

**FINAL WILDLIFE STUDY PLAN**

**Cascade Creek Hydroelectric Project (FERC No. 12495-002)**

**Cascade Creek LLC**

**September 2010**

## Table of Contents

1.	Introduction.....	1
2.	Background.....	1
3.	Overall Study Scope .....	1
3.1	Goals and Objectives.....	1
3.2	Resource Management Goals.....	1
4.	Project Description.....	3
5.	Study Area .....	3
6.	Potential Nexus Between Operations and Effects .....	4
7.	Study Elements .....	4
7.1	Literature Search .....	4
7.2	Terrestrial Wildlife Studies .....	5
7.2.1	Sitka Black-tailed Deer.....	5
7.2.2	Small Mammals .....	7
7.2.3	Queen Charlotte Northern Goshawk.....	9
7.2.4	Amphibians.....	11
7.2.5	Wolverine.....	14
7.2.6	Moose.....	14
7.2.7	Mountain Goat .....	15
7.3	Habitat Map.....	15
8.	Schedule.....	15
9.	Level of Effort and Cost .....	15
10.	Reporting.....	15
11.	Meetings.....	16
12.	Literature Cited .....	16
	Appendix A.....	20

## **1. INTRODUCTION**

In February, 2008, Cascade Creek Limited Liability Corporation (“CCLLC”) received a Preliminary Permit (“Permit”) from the Federal Energy Regulatory Commission (FERC) for the Cascade Creek hydroelectric Project (FERC No. 12495-002, “Project”). The proposed Project would be located approximately 15 miles N.E. of Petersburg, Alaska, and may involve effects to resources associated with Swan Lake, Falls Lake, Cascade Creek, Thomas Bay, and Frederick Sound.

## **2. BACKGROUND**

Generally, the Project would consist of construction and operation of an intake structure and an outlet control structure at Swan Lake; a power conduit consisting of a mostly unlined 12 foot diameter tunnel; and a steel penstock leading to a powerhouse located at tidewater on Thomas Bay. Installed capacity of the Project would be approximately 70 megawatts (MW). The current run of the river operational proposal would draw water from Swan Lake at a rate congruent with inflow in a manner that maintains natural lake level fluctuations. A subsea and overhead transmission line will be installed to transmit generated power from the Project site to a substation located near Petersburg.

During initial consultation and scoping, Project stakeholders including state and federal resource agencies indicated concern for Project effects on wildlife resources within the project area and close proximity. A Draft Wildlife Study Plan was prepared to address these concerns, as related to Scoping Document 1. More recently, Scoping Document 2 has been prepared and is being issued simultaneously with this Final Wildlife Study Plan. This Final Wildlife Study Plan reflects comments from stakeholder review of the Draft Wildlife Study Plan and stakeholder coordination through the development of Scoping Document 2.

## **3. OVERALL STUDY SCOPE**

### **3.1 *Goals and Objectives***

This study plan is designed to provide pre-development baseline data on terrestrial resources in areas potentially affected by the Project. This data would be used as part of a separate process and document to examine potential effects of hydro development associated with run-of-the-river operations of the proposed Cascade Creek Hydroelectric Project.

Evaluations of effects to federally listed threatened and endangered wildlife pursuant to the Endangered Species Act (ESA) and sensitive species listed by the U.S. Forest Service (USFS) will be evaluated in a separate document, the Biological Assessment/Evaluation.

### **3.2 *Resource Management Goals***

This study plan will provide baseline information to agencies with jurisdiction over wildlife resources allowing them to address potential project effects. This information will assist agencies in identifying appropriate Protection, Mitigation and Enhancement measures (PM&Es) for the

Project license according to their respective management goals. The following summarizes the various agencies that have provided commentary and feedback on the Project to date.

The project occurs on lands administered by the USFS, specifically, the Tongass National Forest. The Tongass National Forest administers their resources guided by the National Forest Management Act (NFMA), which is the chief statute governing the administration of national forests. The NFMA requires the Tongass National Forest to evaluate their lands and build a management program based on multiple-use and sustained-yield principles. This management program, entitled The Tongass Land and Resource Management Plan (TMLP) functions as a guide for management activities as well as institutes management standards for the Tongass National Forest. Within the TMLP, management plans are outlined for Forest service designated species, which include Management Indicator Species (MIS) and Forest Service Sensitive Species. MIS represent species whose response to land management activities can be used to predict the probable response of other taxa with similar habitat requisites. MIS are selected because their population level changes are thought to indicate the effects of management activities. Sensitive species are so designated because their population viability is a concern on the Tongass National Forest. These populations or the population's habitat exhibits or are predicted to exhibit a significant downward trend. The goal of the Forest Service Sensitive Species Program is to prevent federal listing under the ESA.

Terrestrial wildlife and freshwater fish resources are administered by the U.S. Fish and Wildlife Service (USFWS). The mission of USFWS is to “conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.” In doing so, USFWS enforces wildlife laws, protects endangered species, manages migratory birds, and helps to restore important fisheries. They administer the ESA, designed to protect imperiled species from going extinct. Species are added to the ESA by either a candidate assessment process, where agency officials identify candidates; or a petition process, where any interested party can petition the Secretary of the Interior to add a candidate. USFWS also administers the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). The MBTA prevents the “take” of migratory birds. A bird is considered migratory under the MGTA if it spends any part of its lifecycle across an international border. The BGEPA offers even further protection for bald and golden eagles.

The Alaska Department of Fish and Game (ADFG) seeks to provide the public the opportunity to utilize the state's fish and wildlife, ensure the sustainability of the resources, supply information about and involve the public in management of the resources, while protecting the state of Alaska's sovereignty to manage these resources. He ADFG identifies Species of Special Concern, which are defined as “any species or subspecies of fish or wildlife or population of mammal or bird native to Alaska that has entered a long-term decline in abundance or is vulnerable to a significant decline due to low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbance.” The ADFG provides for recovery efforts for taxa designated a Species of Special Concern, mitigates significant threats to those species and attempts to identify the species before federal listing becomes necessary.

While FERC is the lead agency for the National Environmental Policy (NEPA) document for this project, the Environmental Protection Agency (EPA) is the overall agency responsible for

administering and assuring adequacy of the NEPA process holistically, and is directed by the Clean Air Act to oversee environmental projects associated with major federal activities. Effects to wildlife must be considered as part of the NEPA process.

The Alaska Natural Heritage Program (AKNHP) is a clearinghouse for information on Alaskan species of conservation concern. AKNHP “collects, validates, and distributes this information, and assists natural resource managers and others in applying it effectively.”

