Bird and Bat Conservation Strategy for the Horse Butte Wind Facility

Prepared for

Horse Butte Wind I LLC

Prepared by

SWCA Environmental Consultants

December 2013

BIRD AND BAT CONSERVATION STRATEGY FOR THE HORSE BUTTE WIND FACILITY

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1 INTRODUCTION

In 2009, Utah Associated Municipal Power Systems (UAMPS) began coordinating with Bonneville County, the U.S. Fish and Wildlife Service (USFWS), the Idaho Department of Fish and Game (IDFG), and the East Idaho Uplands Sage-grouse Local Working Group regarding construction of the Horse Butte wind energy generation project (Project) located outside of Idaho Falls in Bonneville County, Idaho.[1] UAMPS acted as the Project developer and sold the Project to Horse Butte Wind I LLC (HBW). UAMPS is the sole purchaser of the power generated by the Project.

UAMPS has invested significant time and resources in characterizing wildlife use in the Project Area through site-specific wildlife studies. UAMPS hired SWCA Environmental Consultants (SWCA) to conduct baseline wildlife studies at the Project site to fully understand the impacts to wildlife from the construction, operation, maintenance, and decommissioning of the wind facility. Pre-construction wildlife surveys began in 2009 and were informed by USFWS guidelines on minimizing wildlife impacts from wind turbine development and communications with local USFWS and IDFG biologists. Since wildlife studies began in 2009, UAMPS has coordinated closely with USFWS and IDFG and in the process has obtained their endorsement on wildlife survey methodology[2] and disclosed the results of wildlife surveys as soon as they are available. UAMPS has visited with USFWS and IDFG on several occasions over the past four years to disclose and discuss the results of these surveys. Additionally, UAMPS corresponded with and attended meetings of the East Idaho Uplands Sage-grouse Local Working Group.

As the Project developer, UAMPS obtained use permits authorizing development of the Project from Bonneville County in December 2010 and January 2011. The use permit record includes documentation of UAMPS' efforts and commitment to coordinate with USFWS and IDFG regarding wildlife studies for the Project. While there is currently no means or mechanism to obtain a permit for programmatic take of birds protected by the Migratory Bird Treaty Act of 1918, as amended (MBTA) from operation of an otherwise lawful activity, UAMPS believes it has made a good-faith effort to implement reasonable and effective measures to avoid take.

Construction of the Project began in the fall of 2011 and the Project began commercial operation on August 15, 2012. Development of the Project was already well underway when USFWS published its *Land-Based Wind Energy Guidelines* on February 8, 2011 and March 23, 2012 (Guidelines). UAMPS has made good-faith efforts to keep abreast of and become familiar with the Guidelines and to work with USFWS regarding how to apply the tiered approach recommended in the Guidelines, and to implement those portions of the Guidelines relevant to the continuing activities of the Project. The Project is considered to be an "on-ramp" project, construction of which was nearly complete at the time the voluntary Guidelines were released. The draft Guidelines (USFWS 2011a) as well as the current version of the Guidelines (USFWS 2012a) acknowledge that for projects already in the development or operational phase, implementation of all tiers of the recommended approach may not be applicable or possible. The 2012 Guidelines advise Project proponents with operating or soon-to-be operating facilities to consider where the Project is in the planning process relative to the appropriate tier and inform the Service what actions they will take to apply the Guidelines. UAMPS has consistently coordinated with the Service throughout the project planning and operation phases and been receptive to USFWS recommendations on how the Project can be more consistent with the Guidelines. A combined draft Bird and Bat Conservation Strategy (BBCS) and Eagle Conservation Plan (ECP) was provided to the USFWS

[1] See Appendix A for correspondence documenting UAMPS' efforts to coordinate development of the Project with USFWS and IDFG. These efforts are referenced throughout this BBCS.

[2] *Id.*

for review in October 2012. USFWS provided feedback and comments on the draft BBCS and ECP in July 2013. This stand-alone BBCS responds to those comments and incorporates USFWS feedback.

UAMPS initiated post-construction avian fatality searches in September 2012. UAMPS has set up an account in the USFWS Bird Fatality/Injury Reporting System (BIMRS). Avian fatalities associated with operation of the facility are being documented and species protected under the Endangered Species Act of 1973, as amended (ESA), MBTA, Bald and Golden Eagle Protection Act of 1940, as amended (BGEPA) and are reported to the USFWS Office of Law Enforcement (OLE) through the BIMRS.

1.1 Purpose of the Bird and Bat Conservation Plan

The purpose of this BBCS is to avoid and minimize risk to birds protected under the MBTA and BGEPA. It also documents the steps that UAMPS has taken and plans to take to avoid, minimize, and mitigate Project-related impacts to avian and bat species. Although this Project was developed prior to issuance of the USFWS Guidelines (USFWS 2012a), it is understood that the USFWS will exercise discretion in applying the Guidelines to existing projects, and this BBCS represents Project efforts to meet the intent of the law and the Guidelines.

1.2 Legal Drivers and Permit Compliance

The Project is subject to all relevant federal, state, and local statutes, regulations, and plans. The federal regulatory framework for protecting birds includes the ESA, the MBTA, the BGEPA, and Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

The ESA offers federal protection for imperiled species and for the habitats they depend on. The ESA establishes penalties for taking, killing, harming, or possessing listed species without a permit. The ESA also requires that "critical habitat" be designated for listed species when "prudent and determinable." Critical habitat may include areas that are not currently occupied by the species at the time of listing, but are essential to its conservation. No birds or bats listed under the ESA occur in the Project Area.

The MBTA offers federal protection for all species of migratory birds, including eagles and other raptors. The MBTA, which is administered by the USFWS, is the basis of migratory bird conservation and protection in the United States. Under the MBTA, it is unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Unlike the ESA, there are no provisions or permits that allow for incidental take under the MBTA.

All migratory birds are covered under the MBTA, while the BGEPA specifically protects bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). As recommended by the USFWS, UAMPS has prepared an ECP SWCA 2013a) as a good-faith effort to supplement this BBCS in order to specifically and proactively address potential impacts to eagles, resulting from the construction and operation of the Project. The BGEPA prohibits anyone without a permit from "taking" bald eagles and golden eagles, their parts, eggs, or nests. *Take* is defined by the BGEPA as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb;" the BGEPA's definition of *take* differs from the definition in the ESA in that it does not include habitat destruction or alteration, unless such damage "disturbs" an eagle. *Disturb* is defined as "to agitate or bother to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." The MBTA prohibits incidental "take" of migratory birds—more than 1,000 species (50 Code of Federal Regulations [CFR] 10 and 21), including the golden eagle—their parts, eggs, or nests "at any time, by any means." *Take* is defined by the MBTA as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.” Under the MBTA, “take” does not include habitat destruction or alteration, as long as it does not involve a known direct taking of birds, nests, or eggs.

