the project could potentially have on wildlife, and to recommend prevention, mitigation, and enhancement measures to counteract those effects. The primary emphasis will be on species listed under the ESA and on the PHS list. PHS Management Recommendations for species the project may impact will be incorporated into the Habitat Management Plan. Agency, Tribal, and stakeholder participants in the licensing process will be consulted on the recommendations before they are finalized.

8 PROGRESS REPORTING

In accordance with 18 CFR §5.11(b)(3), this section describes provisions for periodic progress reports, including the manner and extent to which information will be shared; and the time allotted for technical review of the analysis and results.

Study reports will be submitted as required by the FERC Integrated Licensing Process (ILP). The most recent schedule, issued by FERC in Appendix B of Scoping Document 1, includes a number of opportunities for progress reports, exchange of analysis and results between stakeholders, and information sharing. An agency, ngo and stakeholder meeting to review the initial proposed study plans has already occurred on October 4th and 5th, 2012. Study plan comments have been received and incorporated into this revised version. Once studies begin, the ILP also has deadlines for an Initial Study Report to be submitted, an Initial Study Report Meeting, and an Initial Study Report Meeting Summary.

9 SCHEDULE

In accordance with 18 CFR §5.11(b)(2), the schedule for conducting the study is provided in Table 1 below.

Table 1. Resource Study Schedule

Component	Completion Date*
Pre-field Review	February 28, 2013
Field Surveys	August 31, 2013
Initial Study Report filed with FERC	February 6, 2014
Study Report Meeting	February 21, 2014
Initial Study Report Meeting Summary	March 10, 2014
Final Study Report	March 31, 2014

*Dates based on schedule created and presented by FERC in Scoping Document 1 and subject to change.

10 LEVEL OF EFFORT AND COST

In accordance with 18 CFR §5.11(d)(6), the anticipated level of effort and cost are provided in Table 2 below.

The estimated cost of this work is approximately \$59,750.

Table 2. Level of Effort and Cost

Task	Labor and Expenses
Background Review	\$3,750
Field Surveys & Meetings	\$18,000
Draft & Finalize Technical Report	\$25,000
Draft & Finalize Habitat Management Plan	\$13,000
Total	\$59,750

11 REFERENCES

BCH (Black Canyon Hydro, LLC). 2012. Pre-application document for Black Canyon Hydroelectric Project FERC Project No. 14110. March 27.

California Native Plant Society. 2004. Vegetation Rapid Assessment Protocol. Prepared by the CNPS Vegetation Committee. Revised September 20.

Council on Environmental Quality. 2011. Final guidance for federal departments and agencies on the appropriate use of mitigation and monitoring and clarifying the appropriate use of Mitigated Findings of No Significant Impact. Available online at

<https://www.federalregister.gov/articles/2011/01/21/2011-1188/final-guidance-for-federal-departments-and-agencies-on-the-appropriate-use-of-mitigation-and#p-3>.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States. Publ. No. FWS/OBS-79/31. US Fish and Wildlife Service. 103 pp.

EPA (US Environmental Protection Agency). 2002. Methods for Evaluating Wetland Condition: Biological Assessment Methods for Birds. EPA-822-R-02-023. Office of Water, US Environmental Protection Agency, Washington, DC.

Hall, F.C., L.W. Brewer, J.F. Franklin, and R.L. Werner. 1985. Plant communities and stand conditions. Pages 17-31 in E.R. Brown, ed. Management of wildlife and fish habitats in forest of western Oregon and Washington, Parts 1 and 2. Publication No. R6-F&WL-192-1985, US Forest Service, Portland, OR.

Henderson, J.A., R.D. Leshner, D.H. Peter, and D.C. Shaw. 1992. Field Guide to the Forested Plant Associations of the Mount Baker-Snoqualmie National Forest. Technical Paper R6 ECOL TP 028-9 1. US Department of Agriculture, Forest Service Pacific Northwest Region. June.

NRCS (Natural Resources Conservation Service). 2012. WETS Table for Snoqualmie Falls station WA7773. Available at <http://www.wcc.nrcs.usda.gov/>.

Snohomish PUD (Snohomish Public Utility District). 2011a. Pre-Application Document, Calligan Creek Project, FERC Project No. 13948, Washington. September.

———. 2011b. Pre-Application Document, Hancock Creek Project, FERC Project No. 13994, Washington. September.

USFWS (US Fish and Wildlife Service). 2012a. National Wetlands Inventory Wetlands Mapper. <http://www.fws.gov/wetlands/Data/Mapper.html>.

———. 2012b. Endangered Species Program Overview. On the web: <http://www.fws.gov/endangered/about/index.html>.

WDFW (Washington Department of Fish and Wildlife). 2012a. Priority Habitats and Species List. <http://wdfw.wa.gov/conservation/phs/list>.

———.2012b. Agency website. <http://wdfw.wa.gov>.

WDNR (Washington Department of Natural Resources). 2012a. Mount Si Natural Resources Conservation Area. http://www.dnr.wa.gov/AboutDNR/ManagedLands/Pages/amp_na_si.aspx. Accessed August 2, 2012.

———.2012b. Natural Heritage Program website. Accessed at http://www.dnr.wa.gov/researchscience/topics/naturalheritage/pages/amp_nh.aspx.

Whiteaker, L., J. Henderson, R. Holmes, L. Hoover, R. Leshner, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. Survey Protocols for Survey and Manage Strategy 2 Vascular Plants. Version 2.0. December.

12 APPENDIX A: Vegetation Habitat, Rare Plant and Wildlife Study Area