#### **4. PROJECT DESCRIPTION**

The current description of the project, including both transmission line alternatives being considered under the NEPA is detailed in Scoping Document 2.

#### **5. STUDY AREA**

Wildlife studies will be conducted at various levels of intensity within the project area depending on the anticipated impacts on wildlife and their habitat. Study areas described in the following plan will be referenced relative to:

##### **Upper Cascade Creek**

- This study area comprises the portion of Cascade Creek that flows from a natural fish barrier, approximately 1 mile upstream of Swan Lake, and drains into Swan Lake. The area also encompasses Spring Creek running parallel to Upper Cascade Creek for approximately 1 mile upstream of Swan Lake.

##### **Swan Lake**

- This study area encompasses Swan Lake and its immediate surroundings and includes the intake for the tunnel system and any temporary staging or storage areas during project construction on the shoreline of Swan Lake.

##### **Lower Cascade Creek Corridor**

- This includes Cascade Creek between the Swan Lake outlet and the Falls Lake inlet, and from Falls Lake inlet along Cascade Creek to its discharge in Thomas Bay. This area also includes Falls Lake and the Pond area between Falls Lake and Swan Lake.

##### **Project Powerhouse and Tunnel**

- The tunnel. This portion of the project lies between the intake at Swan Lake, continuing 13,100 feet in two horizontal and one vertical section in a southwesterly direction to the powerhouse site, and is entirely underground.
- The powerhouse site. This includes the area between the point in which the tunnel daylights, shaft, penstock, 8-acre powerhouse pad, tailrace, and any temporary staging and storage areas during construction.

### **Transmission Line Routes**

- Thomas Bay Subsea Transmission Line. This includes the subsea transmission line between the powerhouse site and the overhead transmission connection on the eastern shore of Point Agassiz Peninsula.
- Point Agassiz Overhead Transmission Line. This includes the overhead transmission line and access corridor from the shore of Thomas Bay, southwest approximately 6 miles to the subsea initiation at Frederick Sound just north of Agassiz South Base.
- Frederick Sound Subsea Transmission Line. This includes the section initiating at the point where the overhead transmission line becomes subsea from the western shores of Point Agassiz Peninsula and crosses Frederick Sound southwest to the eastern shores of Mitkof Island.
- Petersburg Overhead Transmission Line. This includes the point at which the Frederick Sound Subsea Transmission Line connects to the eastern shores of Mitkof Island approximately 1 mile south of Petersburg, and continues over land to the substation.

## **6. POTENTIAL NEXUS BETWEEN OPERATIONS AND EFFECTS**

Based on generalizations of the project description in Scoping Document 2, effects of proposed project construction and operations may be derived from disturbance and habitat modification along transmission corridors and in facility infrastructure areas. Likewise, the EPA provided comment requesting evaluation of the potential effects on wildlife habitat from destruction, alteration, and habitat fragmentation caused by roads, transmission corridors, and other management and human activities. The USFS also expressed concern that there may be temporary habitat loss associated with the project, and additional information may be needed for those wildlife species that occur in the project area. Species-specific project nexuses are discussed in the respective “Study Objectives” section for each species.

## **7. STUDY ELEMENTS**

The Wildlife Study Plan includes the following elements:

- A detailed literature search to gather existing data and information on all wildlife resources in the area;
- Field surveys to note presence, relative abundance, life history and habitat descriptions and use of wildlife species in the project area;
- Habitat and vegetation map resulting from on-the-ground field surveys, above, combined with aerial surveys and existing vegetation mapping.

### **7.1 *Literature Search***

A literature review will be conducted to develop a complete list of wildlife species known and with potential to occur in the Project area. Primary sources will include, but not be limited to:

- USFS Tongass National Forest survey and planning reports noting any sensitive species, species of special concern, or indicator species;
- ADFG periodic wildlife surveys, harvest records for big game, wildfowl, trapping and other activities, and records of subsistence uses and takes in the overall area;
- USFWS for information on federally-listed threatened, endangered or candidate species;
- AKNHP listings for important and sensitive species;
- Academic libraries of the University of Alaska and its affiliates in southeast Alaska, as well the Environment and Natural Resources Institute, Anchorage; and
- Cultural Resources researchers to assure inclusion of tribal knowledge of distribution, importance and use of wildlife species in the affected area.

## 7.2 *Terrestrial Wildlife Studies*

### 7.2.1 Sitka Black-tailed Deer

#### *Overview*

The Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) is endemic to Alaska and is the state's only native deer. This species is found in Southeast Alaska and northwest British Columbia. This species of deer has been found on nearly all islands within the Alexander Archipelago where the climate is less severe than those of mainland Alaska. Accordingly, deer populations tend to be denser on the islands of Southeast Alaska than on the mainland (Schoen, J. and Dovichin, 2007). This deer is considered a MIS to the USFS.

The Sitka black-tailed deer is of significance to the Project because this species is used more than any other terrestrial species in Southeast Alaska for hunting and subsistence. In addition, this species is an important food source for wolves and black bears. Sitka black-tails largely favor old-growth forests (USFS 2008). Changes to land cover type resulting from overland transmission line development could affect populations in the project area.

#### *Life History and Habitat*

Sitka black-tails use a variety of habitats throughout the year from coastal beaches to alpine areas, but tend to favor old-growth forests throughout the year. Old growth is important during the winter, as well, because of snow interception provided by the canopy and the abundance of understory forage common in these forests. The Sitka black-tail is generally found at elevations below 800 feet during winter months due to deep snow cover at higher elevations. During summer months, the range of the Sitka black-tail is largest as this species will move up in elevation and may be found in alpine meadows above tree line. Spring and summer habitats are vital to the recovery of this species because severe winters may cause deer to be severely malnourished (Schoen, J. and Dovichin, 2007).

During springtime the range of the Sitka black-tail increases as the snow melts and edible plants emerge at higher elevations. In late-May and early-June fawns are born, generally between sea level and 1,500 feet elevation. Migration of this species continues upwards in June as the snow continues to melt, and by late-June or early July, black-tails may occupy subalpine meadows of elevations up to 3,000 feet that contain abundant herbaceous forage among patchily distributed Sitka spruce (*Picea sitchensis*) and mountain hemlock (*Tsuga mertensiana*). Downward

migration generally begins in September with the first frosts and the desiccation of high-country forage plants (Schoen, J. and Dovichin, 2007).