On September 11, 2009 (50 CFR 13 and 22), the USFWS set in place rules establishing two new permit types under the BGEPA: (1) take of bald and golden eagles that is associated with, but not the purpose of, the activity; and (2) purposeful take of an active or inactive nest where necessary to alleviate a safety emergency; an inactive eagle nest when the removal is necessary to ensure public health and safety; an inactive nest that is built on a human-engineered structure and creates a functional hazard that renders the structure inoperable for its intended use; or an inactive nest, provided the take is necessary to protect an interest in a particular locality and the activity necessitating the take or the mitigation for the take will, with reasonable certainty, provide a clear and substantial benefit to eagles. The USFWS has a process for issuing the new permits for take of bald and golden eagles at wind energy facilities (50 CFR 13 and 22) and recommends that project proponents prepare a BBCS to avoid, minimize, and otherwise mitigate project-related impacts to birds and bats and specifically golden eagles to ensure no net loss to the golden eagle population.

Title 36 of the Idaho Statute sets forth laws governing the management of wildlife in the State of Idaho (IDFG 2010). Section 103 of the Title authorizes the Idaho Fish and Game Commission to administer wildlife policy in the state and mandates that “All wildlife, including all wild animals, wild birds, and fish, within the state of Idaho, is hereby declared to be the property of the state of Idaho. It shall be preserved, protected, perpetuated, and managed.” Title 36-202 IC defines *wildlife* as “Wildlife shall mean any form of animal life, native or exotic, generally living in a state of nature.” As such, IDFG maintains a statewide *Comprehensive Wildlife Conservation Strategy* (IDFG 2005). Under Title 36 Chapter 11 it is unlawful, with few exceptions, for a person to take any game animals, birds, or “fur bearing animals” in Idaho.

1.3 UAMPS Corporate Policy

UAMPS is a governmental agency that provides comprehensive wholesale electric energy, on a nonprofit basis, to community-owned power systems throughout the Intermountain West. The UAMPS membership consists of 45 members from Utah, Arizona, California, Idaho, Nevada, New Mexico, Oregon, and Wyoming. UAMPS partners with its members to provide affordable and reliable electricity to their customers.

Upon the direction of its members, UAMPS sought development of the Horse Butte Wind Project in order to provide its members with a form of renewable energy generation. The Project is one of 15 projects that UAMPS members may participate in and is UAMPS’ first renewable energy project. UAMPS is the sole purchaser of power generated by the Project.[3] The output from the Project provides renewable energy for 24 UAMPS members in five states.

1.4 Project Description

HBW constructed the Project on 17,897 acres of private land in Bonneville County, Idaho (Project Area). The Project is located approximately 15 miles east of Idaho Falls (Figure 1). The Project’s goals are to generate affordable renewable energy and renewable energy credits for UAMPS and its members.

The Project is a wind generation facility that includes 32 turbines producing approximately 57 megawatts (MW) of power, built on leased private lands. The Project is accessed via existing public roads, primarily

[3] HBW has contracted with UAMPS to implement the post-construction mitigation measures and adaptive management discussed in Section 6 of this document.

the Kepps Crossing Road, and new roads accessing turbines and other infrastructure. All facilities associated with operation and maintenance of the Project are included in the Project Area. The facilities include, but are not limited to, the following:

- 32 wind turbines, foundations, and pad-mounted transformers
- On-site operations and maintenance facilities
- Electrical substations
- One permanent meteorological (met) towers and three temporary met towers[4]
- Access roads and crane pads necessary for construction and maintenance of all wind turbine generators[5]
- A buried electrical energy collection system between turbines
- Two short segments of overhead line (approximately 150 feet long) from the Horse Butte substation to the Cattle Creek substation and from the Cattle Creek collection substation to the existing Palisades-Goshen 115-kilovolt (kV) transmission line constructed to American Power Line Interaction Committee (APLIC [2006]) standards
- A temporary concrete batch plant for turbine foundations and other construction requirements

1.5 Pre-construction Site Selection

UAMPS conducted a feasibility analysis using Sagebrush Energy, LLC (Sagebrush) and Idaho National Laboratories (INL) to assess the wind resource at the Project site. In addition to the Horse Butte project site, UAMPS also evaluated others sites in the surrounding area. It was determined that Horse Butte project site had a good wind resource profile and could be developed by UAMPS directly, which was the least cost option. V-Barr was hired to model the site using the compiled wind data (after INL and Sagebrush's initial feasibility work); with V-Barr's assistance additional met towers were added. Utilizing that data from the new met towers, V-Barr began micro-siting where to locate the turbines. Around the same time (2009), UAMPS engaged SWCA to characterize the baseline conditions of plant and wildlife resources located in and around the Project Area. Wildlife surveys were initiated in February 2010. The results of these surveys are presented below in Section 2. At this stage, UAMPS and SWCA initiated conversations with IDFG and USFWS staff to seek their input on the Project's development. Based on the results of the raptor and eagle nest surveys, a string of seven proposed turbines at the west edge of the Project Area was relocated to avoid potential impacts to a cluster of golden eagle nests.

[4] The temporary met towers will not remain for the life of the project but are to assess the feasibility of Phase 2. The permanent met tower does not have guy wires, because it is a lattice tower. The three temporary met towers do have guy wires and have bird diverters on those guy wire lines.

[5] Access roads were created to grant access to the wind turbine generators. Some portions of the access roads were pre-existing and previously used by the landowners for agricultural purposes or as access roads for their property. UAMPS estimates 85% of access roads are new roads. The crane pads were reclaimed after construction by de-compacting and reseeding.

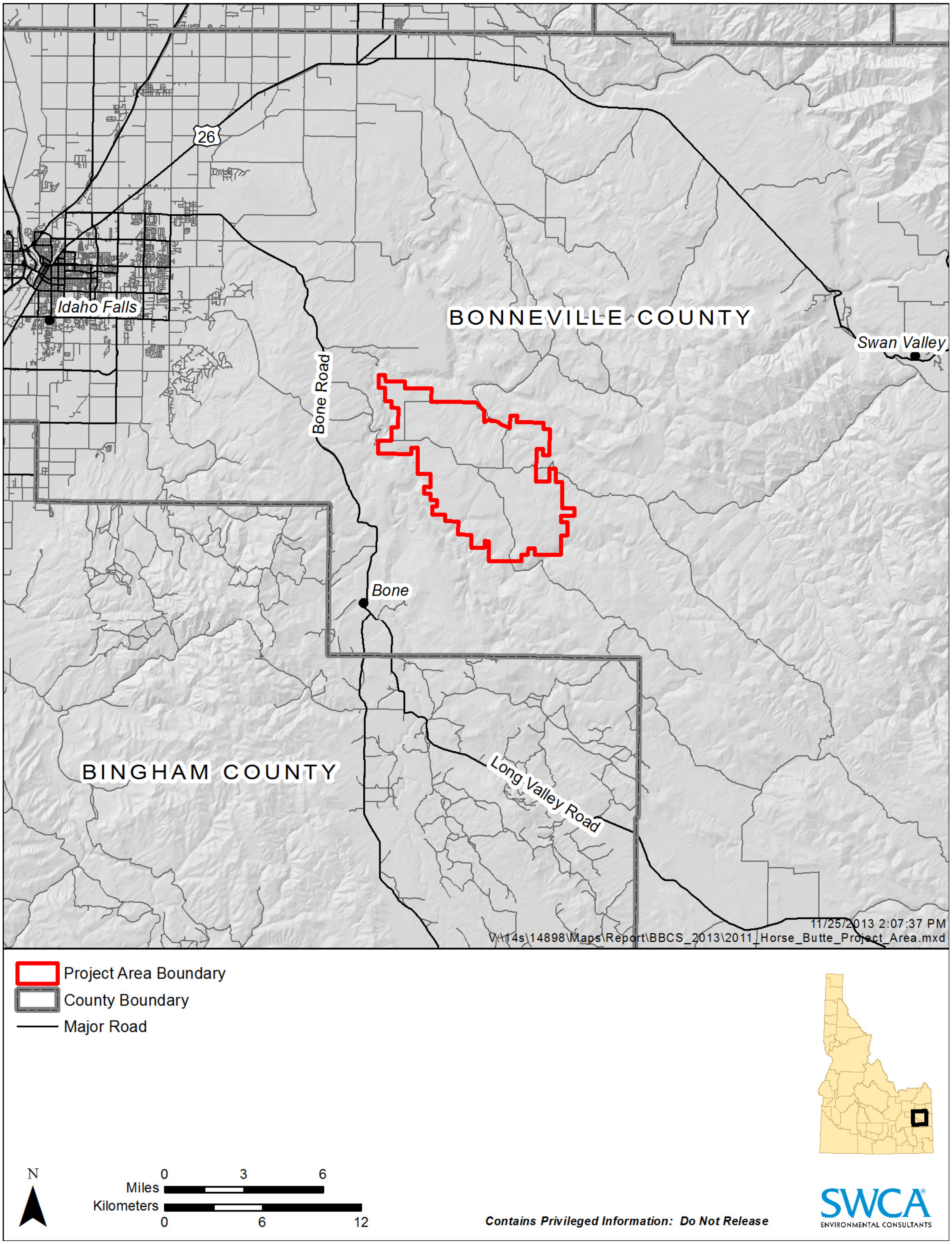

Figure 1. Horse Butte Project Area.

1.6 Environmental Setting

Although the Project is considered an on-ramp project because construction was nearly complete at the time the USFWS Guidelines (USFWS 2012a) were issued, UAMPS did characterize habitat at the Project site starting in 2009 site prior to undertaking development. UAMPS has also frequently coordinated with USFWS and IDFG via phone, email, and face-to-face meetings on many occasions since 2009 regarding the presence of wildlife and their associated habitats (see Appendix A).

Multiple site reconnaissance and habitat assessment surveys were conducted in 2009 and 2010 to identify and document plant communities, topography, and wildlife habitats in and within 1 mile of the Project Area (collectively referred to as the “Study Area”). The size of the original Project Area was 8,175 acres. The size of the original Study Area was 20,534 acres. In 2011, the size of the Project Area was increased from 8,175 acres to 17,897 acres, and thus the Study Area was also expanded at that time from its previous size of 20,543 acres to 37,718 acres. The Project Area boundary was expanded once additional leases were obtained from landowners and the expanded conditional use permit was acquired from Bonneville County.

The Project Area ranges from an elevation of 5,886 feet to 8,342 feet above mean sea level. Vegetation in the Project Area is dominated by agricultural and grassland plant communities. Agricultural lands consist of dry farm crops and fallow fields. In addition, much of the agricultural land has been seeded with crested wheatgrass (*Agropyron cristatum*) and other common seeded grass species, and is managed as Conservation Reserve Program (CRP) lands. Within the Project Area smaller areas of sagebrush, Utah juniper woodland, riparian, and aspen communities are interspersed with the agricultural lands. The agricultural plant community in the Study Area primarily consists of monotypic vegetation, which results in relatively low avian species diversity compared with the sagebrush and aspen stringer habitats. There are also other plant communities in small quantities interspersed through the area that provide habitat for wildlife. These plant communities include riparian habitats and cliff habitat. Table 1 provides a list of all landcover types, according to the 2006 National Land Cover Data (NLCD; Fry et al. 2011), that occur within the Project Area boundary. Based on field observations during the avian surveys, the NLCD underestimates the acreage of agricultural lands and overestimates the acreage of shrub/scrub habitat. The acreage of agricultural lands in the Project Area as reported by the Idaho Gap Analysis Project (GAP) (Scott et al. 2002) is 13,257 acres, which is more representative of site conditions.

Table 1. Acres of Landcover by Type in the Horse Butte Project Area

Landcover Types*	Acres
Cultivated crops	1,768
Deciduous forest	487
Developed, low intensity	29
Developed, open space	100
Emergent herbaceous wetlands	69
Evergreen forest	298
Grassland/herbaceous	4,850
Mixed forest	55
Pasture/hay	124
Shrub/scrub	10,091
Woody wetlands	26
Total	**17,897**

* National Land Cover Data (Fry et al. 2011).

The USFWS and IDFG have provided lists of special-status avian and bat species that could occur in Bonneville County. The USFWS County species list is included in Appendix B. Appendix C presents the 78 species (68 birds and 10 bats) with the potential to occur in the Study Area, listed by common name, scientific name, USFWS and Idaho status, and potential for occurrence in the Study Area.

No critical habitat for any species listed under the ESA is present in the Project Area. The Project Area does not contain lands with an Important Bird Area (IBA) designation and is not a Ramsar Convention site or Western Hemisphere Shorebird Reserve Network site. However, it is largely surrounded by the 31,000-acre IDFG Tex Creek Wildlife Management Area (WMA) (Figure 2), which is a state IBA as well as CRP lands.