The rut, or breeding season, begins in late-October and continues through the end of November. Deer are distributed between sea level and 1,500 feet in elevation during this time and occupy old-growth, forest openings and muskeg. From December through March, Sitka black-tails are generally confined to limited areas within old-growth forests that remain largely free of snow and provide forage throughout the winter months. Upward movement of this species is largely dictated by snow levels during the winters. Mature hemlock spruce forests provide Sitka black-tails with the best habitat during severe winters (Schoen, J. and Dovichin, 2007).

### ***Study Objectives***

The purpose of this study is to assess the relative quality and availability of winter range habitat in the Cascade Creek project area. This information will be used to establish a baseline for future monitoring of Sitka black-tailed deer winter range.

### ***Methodology***

#### ***Deer Winter Range Assessment***

Suitable winter range habitat will be evaluated using methodology that was originally developed by Kirchhoff and Hanley specifically for deer in Southeast Alaska known as the “Quick-Cruise Method”. This methodology provides an efficient and standardized evaluation of habitat for big game winter range habitat, based on the characteristics described in the *Life History and Habitat* section above (Kirchhoff and Hanley, 1992).

The Quick-Cruise Method allows biologists to quantify variables affecting habitat quality such as forage composition and quality, topography, and snow cover. Quality of habitat is quantified using a simple scoring method that assigns highest value to the most suitable winter range habitat for deer. Generally speaking, suitable winter range habitat for Sitka black-tailed deer is characterized by abundant and nutritious forage, minimal snow cover, nearby permanent unfrozen waters, flatter ground, slope aspects that are more likely to remain free of snow (Kirchhoff and Hanley, 1992).

The specific methodology, evaluation criterion, and scoring methods are outlined in the *Deer Winter Range Stand Exam Form* developed by Kirchhoff and Hanley, 1992, which is included in Appendix A. Correspondingly, winter range habitat criterion includes:

#### Forage (50% of total score)

- Shrubs (Blueberry)
- Forbs (Bunchberry/Goldthread/5 leaf Bramble)
- Nutritional Quality (Overstory canopy cover; shaded areas indicate higher nutritional value)
- High Value Species within 100’ of Plot Center (Huckleberry/Skunk Cabbage/Shield Fern)

#### Snow Conditions (50% of total score)

- Snowfall

- Elevation
- Distance from Coast
- Snow Interception
- Snow Melt (Evaluation of slope and aspect)
- Shading (Angle to horizon)

For each stand, the observer will fill in all fields contained in the exam form such as stand number, observer(s), date, etc. In addition, the presence or absence of deer, abundance of pellet groups, evidence of bedding, trails, condition of vegetation, snowdrifts, and animal scat, etc. will be noted (Kirchhoff and Hanley, 1992).

Previously harvested areas do not provide high-quality winter forage for deer; therefore a stratified approach will be used to identify all productive old-growth (POG) stands within 500 feet of the proposed overland transmission line on Agassiz Peninsula. These POG stands will be overlaid with a random grid of sampling points spaced 450 feet apart utilizing Geographical Information System (GIS) software. Additionally, three sampling points will be located in the vicinity of the powerhouse site. All completed sampling points will be averaged by POG stand to provide a baseline of overall quality of winter range habitat. At points located along POG stand edges, field staff will move into the interior of the stand to an area more accurately representative of the stand as a whole. Locations of the survey points will be identified in the field by GPS.

Although this field method does assess snow conditions, it is not a requirement that data is collected during winter months because the snow conditions criterion are based on geographical features such as shading and elevation rather than analysis of the actual snowpack in the area (Kirchhoff and Hanley, 1992).

### ***Work Product***

The work product will be a report summarizing the data collected from all winter range habitat assessments. The final report will include maps delineating winter range habitat and locations of all surveys, and recorded observations. Photographs of winter range habitat may also be included.

## **7.2.2 Small Mammals**

### ***Overview***

Southeast Alaska is home to a large number of small mammal species that largely fall into the following categories of taxa: shrews, rodents, pikas, mustelids, and hares. Many of the species within these taxa are endemic and exist in isolated populations due to the naturally fragmented landscapes common to this part of the state. The fragmented landscapes include the Alexander Archipelago islands and narrow corridors or “bottlenecks” of habitat that result from the complex glacial history in the region.

This study focuses on “endemic species,” which are defined by the USFWS as a species native and confined to a certain region and having comparatively restricted distribution. The 2008 Tongass Forest Plan further emphasizes endemic studies to include endemic terrestrial mammals

with a focus on small (voles, mice, and shrews) and medium-sized (ermine and squirrels) endemic mammals with limited dispersal capabilities.

Endemics are generally more vulnerable than non-endemics to natural or human-caused disturbances because of their limited geographic extent. In addition, small mammals are an important source of food for predators in the area (USFS 2008). The Cascade Creek project has the potential to affect local small mammal populations through surface disturbances resulting from the development of overhead transmission lines, powerhouse site, penstock, access roads and outbuildings. Small mammals have been included in this wildlife study plan for these reasons and based on comments made by the ADFG that the temporary loss of habitat from development activities is of concern.

### ***Life History and Habitat***

Small mammals in southeast Alaska have not been studied to the extent of larger mammals and other species of concern in the region. For this reason, knowledge of distribution and population of small mammal communities in the area are patchy at best. However, species that have been documented within one hundred miles of the Cascade Creek project site include the flying squirrel (*Glaucomys sabrinus*), hoary marmot (*Marmota caligata*), red squirrel (*Tamiasciurus hudsonicus*), American beaver (*Castor canadensis*), western jumping mouse (*Zapus princeps*), long-tailed vole (*Microtus longicaudus*), meadow vole (*Microtus pennsylvanicus*), southern red-backed vole (*Clethrionomys gapperi*), northern red-backed vole (*Myodes rutilus*), common muskrat (*Ondatra zibethicus*), northwestern deer mouse (*Peromyscus keeni*), northern bog lemming (*Synaptomys borealis*), cinereus shrew (*Sorex cinereus*), dusky shrew (*Sorex monticolus*), American water shrew (*Sorex palustris*), ermine (*Mustela ermine*), marten (*Martes americana*), and the American mink (*Neovision vision*) (MacDonald and Cook 2007). Of these species, the ermine and marten are designated Species of Conservation Concern (ADF&G 2006). There may, however, be additional undocumented sensitive species living in the study area.