The Tex Creek Wildlife Management Area (WMA) is managed by IDFG to protect wildlife and wildlife habitat. The Tex Creek WMA provides important habitat for several species of sage grouse, raptors and eagles, and migratory songbirds (National Audubon Society 2013). The WMA also provides habitat for big game including Rocky Mountain elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*), and the lower stream reaches in the WMA are fish-bearing and support native cutthroat trout (*Oncorhynchus clarkii*), introduced brook trout (*Salvelinus fontinalis*) and German brown trout (*Salmo trutta*) (IDFG 2012).

1.6.1 Riparian and Wetland Habitats

Field confirmation of National Wetland Inventory data reveals that wetlands are located within the Project Area (SWCA 2011a). They are restricted to wet meadows and riparian zones associated with drainage swales and ephemeral stream systems. SWCA identified one spring and one artesian well that appear to be more permanent sources of hydrology for some wetlands in the Project Area.

Tex Creek and Willow Creek are perennial streams adjacent to the Project Area. These waterways support narrow riparian zones in valley bottoms. Riparian vegetation generally consists of shrub/scrub communities dominated by willow (*Salix* species). Coniferous and deciduous trees, including mainly cottonwood (*Populus* species), are occasionally present along the top of the stream bank. Trees tend to be widely spaced along the stream channels, creating an open riparian canopy. No site-specific surveys were conducted for federally listed or special-status riparian- or wetland-obligate species. However, none of these species were identified during the wetland determination that SWCA conducted near the proposed new and existing access roads, turbine locations, and utility corridors in the Project Area. SWCA determined that no potentially jurisdictional waters were present in the construction footprint in the Project Area.[6]

1.6.2 Raptor Habitat and Prey Density

Woody vegetation and/or tree snags in the Project Area, along with rock ledges and other small canyons, provide potential substrates for raptor nests. Based on incidental observations, the Project Area appears to include some forage resources for large raptors. These forage resources are typical for ranchlands in southeast Idaho and include ground squirrels (*Spermophilus* spp., *Xerospermophilus* spp., *Ammospermophilus* spp.), white-tailed jackrabbit (*Lepus townsendii*), and cottontail rabbit (*Sylvilagus* spp.). As a "boom/bust" species, rabbits can be scarce in any one year but abundant in subsequent years. Observations during site surveys indicated a low potential presence of colonial rodents, such as ground

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[6] UAMPS received a letter of concurrence from the U.S. Army Corps of Engineers (USACE), dated June 15, 2012, confirming SWCA's findings and noting that "the 'study area' … is located in uplands and does not involve work in areas subject to [USACE's] jurisdiction." The USACE further concluded that the Project would not require a permit under Section 404 of the Clean Water Act.

squirrels, that may attract raptors to the area to forage. No concentrations of burrowing mammals were observed, and no prairie dog (*Cynomys* sp.) colonies were observed in the Project Area.

1.6.3 Tex Creek Canyon and Willow Creek Canyon

Tex Creek Canyon to the north and Willow Creek Canyon to the south of the Project Area are the most prominent canyons in the Study Area. Both Tex Creek and Willow Creek are perennial waterways characterized by large cliff walls, vertical cliff faces, and ledges. Tex Creek Canyon appears to also function as an avian migratory corridor based on the SWCA 2009 and 2011 fall migration surveys (SWCA 2011b). Intensive fall raptor migration studies have been conducted in the Study Area, with survey points strategically located to determine raptor migration use. Results of raptor migration studies show some movement through this canyon corridor. During fall migration surveys, many of the raptors observed during the survey were observed flying west through the Tex Creek canyon and then flying south once they were west of the Project Area.

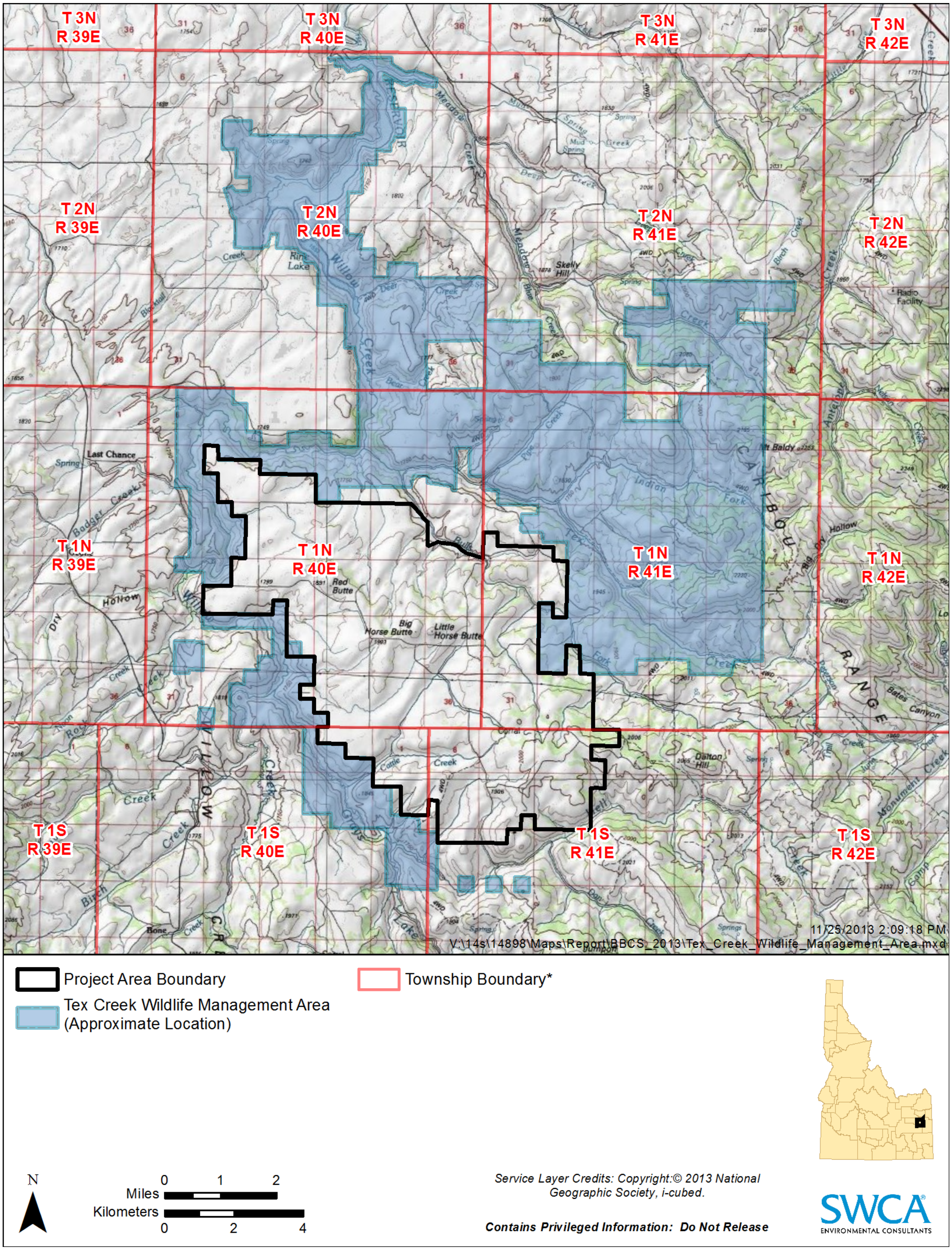

Figure 2. Tex Creek Wildlife Management Area.

2 SITE SUITABILITY AND PRE-CONSTRUCTION STUDIES

UAMPS is committed to developing this Project in the most environmentally responsible way possible. The Project was carefully planned over the course of four years with USFWS and IDFG involvement to best achieve this commitment and is based on an intensive pre-construction biological evaluation of the site, literature searches, and field studies, as described below. The USFWS office in Chubbuck, Idaho, provided input on survey methodologies, reviewed survey results and reports, and assisted with micro-siting turbines.

In January 2010, prior to conducting pre-construction biological studies, UAMPS coordinated with USFWS and IDFG regarding the biological survey methods to be used. UAMPS subsequently disclosed and discussed the results of these studies with the agencies on several occasions. Surveys conducted in 2009 and 2010 were conducted within the original Project Area, which was approximately 8,175 acres. Surveys conducted beginning in 2011 were conducted in the expanded 17,897-acre Project Area. The following is a summary of those pre-construction studies.

2.1 Raptor Nest Surveys

Raptor nest surveys conducted by SWCA from 2010 to 2013 are summarized in Table 2 according to survey dates, type of survey (aerial or ground survey), and survey location. Intensive aerial (helicopter) raptor nest surveys were conducted in the winter of 2010 in the 8,175-acre Project Area plus a 1-mile buffer (SWCA 2011c) and in the winter of 2011 in the 17,897-acre expanded Project Area plus a 1-mile buffer (SWCA 2011d). Aerial surveys were conducted in the winter as directed by USFWS to avoid the potential for disturbance to active nests by helicopter surveys. Ground-based surveys were conducted during the active nesting season (i.e., spring) in 2010 and 2011 to confirm the occupancy status of each nest. The main objective of the surveys was to document diurnal raptor nesting within and adjacent to the Project Area.

Table 2. Raptor Nest Survey Dates, Type, and Location

Survey Dates	Survey Type	Survey Location
February 23, 2010	Aerial	Original Project Area plus 1-mile buffer
March 1, 2010	Aerial	Original Project Area plus 1-mile buffer
April 30, 2010	Ground	Nests documented during 2010 aerial surveys
May 1, 2, 6, 7, 8, 13, and 14, 2010	Ground	Nests documented during 2010 aerial surveys
March 1–2, 2011	Aerial	Expanded Project Area plus 1-mile buffer
May 5, 6, 10, 12, 23, and 25, 2011	Ground	Nests documented during 2011 aerial surveys
June 12, 2012	Ground	Nests documented during 2011 aerial surveys
June 13–15, 2013	Aerial	Expanded Project Area plus 10-mile buffer*

* The June 13–15, 2013 survey was for eagle nests only, not all raptors.

The combined results of the 2010 and 2011 surveys documented a total of 80 raptor nests within the expanded Project Area (Figure 3; SWCA 2011b, 2011d). Of the 80 nests, 28 were active in 2011. Of these 28 nests, two were occupied by bald eagles, and two were occupied by golden eagles. Active eagle nests were not monitored to determine productivity. The remaining 24 active nests were occupied by non-eagle species. Forty of the 80 nests were detected within the Project Area, and 15 of those nests were active. These active nests detected in the Project Area included one golden eagle nest, nine red-tailed hawk

(*Buteo jamaicensis*) nests, one Swainson's hawk (*Buteo swainsoni*) nest, one great horned owl (*Bubo virginianus*) nest, two common raven (*Corvus corax*) nests, and one unknown hawk nest.

In 2012, SWCA did not conduct raptor nest surveys according to the protocols used in 2010 and 2011 since two years of pre-construction data had been collected. However, while conducting unrelated fieldwork in the area, SWCA made incidental observations of raptor nests, including eagle nests.

In mid-June 2013, an eagle nest survey was conducted in the expanded Project Area plus a 10-mile buffer at the request of the USFWS. In 2013, 26 eagle nests were documented; 14 of the nests were newly documented and 12 of the nests had been previously documented during surveys conducted in 2010 and 2011. Five new eagle nests were documented in 2013: two golden eagle nests and three bald eagle nests. Results of the 2012 and 2013 eagle surveys were presented in a stand-alone Eagle Conservation Plan and are not repeated in this document.