Although many of these species have distinct habitat requirements, small mammals in southeast Alaska do share general preferences. Small mammals are almost always found in or near areas that provide adequate cover from weather such as tall grasses and shrubs. Other habitat features that are favorable for a wide variety of small mammals include logs, burrows and in areas at the bases of trees (Manly et. al. 2006). In southeast Alaska, diversity and populations of small mammals tend to be greatest in scrub and herbaceous habitats and lower in area of dense, closed canopy. Second growth stands that have abundant understory vegetation have been found to support high densities of small mammals (USFS 2008).

Specific food preferences vary among small mammals and a comprehensive description of specific food requirements for each of the small mammal species listed above is beyond the scope of this wildlife plan. However, brief descriptions for some of the species listed in this document are summarized below. Shrews tend to be opportunistic feeders that eat insects, spiders, beetles and on occasion, nesting rodents. Flying squirrels are omnivorous and feed on various insects, fungi, lichens, berries, seeds, green vegetation and will occasionally eat meat, young birds and eggs. Voles are primarily herbivores and tend to feed on a variety of grasses and sedges, but occasionally feed on eggs of ground-nesting birds (Alaska Natural Heritage Program 2010).

### ***Study Objectives***

The purpose of this study is to establish baseline data regarding which species of small mammals occur in and around the Cascade Creek Hydroelectric Project area.

### ***Methodology***

Small mammals will be surveyed using Sherman Live Traps. The sampling design used in this study is adapted from the methodology for small mammal trapping described in the USDA Forest Service Multiple Species Inventory and Monitoring (MSIM) Technical Guide (Manly et. al. 2006). The use of this MSIM technique and any adaptations to this methodology are summarized below, but the user is referred directly to the referenced methodology for a complete description of steps that will be taken in the field.

Small mammal surveys will be conducted using extra long (XLK model, 7.6 by 9.5 by 30.5 cm) and extra large (XLF15 model, 10.2 by 11.4 by 38cm) Sherman Live Traps throughout the study area supplemented with pitfall traps. This combination of traps should provide a more accurate description of small mammal community composition, as it allows for the sampling of the entire range of species that may be present in the study area. Transects will originate from 3 randomly selected stations along the transmission corridor and one transect placed at the powerhouse location. A transect method is appropriate for this wildlife study since it is more efficient than grid arrangements and because transect studies will adequately sample the long narrow transmission corridors. Transects will consist of 10 traps placed in a line centered at the point-count station, placed 20 meters apart (to accommodate average home-range size of most small mammals), and run perpendicular to the corridor trajectory. Traps will remain in place for three days in each survey area and checked at least twice daily.

All small mammal data will be recorded on the following form which is included in Appendix A:

- *Sherman Live Trapping Form*

### ***Work Product***

The work product will be a report that summarizes the data collected from all trapping activities. The report will describe relative species composition for small mammals in the area affected by the powerhouse and transmission line corridor. Maps will be included in the final report that includes locations of all surveys and recorded observations by species. Photographs of specimens may also be included in the final report.

## **7.2.3 Queen Charlotte Northern Goshawk**

### ***Overview***

The Queen Charlotte subspecies of the northern goshawk is endemic to coastal forests from the northern portion of southeast Alaska to Vancouver Island in British Columbia, Canada. The goshawk is rated as a USFS Sensitive Species and a MIS on the Tongass National Forest, is included in the yellow category of Audubon WatchList 2010 (USFS 2008), and is designated an Alaska Species of Special Concern. The Queen Charlotte northern goshawk is believed by ADFG to inhabit the Thomas Bay area on a year-round basis. The northern goshawk has been included in this wildlife study plan due to the potential loss of nesting habitat and effects to

breeding, nesting, and foraging goshawks. The ADFG specifically requested inclusion of nest activity surveys for this species in the Wildlife Study Plan.

### ***Life History and Habitat***

The northern goshawk is present year-round in southeast Alaska, preferring mature and old-growth stands with an open understory for foraging and nesting. Goshawks often select larger trees within stands for nesting. An abundance of this type of habitat exists in the project area.

The “Conservation Assessment for the Northern Goshawk in Southeast Alaska” (Iverson et al. 1996) provides information on nesting chronology in the southeast panhandle region of Alaska, of which egg laying begins the second week of March to May 24; eggs hatch between May 12 and June 23; nestlings fledge between June 23 and August 4; and fledglings disperse from natal territories between August 2 and September 13. Goshawks may use the same nest for multiple years, build a new nest in the same or different stand, or reuse an old nest. Both males and females construct nests. In southeast Alaska, goshawk diet is largely comprised of a few key species: blue grouse spp., medium-sized birds (e.g. Steller’s jay and varied thrush), and red squirrels (USFS 2008).

Large-scale industrial timber harvest has contributed to a decline of goshawks in the Pacific Northwest. Logging activities cause nests to be lost due to tree-cutting, produce nest abandonment and severely diminish appropriate nesting habitat (Squires et al. 1997)

### ***Study Objectives***

The purpose of this study is to assess presence/absence of the northern goshawk including nesting activity in and around the proposed Cascade Creek Hydroelectric Project.

### ***Methodology***

Northern goshawk surveys will be conducted using a modified protocol established by Kennedy and Stahlecker (1993) and further described in the 2006 U.S. Department of Agriculture Northern Goshawk Inventory and Monitoring Technical Guide, and modified in the Broadcast Acoustical Survey (BAS) methods adapted for projects in the Tongass National Forest (Stangl 2009).

Goshawk surveys will be conducted along the terrestrial portion of the transmission line corridor. Survey stations will be established 200 meters apart along a single transect the length of the transmission line corridor. Areas of 40 acres or less that may be developed, such as the powerhouse site, will be surveyed from a minimum of four locations at each boundary of the development area (north, south, east and west).

Broadcast Acoustical Surveys will be completed between June 1<sup>st</sup> and September 1 of 2010. Any documented nests will be visited and surveyed for activity, occupancy and determination of alternate nests in the area (Stangl 2009). A digital amplifier will be used at each call station to sound the juvenile begging or wail call. Broadcast calls will be made at an angle of sixty degrees for a period of ten seconds, followed by a 30 second listening and watching period. This sequence will be completed two more times at each station, approximately 120 degrees from the last broadcasts. A minimum of four minutes will be spent at each station. When time permits,

one minute will be spent watching and listening before broadcasting and up to five minutes will be spent watching and listening after the last call has been made. While travelling between stations, surveyors will listen and watch for responsive northern goshawks as well as any nests or sign. Broadcasting will take place in rainy and windy conditions only if the weather is not expected to interfere with broadcast results.