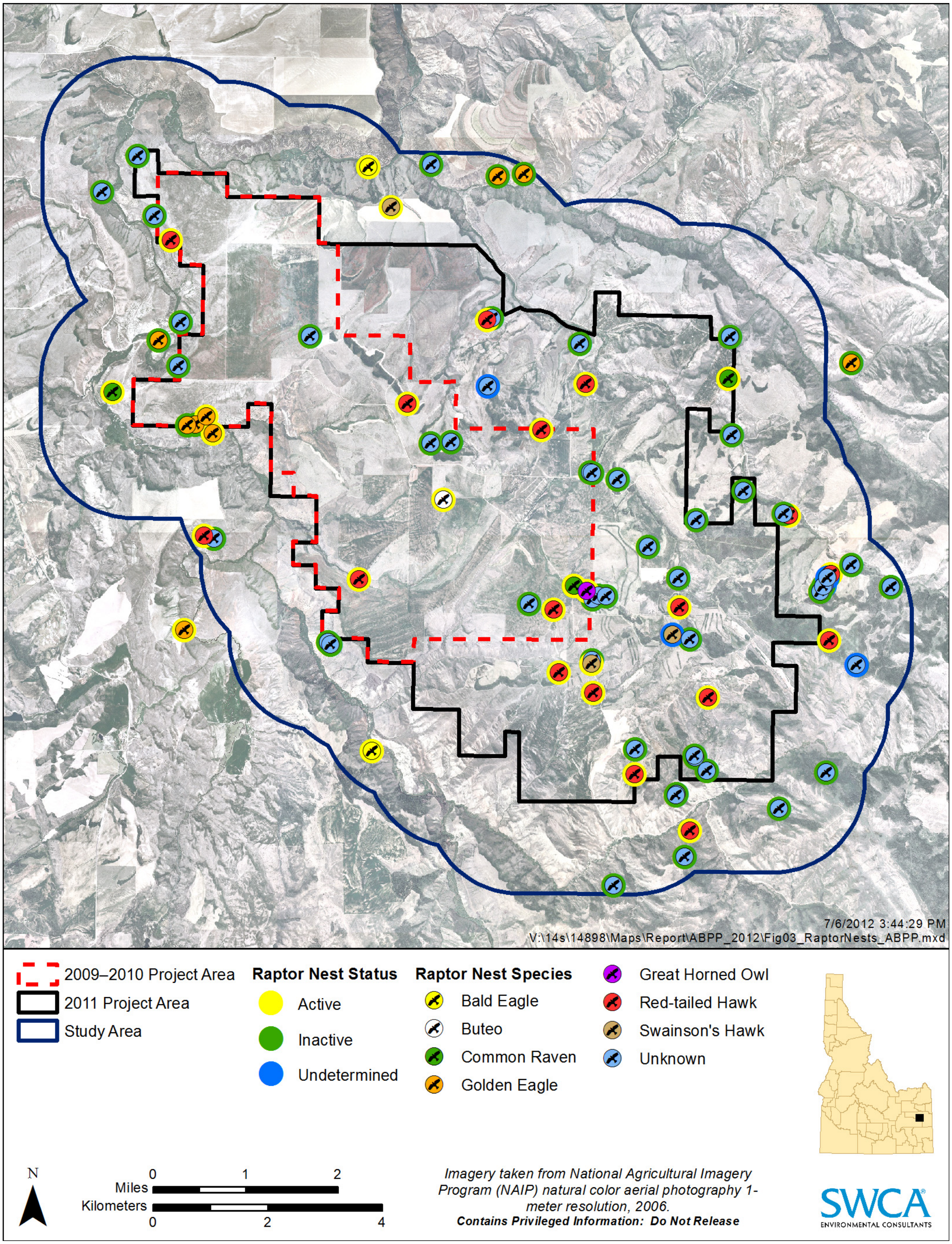

Figure 3. Raptor nest survey results, 2010–2012.

2.2 Raptor Migration Surveys

SWCA conducted a desktop analysis to determine presence of migration corridors (see Section 1.6.3) and conducted fall and spring raptor/eagle migration counts from 2009 to 2011, in coordination with USFWS. Results are summarized below.

Observation points were located at vantage points that offered unobstructed views of the surrounding terrain and airspace. The range of potential points and the general locations of these points were prescribed by the USFWS. The final location and number of points were dependent on (1) the general locations of potential turbines/core turbine areas, (2) the ability of avian surveyors to observe several potential turbine locations from a single point, and (3) the heterogeneity of the terrain and habitats. Sequence observation times covered most daylight hours and different weather conditions, such as windy days. The habitat types at the observation points consisted of sagebrush, juniper, low grass, and/or agricultural fields. However, the migration observation points were primarily selected based on quality of vantage points, ideally with good views of the surrounding landscape to maximize detection of migrating raptors.

PRESENCE OF RAPTOR MIGRATION CORRIDORS/STOPOVER SITES

Raptors tend to migrate along north-south-trending ridgelines, escarpments, upwind sides of slopes, canyons, and shorelines to take advantage of wind currents, and in the case or shorelines: to avoid large water bodies (National Wind Coordinating Collaborative [NWCC] 2010). Raptor stopover sites generally have ample food supplies (high density of small mammal prey).

Important factors when assessing potential risk of a wind facility related to raptor migration include presence of landscape features that could concentrate raptors, high densities of small mammal prey and conditions favorable to high prey densities, and raptor abundance (NWCC 2010; Smallwood and Thelander 2005).

The Project Area does not contain the specific habitat features that are known to concentrate raptors during migration. Also, as described above (see Section 1.6.2), no concentrations of burrowing mammals were observed, and no prairie dog colonies were observed in the Project Area. Landscape features that could concentrate raptors are located east of the Project Area: the north-south-trending Snake River corridor and adjacent mountains (e.g., Rendezvous Mountain) and canyons (approximately 42 miles to the northeast) and, to a lesser extent, the northwest-southeast-trending Snake River corridor and adjacent mountains (e.g., Ross Peak) and canyons (approximately 19 miles to the east). The closest known raptor migration sites, at which HawkWatch International (HWI) has conducted raptor migration studies, include the Wellsville Mountains site in Utah, the Goshutes Mountains site in Nevada, and the Commissary Ridge site in Wyoming. These sites are located roughly 125 miles to the south, 200 miles to the southwest, and 80 miles to the east of the Project Area, respectively. The Wellsville Mountains site is located south along the same north-south-trending Snake River and Rendezvous Mountain area described above.

As described in Section 1.6.3, Willow Creek Canyon (located north, west, and south of the Project Area) and Tex Creek Canyon (northeast of the Project Area) are the most prominent canyons in the Study Area. Characterized by large cliff walls, vertical faces, and ledges, these canyons contain perennial streams with riparian vegetation. Raptor migration along these canyons, as documented during the 2009–2011 surveys, is described below.

FALL MIGRATION

Fall raptor migration surveys were completed in 2009 and 2011. Survey methods were based on techniques employed by HWI (Smith 2005).

During the 2009 fall raptor migration surveys, one observation point in the Project Area was used for surveying fall migrating raptors across the entire Project Area (Figure 4; SWCA 2011b). This observation point was selected by SWCA to maximize migrant raptor counts; it was selected due to its view of the river corridor (north and west of the Project Area), and due to the predominant wind currents and thermals that converge from the adjacent buttes. To identify early-, mid-, and late-season migrants, the 2009 fall raptor migration surveys were conducted for two days in September and four days in October: September 24–25, October 6–7, and October 20–21, 2009. Dependent on weather, each 2009 count was between 3 and 6 hours in duration.

During the 2011 fall raptor migration surveys, four observation points were used due to an increase in the Project Area footprint and as requested by USFWS (see Figure 4; SWCA 2011b). The four points were roughly located on an east-west axis and were spaced sufficiently apart to detect birds crossing the east-west axis count boundary while avoiding double counting of passing raptors. The 2011 fall migration surveys were conducted for four days in September and six days in October: September 20–23, October 4–5, and October 17–20, 2011. Dependent on weather, each 2011 count was between 3 and 8 hours in duration.

The 2009 fall raptor migration surveys yielded a cumulative passage rate of 0.71 raptor per hour (SWCA 2011b), and the 2011 fall raptor migration surveys yielded a cumulative passage rate of 0.13 raptor per hour. The most common species observed in both years were bald eagle, golden eagle, and northern harrier (*Circus cyaneus*). These fall migration raptor passage rates were extremely low when compared to active fall flyways such as the Wellsville Mountains (1997–2009 average: 9.6 raptors per hour), Goshute Mountains (1983–2011 average: 21.2 raptors per hour), and Commissary Mountains (2002–2011 average: 7.9 raptors per hour) sites (HWI 2013).

During the fall migration period of both years, the majority of activity for both resident and migratory raptors was observed in Tex Creek Canyon. Generally the migratory raptors were observed flying from east to west through or near the canyon and then south once they were west of the Project Area. Tex Creek Canyon is adjacent to and outside of the Project Area boundary.

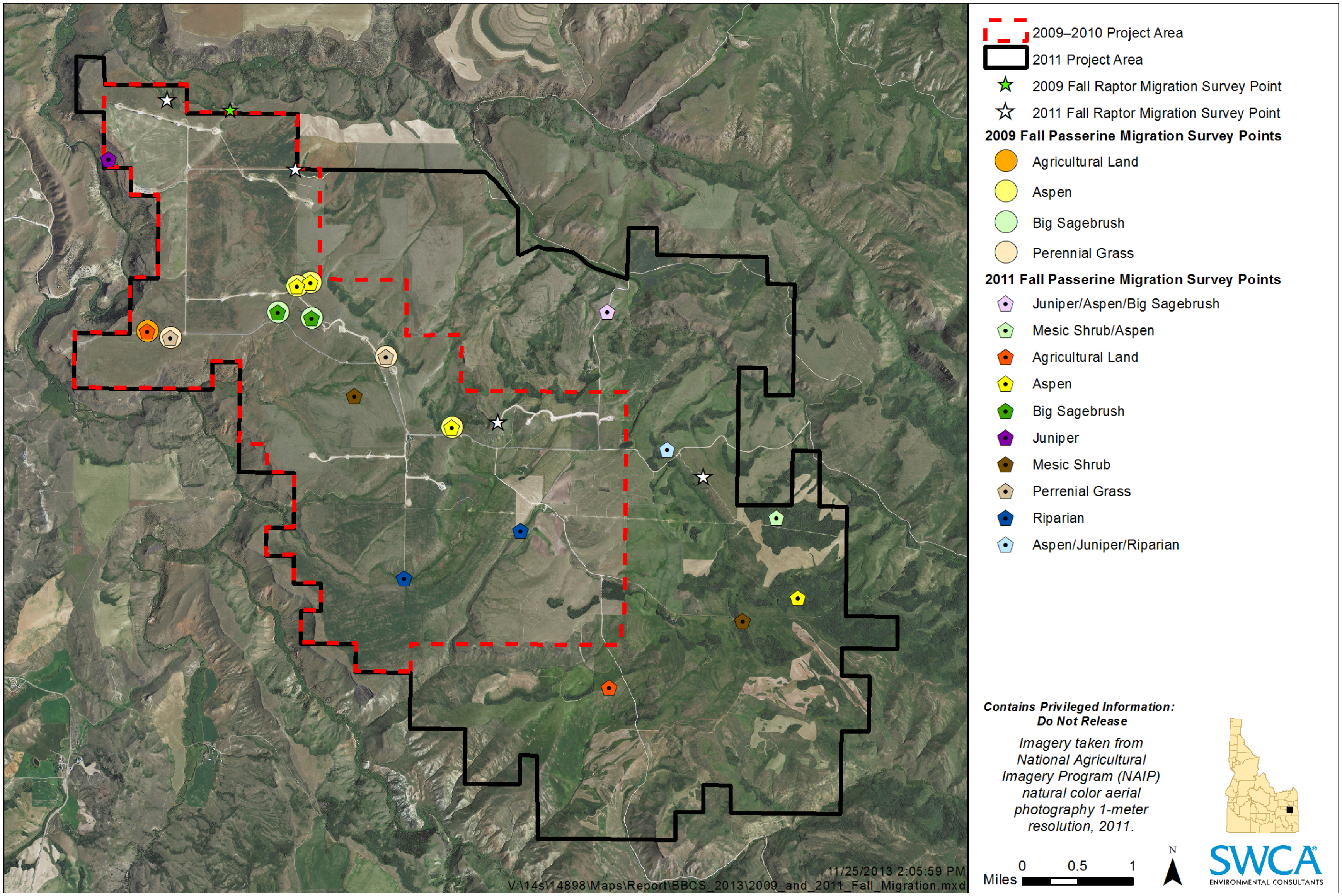

Figure 4. Observation points for 2009 and 2011 fall migration surveys.

SPRING MIGRATION

Spring raptor migration surveys were completed in 2010 and 2011. The 2010 spring migration survey methodology followed the same general methodology that was used in the fall of 2009; however, unlike the fall migration survey, no single distinct high point with a good view of the entire southern area could be identified in the Project Area. After discussion with the USFWS, it was determined that three separate raptor migration observation points would be needed to accurately assess spring raptor migration in and near the Project Area; these three observation points were located in the northwestern, central, and southern portions of the Project Area (Figure 5). The surveys were conducted in three periods with each period lasting three days: April 30–May 2, May 6–8, and May 13–15, 2010 (SWCA 2011b). Spring snowstorms and washed-out roads prevented biologists from accessing the Project Area before April 30. During each survey period, each of the three observation points was surveyed once. Dependent on weather, each 2010 count was between 3.5 and 6 hours in duration.

The 2011 spring raptor migration surveys were conducted following the same methodology that was used for the fall 2010 surveys, except the number of observation points increased from three to six due to the expansion of the Project Area (see Figure 5; SWCA 2011c). Spring 2011 surveys were conducted on April 19–20, April 27–29, and May 11–13, 2011. Dependent on weather, each 2010 count was between 3.5 and 6 hours in duration.

The spring 2010 surveys yielded a cumulative raptor passage rate of 1.35 raptors per hour (SWCA 2011b); the spring 2011 surveys yielded a cumulative raptor passage rate of 0.68 raptor per hour (SWCA 2011c). Spring migration generally occurs in a broad front over a longer window of time relative to fall migration; therefore, HWI data comparisons are available for fall but not for spring data. The spring migration passage rates documented in the Project Area are extremely low relative to those recorded in the fall at HWI sites (see Fall Migration section above). The most common species observed in both years were red-tailed hawk, turkey vulture (*Cathartes aura*), and northern harrier.