All data collected during northern goshawk surveys will be recorded on the following form, Appendix A:

- *Tongass NF Goshawk & Wildlife Survey Form*

### **Work Product**

The work product will be a report that summarizes the data collected from all northern goshawk surveys, particularly nest locations and status. Maps will be included in the final report that include locations of all survey points, goshawk sightings and nest locations.

## **7.2.4 Amphibians**

### **Overview**

Alaska hosts a variety of amphibian species, of which wood frogs (*Rana sylvatica*) and western toads (*Bufo boreas*) are the most common and widespread. Southeast Alaska is considered the northernmost extreme of the range for all amphibian species found in the study area except for the woodfrog and the western toad. The red-legged frog (*Rana aurora*) and the pacific chorus frog (*Pseudacris regilla*) are listed as nonnative species (MacDonald 2003).

The Alaska Natural Heritage Program database reports occurrences of western toads and Columbia spotted frogs (*Rana luteiventris*) in the immediate vicinity of the Cascade Creek Hydroelectric Project area. Wood frogs, long-toed salamanders (*Ambystoma macrodactylum*), and roughskin newts (*Taricha granulosa*) have been reported within 30 miles of the project area. Other amphibians that also occur in Alaska but have not been observed within at least 100 miles of the project site include northwestern salamanders (*Ambystoma gracile*), pacific chorus frogs, red-legged frogs and the enigmatic Alaska worm salamander (*Batrachoseps caudatus*) (ADFG 2006).

Amphibians are often considered indicator organisms, meaning the relative health of amphibian populations can be used to track large-scale changes in environmental quality and ecosystem functions. These species serve well as bioindicators because amphibians have highly permeable skin and eggs, which makes them sensitive to toxins and changes in moisture and temperature conditions. Amphibians also occupy a key trophic role in both aquatic and terrestrial ecosystems functioning as consumers of invertebrates and as prey for larger animals (ADFG 2006).

Amphibian populations around the world are declining rapidly, however, research is lacking on amphibian populations in Alaska. Significant declines have been noted for the western toad within the state, but little is known about total populations or current trends of other amphibians that are found in the state. Loss and degradation of habitat are major factors for amphibian decline on a global level, but there are many unknowns as to why amphibian populations are declining so rapidly. Several fungal diseases, such as chytrid fungus, have been discovered

recently and pose major threats to amphibians worldwide. Chytrid fungus has been documented in Alaskan amphibians. Many scientists consider cumulative effects to be the major factor; i.e., the combination of habitat degradation and other environmental effects such as climate change, which are contributing to reduced amphibian populations globally. Other common sources of mortality for amphibians include increased UV-B radiation, predation from introduced fish and amphibian species and damage to immune systems from pesticides and other pollutants. Amphibian populations in Alaska appear to have higher rates of deformity than in most areas within the United States but reasons for this are not yet known (ADFG 2006, Woodford 2006).

In Alaska, amphibians are managed by Alaska Department of Fish and Game under statute 16.05.030, in which amphibians are legally included in the definition of “fish”. This statute makes it illegal for anyone to “hold, transport or release” any native amphibians without a valid permit. The species occurring in the project vicinity are not currently listed as threatened or endangered under state or federal law, but the Columbia spotted frog is a candidate under the ESA. All species potentially occurring in the Cascade Creek project area are listed in Table 4 (MacDonald 2003).

Amphibians exhibit a high degree of site fidelity to breeding sites. For this reason, comprehensive field efforts will be completed to assess potential impacts to these areas resulting from dewatering or changes in water levels in Lower Cascade Creek, the Pond area and Falls Lake. Such field efforts are especially important because even relatively minor changes in water levels at these sites could greatly increase the likelihood of local population extinctions in the project area due to habitat degradation or loss. Although the total amount of suitable amphibian habitat in the project area is relatively small compared to the forested area, the assessment area comprises some of the only complex aquatic habitats in the vicinity. Therefore, amphibians in this area are potentially vulnerable to change because populations would be concentrated. In addition to their global and local sensitivity, amphibians have been included in this wildlife study plan based on comments made by USFWS to the Draft Wildlife Resources Study Plan.

### ***Life History and Habitat***

Although phenology of aquatic habitat use by amphibians within the Cascade Creek project area varies, these species are normally associated with freshwater during all or parts of the year. All amphibian species are associated with aquatic habitats during the breeding season and western toads and roughskin newts utilize upland terrestrial habitat outside of the breeding season. Aquatic habitat for these amphibians generally includes quiet waters such as backwaters, beaver ponds, marshes, springs, and slower sections of rivers and streams. Shallower waters are typically used for eggs and larval development. During the larval stage, amphibians filter feed on small, suspended aquatic invertebrates, plant material, or bottom detritus. After metamorphosis, amphibians feed on various small terrestrial and aquatic invertebrates (ADFG 2006, MacDonald 2003).

Except for the Columbia spotted frog, which is an aquatic obligate, migrations toward breeding grounds begin in early spring. Oviposition occurs from April to July, depending on the species, weather conditions and elevation. Exact timing of breeding for Alaskan amphibians is relatively unknown as compared to other amphibians in the United States. Breeding may occur later in the year due to the relatively higher elevation at Swan Lake than along lower Delta Creek. Hatching

takes between one week and several weeks, depending on the species. Larval development occurs during the summer and metamorphosed juveniles will migrate towards winter hibernacula beginning in the fall. Characteristics of winter hibernacula vary between different amphibian species but generally consists of various types of cracks and crevices such as those located beneath downed woody debris. Some juveniles will remain in the ponds during the first winter but will migrate to other winter hibernacula the following fall (MacDonald 2003).

**Table 4. Amphibian species potentially occurring in the project area.**

Species	Status	Occurrence	Habitat	State Trend
Northwestern Salamander ( <i>Ambystoma gracile</i> )	ADFG, S3, ESA PS	Not Likely	Muskeg ponds, freshwater lakes	Very little information is known about this species, considered rare; only three specimens collected in Alaska
Long-toed Salamander ( <i>Ambystoma macrodactylum</i> )	ADFG, S3	Likely	Broad range, sea level to mountainous	Unknown; relatively common throughout its range, generally threatened by introduction of nonnative fish species and habitat fragmentation due to development
Roughskin Newt ( <i>Taricha granulose</i> )	ADFG, S4	Likely**	Forested freshwater bodies	Very little information is known about this species
Western Toad ( <i>Bufo boreas</i> )	ADFG, S3S4, ESA PS	Likely	Broad range, sea level to mountainous	Formerly considered abundant and widespread in SE Alaska, sharp declines are being noted
Pacific Chorus Frog* ( <i>Pseudacris regilla</i> )	SNR	Not Likely	Muskeg ponds, freshwater lakes	Remains confined to pond system where it was originally introduced
Wood Frog ( <i>Rana sylvatica</i> )	ADFG, S5	Likely	Diverse vegetation, permanent or ephemeral waters	Overall population and trends are unknown, although expected to be stable or slightly declining. Recent high incidence of abnormalities reported in core of range is cause for concern. In many areas wood frogs are no longer present at historical breeding sites in Alaska.
Columbia Spotted Frog ( <i>Rana luteiventris</i> )	ADFG, S2, BLM S, ESA PS	Likely	Highly aquatic, permanent waters	Population status is unknown, although suspected to be low.
Red-legged Frog* ( <i>Rana aurora</i> )	SNR, ESA PS	Unlikely/Unknown	Dense vegetation, permanent waters	This species has not yet been studied in Alaska
Alaska Worm Salamander ( <i>Batrachoseps caudatus</i> )	SR	Unknown (Enigmatic)	Unknown	No confirmed observations of this species in Alaska in over 100 years, validity of original observations considered questionable

\* Denotes an invasive species.

\*\* Observed in study area during field reconnaissance in June, 2010

ADFG: Legally protected from taking

BLM S: Sensitive

ESA PS: Partial status, U.S. Endangered Species Act of 1973, as amended by the U.S. Fish and Wildlife Service and the U.S. National Marine Fisheries Service (as of October 2002)

S1: Critically Imperiled— Critically imperiled in the jurisdiction because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the jurisdiction.

S2: Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3: Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4: Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5: Secure—Common, widespread, and abundant in the nation or state/province.

SNR: Unranked—National or subnational conservation status not yet assessed.

SR: Reported to occur.

### ***Study Objectives***

The purpose of this study is to assess potential amphibian species composition, particularly those that are sensitive, and to evaluate habitat suitability in the Project area. The results of this assessment will be used to develop PM&Es for amphibians.

### ***Methodology***

An intensive literature review will be conducted to determine which species could potentially occur in the Project area. The assessment of potential presence/absence will be based on records and anecdotal information on current and historical distribution; presence according to life cycle and phenology (i.e., breeding, migration, estivation etc.); observations during other field investigations related to the Project; and availability of suitable habitat in the Project area.

Additionally, all habitat potentially affected by the Project will be evaluated for amphibian suitability and mapped. Aerial imagery and topographic maps will be used, along with field reconnaissance to perform this evaluation.

The presence/absence assessment and habitat suitability map will be used to develop appropriate recommendations for construction and/or operational mitigation measures pertaining to amphibians.

### ***Work Product***

The work product will be a report that summarizes the above information along with an amphibian habitat suitability map, which will include delineations of amphibian habitat and locations of all incidental observations. If available, photographs of amphibian habitat and incidental observations will be included in the final report.

#### **7.2.5 Wolverine**

ADFG will be conducting these studies.

#### **7.2.6 Moose**

ADFG will be conducting these studies.

### 7.2.7 Mountain Goat

ADFG will be conducting these studies.

### 7.3 *Habitat Map*

The EPA expressed concern that the proposed project may have impacts on wildlife habitat and habitat connectivity, and that the NEPA document should describe the current quality and potential capacity of habitat as well as its use by wildlife on and near the proposed project area, and identify known wildlife corridors, migration routes, and areas of seasonal wildlife congregation.

Using a combination of aerial and ground photos, topographic and existing resource maps as a primary data source, researchers will survey and document habitat features including vegetation community composition, estimates of relative percent cover of dominant species (e.g. willow, alder, cottonwood, sedges, forbs, grasses) and seral stage. Aerial imagery will be ground-truthed in accessible areas. Significant habitat features such as slopes, springs, rock outcrops, caves, mineral licks, wetlands, snags, dens and related will be catalogued. These surveys will be closely coordinated with botanical resource specialists who will be surveying the same areas for detailed plant distribution and abundance.

## 8. SCHEDULE

Terrestrial wildlife studies will be conducted according to the schedule in Table 5.

**Table 5. Terrestrial Wildlife Study Schedule**

<b>Activity</b>	<b>Time Frame</b>
Sitka black-tailed deer winter range assessments	August 1 to September 30, 2010
Small mammal trapping	August 1 to September 30, 2010
Charlotte Queen northern goshawk surveys	June 1 to August 31, 2010

## 9. LEVEL OF EFFORT AND COST

CCLLC finalized an agreement with OASIS Environmental, Inc. (OASIS) in July 2010 and will utilize the services of OASIS to develop the Wildlife Study Plan and conduct related field and reporting activities. In addition, OASIS staff will serve as a liaison for CCLLC to lead the Wildlife Study Group meetings and associated reporting. Estimates for the level of effort and cost are to be determined.

## 10. REPORTING

These wildlife and habitat studies will be carried out until September 30, 2010. A progress report documenting the wildlife and habitat surveys will be distributed monthly to the Wildlife Study Group beginning in September 2010. The progress reports will summarize preliminary survey information on wildlife studies that occurred during the past month and an outlook on wildlife

studies that will occur in the coming month. Additionally, survey reports for each field study will be submitted to agency stakeholders by January 31, 2011. Survey reports will include the following information:

- **Methods.** The author(s) will describe observation methods, including sites, dates, observations recorded (wildlife numbers and species, weather, etc, as described above) identification keys used and other items.
- **Results.** Authors will describe the results of the surveys and other recorded data. Study area base maps will be used to the extent possible to identify wildlife locations from the surveys, noting habitat utilization and life history activities. Observations of sensitive species, including ESA-listed and -candidate species will be noted. Any initial reports of ESA-listed and -candidate species will prompt discussions with USFWS to determine if additional study effort is needed.
- **Discussion.** This section will be brief and limited to general discussions of species present, timing and habitat utilization, as they relate to other areas in Southeast Alaska, and to any previous data collected in the project area. More intensive interpretation of these data in terms of species importance, impacts and mitigation measures will be done as part of development of the relicensing NEPA documents.
- **Recommendations.** This section will focus on evaluation of previous studies and ways in which they might be improved. In successive months this section will be used to evaluate effectiveness of changes and the extent to which proposals have been achieved.

## 11. MEETINGS

An initial Wildlife Study Group meeting will be held on August 12, 2010 prior to the beginning of 2010 field work. This meeting will be part of an overall stakeholder meeting, to include agency, client, and researcher representatives for the Aquatic Resources Study Plan and possibly representatives for other study plans. The objective of the meeting will be to discuss the study approach and make any revisions necessary to address the needs of the participating agencies. After the meeting, CCLLC will provide draft meeting minutes for review, and, following finalization of the minutes and incorporation of revisions to the plans directed at the meeting, the Study Plan for the Wildlife for the Project will be adopted as final.

The Wildlife Study Group will meet on a quarterly basis to discuss the progress of the implementation of the Final Wildlife Study Plan, or any updates to the Revised Draft Wildlife Study Report. Meeting times and a draft agenda will be developed at the Wildlife Study Group meeting on August 12, 2010.

## 12. LITERATURE CITED

ADFG [Alaska Department of Fish and Game]. 2006. *Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources*. Alaska Department of Fish and Game, Juneau, Alaska. xviii+824 p.

Alaska Natural Heritage Program. 2010. Mammals Tracking Lists and Status Reports. Accessed July, 28, 2010 from:

[http://aknhp.uaa.alaska.edu/zoology/Zoology\\_Mammals\\_track08.htm#LAGOMORPHA](http://aknhp.uaa.alaska.edu/zoology/Zoology_Mammals_track08.htm#LAGOMORPHA)

Iverson, G. C., G. D. Hayward, K. Titus, Kimberly; E. DeGayner, R. E. Lowell, C. D. Crocker-Bedford, P. F. Schempf, and J. Lindell. 1996. Conservation assessment for the northern goshawk in southeast Alaska. Gen. Tech. Rep. PNW-GTR-387. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 101 p.

Kennedy, P. L. and D. W. Stahlecker. 1993. Responsiveness of nesting northern goshawks to taped broadcasts of 3 conspecific calls. *Journal of Wildlife Management* 57:249-257

Kirchhoff, M. D. and T. A. Hanley. 1992. A Quick-Cruise Method for Assessing Deer Winter Range in Southeast Alaska. Habitat Hotline, Issue No. 92-1. Juneau, Alaska.

MacDonald, S.O. 2003. The Amphibians and Reptiles of Alaska: A Field Handbook . Unpublished report to U.S. Fish and Wildlife Service, Juneau, AK. Retrieved on July 21, 2010 from: <http://www.alaskaherps.info/>

MacDonald, S.O. and J.A. Cook. 2007. Mammals and amphibians of Southeast Alaska. The museum of Southwestern Biology, Special Publication 8:1-191.

Manley, P.N., B. Van Horne, J. K. Roth, W. J. Zielinski, M. M. McKenzie, T. J. Weller, F. W. Weckerly, and C. Vojta. 2006. Multiple species inventory and monitoring technical guide. Gen. Tech. Rep. WO-73. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. 204 p.

Pearson, D.E. and L. F. Ruggiero. 2003. Transect versus Grid Trapping Arrangements for Sampling Small-Mammal Communities. *Wildlife Society Bulletin*, Vol. 31, No. 2 (Summer, 2003), pp. 454-459

Schempf, P. 2001. Raptor Management Plan for Alaska. U. S. Fish and Wildlife Service, Juneau, unpublished report. 91pp.

Squires, J. R. and R. T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the *Birds of North America Online*: <http://bna.birds.cornell.edu/bna/species/298doi:10.2173/bna.298>

Stangl, J. T. 2009. Tongass National Forest project level goshawk inventory protocol. USDA Forest Service, Sitka, Alaska. 9 pp.

USFS [U.S. Forest Service], 2008. Tongass Land and Resource Management Plan, Final Environmental Impact Statement, Plan Amendment, Volume I. Forest Service R10-MB-603c

Willson, M. F., S. M. Gende, and B. H. Marston. 1998. Fishes and the Forest. *Bioscience* 48:455-463.

Woodbridge, B. and C. D. Hargis. 2006. Northern goshawk inventory and monitoring technical guide. Gen. Tech. Rep. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p.

Woodford, R. 2006. Toads and Frogs in Trouble. Alaska Fish and Wildlife News, March 2006. Retrieved on July 23, 2010 from:

[http://www.wc.adfg.state.ak.us/index.cfm?adfg=wildlife\\_news.view\\_article&issue\\_id=36&articles\\_id=197](http://www.wc.adfg.state.ak.us/index.cfm?adfg=wildlife_news.view_article&issue_id=36&articles_id=197)

Page Intentionally Blank

# APPENDIX A

## Survey Forms and Protocols

---

## DEER WINTER RANGE STAND EXAM FORM

Project Area: \_\_\_\_\_ Date: \_\_\_\_\_ Unit #: \_\_\_\_\_

Survey Team: \_\_\_\_\_

Survey Name: \_\_\_\_\_ GPS PT Name: \_\_\_\_\_

### FORAGE (50% of total score)

(1) Shrubs (*Vaccinium* spp) (20 pts)

(a) Abundance within 6' plot - % Blueberry Cover

75 % 10

50-75 % 8

25-50 % 6

5-25 % 4

1-5 % 2

Absent 0

(b) Plant Height (Most twigs are)

< 4 feet 2

> 4 feet 1

(1) Total \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

8.1.1 Blueberry Cover X Plant Height

(2) Forbs (*Bunchberry*/*Goldthread*/*5-leaf Bramble*) (15 pts)

Abundance within 6' plot cover - % Cover

> 20 % 15

5-20 % 10

1-5 % 5

Absent 0

(2) Total \_\_\_\_\_

(3) Nutritional Quality (5 pts)

Over story canopy within 100'

> 40 % 5

< 40 % 0

(3) Total \_\_\_\_\_

(4-6) High Value Species within 100' (10 pts)

(4) Huckleberry (*Vaccinium parvifolium*)

Present 4

Absent 0

(4) Total \_\_\_\_\_

(5) Skunk Cabbage

Present 3

Absent 0

(5) Total \_\_\_\_\_

(6) Shield Fern

Present 3

Absent 0

(6) Total \_\_\_\_\_

(7) FORAGE SUBTOTAL (Add Lines 1-6)

(7) Total \_\_\_\_\_

(7) Total \_\_\_\_\_

### Snow Conditions (50% of total score)

(8) Elevation (Snowfall 15 pts)

0-500 ft. 15

500-1000 ft. 10

1000-1500 ft. 5

1500 ft. 0

(8) Total \_\_\_\_\_

(9) Distance from Coast (5 pts)

< 0.5 mile 5

0.5-3.0 miles 3

> 3.0 miles 1

(9) Total \_\_\_\_\_

(10) Snow Interception (15 pts)

10+ count 15

8-9 count 13

6-7 count 11

4-5 count 8

2-3 count 4

0-1 count 0

(10) Total \_\_\_\_\_

(11) Snow Melt (10 pts)

(b) Aspect

South 5

West 3

(a) Degrees

< 15 1

2

> 15 2

2

East

North 0

Flat

(11) Total

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

*Slope X Aspect (10 pts)*

(12) Shading (Angle to Horizons 5 pts)

> 30 degrees 0

15-30 degrees 3

< 15 degrees. 5

(12) Total \_\_\_\_\_

(13) SNOW SUBTOTAL (Add Lines 8-12)

(14) Add Lines 7 and 13

TOTAL (out of 100 possible) \_\_\_\_\_

Plant Association Code: \_\_\_\_\_

Data Entered: Excel \_\_\_ GIS \_\_\_ FAUNA \_\_\_



**OTHER INFORMATION** (Use "N" if Not recorded)

**Ranger District** \_\_\_\_\_  
ANM CRD HRD JRD KMRD PRD SRD TBRD WRD YRD

**Reason for Survey** \_\_\_\_\_ (K) Known Nest (T) New Nest Search  
(O) Observation (H) Potential Habitat (C) Convenience (R) Random

**Travel Used to Conduct Transect** \_\_\_\_\_  
(F) Foot (A) Auto (P) Plane (H) Helicopter (K) Kayak (S) Skiff (T) Ranger Boat

**Precipitation** \_\_\_\_\_ (L) Light Rain (R) Rain (H) Hail (S) Snow (D) Dry

**Wind** \_\_\_\_\_ (C) Calm (L) Light (M) Moderate (H) High (V) Variable

**Cloud Cover** \_\_\_\_\_ ☉ Clear (P) Partly (L) Light (M) Moderate (O) Dark (F) Fog

**MIS & OTHER WILDLIFE SURVEY RESULTS**

**DEER : Total # Pellets:** \_\_\_\_\_ **High Use Areas Mapped (yes/no)** \_\_\_\_\_

**Type of Deer Sign** (track, trail, bed) \_\_\_\_\_

**Average Browse** Low Medium High **Quick Cruise Plot (yes/no)** \_\_\_\_\_

**BEAR: Total # Sign:** \_\_\_\_\_ **High Use Areas Mapped (yes/no)** \_\_\_\_\_

**Type of Bear Sign** (scat, rub, dig, bed, forging area) \_\_\_\_\_

**Average Use** Low Medium High

**Check if Observed/Heard** Bald Eagle \_\_\_\_\_ Black Bear \_\_\_\_\_ Brown Bear \_\_\_\_\_

Brown Creeper \_\_\_\_\_ Canada Goose \_\_\_\_\_ Hairy Woodpecker \_\_\_\_\_

Marten \_\_\_\_\_ Mountain Goat \_\_\_\_\_ Murrelet \_\_\_\_\_ Red Squirrel \_\_\_\_\_

Red -breasted Sapsucker \_\_\_\_\_ Red-tail \_\_\_\_\_ River Otter \_\_\_\_\_

Sharp shinned \_\_\_\_\_ Sitka BT Deer \_\_\_\_\_ Swan \_\_\_\_\_ Wolf \_\_\_\_\_

**Other Species Observed/Heard:**

Data Entry: Excel Goshawk \_\_\_\_\_ Excel Wildlife Observation \_\_\_\_\_ FAUNA \_\_\_\_\_

GIS Entry: Survey Points \_\_\_\_\_ Survey Route \_\_\_\_\_ High Bear/Deer Use \_\_\_\_\_ Goshawk Habitat \_\_\_\_\_ Wildlife Obs \_\_\_\_\_

Nest Data Entry: Excel Nest Summary \_\_\_\_\_ GIS nests \_\_\_\_\_

**GOSHAWK & WILDLIFE SURVEY FORM**

Project Area/Nest Name : \_\_\_\_\_ Date: \_\_\_\_\_

Survey Name \_\_\_\_\_ Trail/Road/Unit #: \_\_\_\_\_  
(VCU, Year, Month, Day, Survey #, Survey Point Range 12002005070201(1-9))

**GOSHAWK SURVEY (Be sure to Include a Map!)**

**VCU** \_\_\_\_\_ **Year** \_\_\_\_\_ **Month** \_\_\_\_\_ **Day** \_\_\_\_\_

**Survey #** \_\_\_\_\_ **# Points** \_\_\_\_\_ **Survey Type (BC, NS, VW)** \_\_\_\_\_  
(BC) Broadcast Call (NS) Nest Search (VW) Valley Watch

**Surveyors:** \_\_\_\_\_

**Surveyor Qualification:** Experienced Limited None

**Total Time:** Start \_\_\_\_\_: \_\_\_\_\_ End \_\_\_\_\_: \_\_\_\_\_ **Total Minutes** \_\_\_\_\_

**# Broadcast Call Stations:** \_\_\_\_\_ **Type:** Alarm \_\_\_\_\_ Wail \_\_\_\_\_ Both \_\_\_\_\_

**Total Number of Valley/Watch Stations:** \_\_\_\_\_

**GOSHAWK SURVEY RESULTS** **Observation (Yes/No):** \_\_\_\_\_

**Quality Habitat Obs (Yes/No):** \_\_\_\_\_

**Method of Obs:** Visual \_\_\_\_\_ Visual/Aural \_\_\_\_\_ Aural \_\_\_\_\_ Unknown \_\_\_\_\_

**Time Obs:** \_\_\_\_\_: \_\_\_\_\_ **# Detected:** \_\_\_\_\_ **Survey Point #** \_\_\_\_\_

**Reproductive Status:** Failed Non-reproducing Reproducing NA Unknown

**Group Type:** Family Pair Group Single Unknown

**Number/Gender (male, female, unknown) of Goshawk Observed:**

Adult \_\_\_\_\_ Juvenile \_\_\_\_\_ Fledgling \_\_\_\_\_ Nestling \_\_\_\_\_ Egg \_\_\_\_\_ Unknown \_\_\_\_\_

**Activity of Goshawk:** \_\_\_\_\_  
(flight, perch, in nest, incubate, brood, beg, roost, territorial behavior, forage)

**Nest Location:** Documented \_\_\_\_\_ New \_\_\_\_\_

**Nest/Obs GPS Pt Name:** \_\_\_\_\_ **Pt Type:** WGS84 \_\_\_\_\_ List Other \_\_\_\_\_

Lat \_\_\_\_\_ Long \_\_\_\_\_