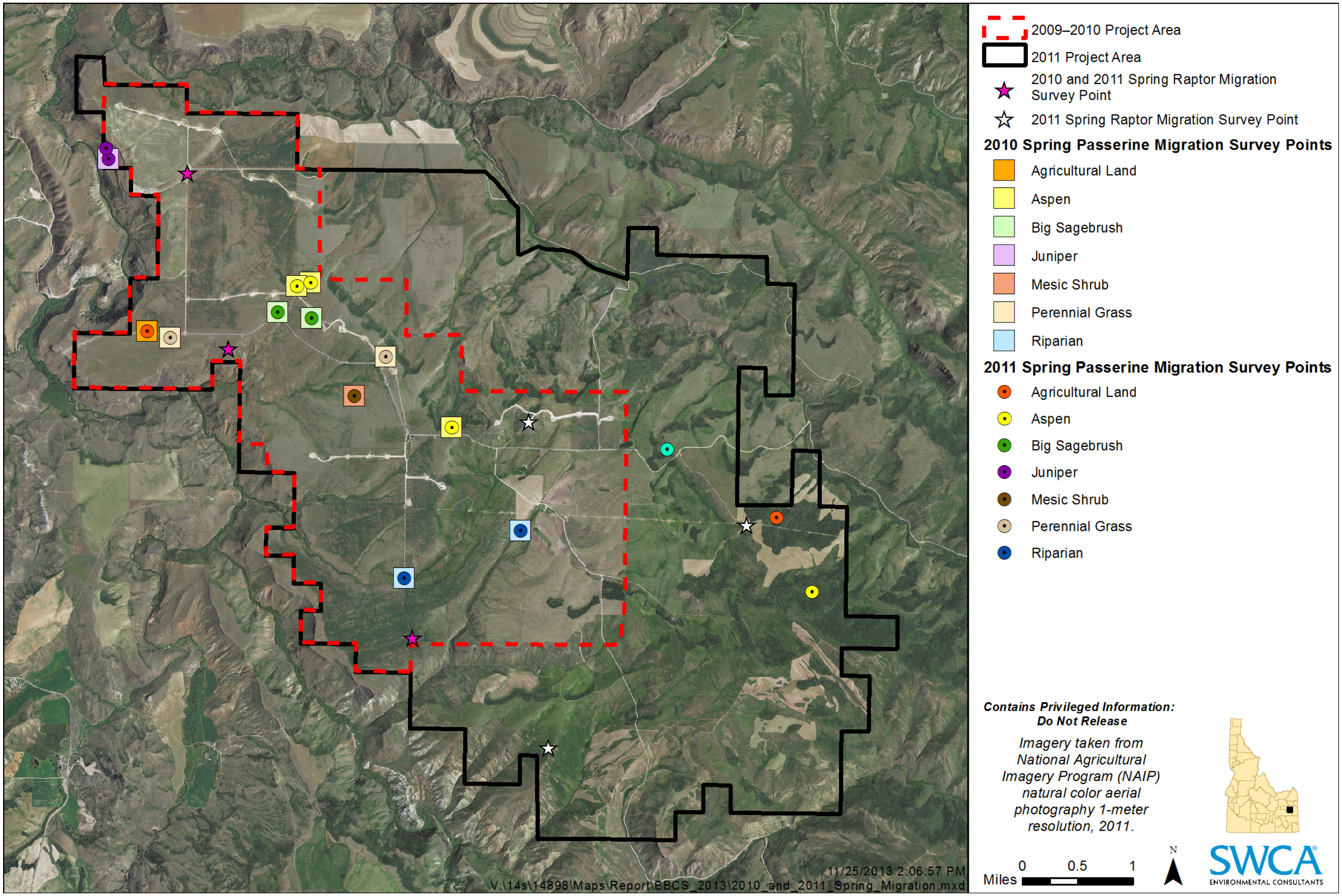

Figure 5. Observation points for 2010 and 2011 spring migration surveys.

2.3 Large-bird Use Surveys

Large-bird use surveys were conducted in the Project Area every two weeks from December 2011 through June 2013. UAMPS coordinated with the USFWS regarding the cessation of large-bird use surveys at a meeting with USFWS, UAMPS, and SWCA at the Horse Butte Operations and Maintenance building, Ammon, Idaho, on June 7, 2013. Ten large-bird observation points were placed throughout the Project Area taking into consideration viewshed and topography to ensure that the Project Area was adequately sampled and that views surrounding each point were maximized (Figure 6). The habitat types at the large-bird observation points consisted of sagebrush, juniper, low grass, and/or agricultural fields. Surveys were conducted twice per month (December 10–11, 22–23, 2011, January 4–5, 27–28, February 6–7, 21–22, March 7–8, 22–23, April 3–4, 24–25, May 14–15, 24–25, June 11–12, 28–29, July 13, 25–26, August 8–9 and 22–23, 2012) for a total of 18 surveys over the course of the winter, spring, and summer. Each point was surveyed for a minimum of 20 minutes during each of the 18 survey visits. The 20-minute survey duration was chosen to allow for multiple points to be surveyed each survey session; it was standard practice per Strickland et al. (2011) to use 20- to 40-minute counts, rather than 1, 2, or more hours, prior to the 2013 USFWS guidance. The time of day that each point was surveyed was varied so that each point was surveyed in the morning and afternoon during several surveys. All raptors seen during each survey were recorded and the following information was collected: species, number of individuals, age, sex, initial height above ground level (HAGL), maximum HAGL, minimum HAGL, flight direction, flight behavior (e.g., soaring, powered flight, hovering), and time. Observers plotted on topographic field maps the flight pathways taken by individuals and groups. These flight pathways were digitized into a geographical information system (GIS) format. Additionally, weather information, including temperature, wind speed, wind direction and cloud cover, was recorded for each point.

The surveys' focus was on raptors; however, all large-bird species were documented. From December 2011 through June 2013, 13 species of raptors were observed. In total 443 raptors, (including turkey vultures) were observed within 800 m of the observation points. The most commonly documented raptors in the Project Area were red-tailed hawk (31.8%), Swainson's hawk (19.4%), rough-legged hawk (*Buteo lagopus*; 13.5%), turkey vulture (7.9%), northern harrier (7.9%), golden eagle (6.5%), American kestrel (4.2%) and bald eagle (3.6%).

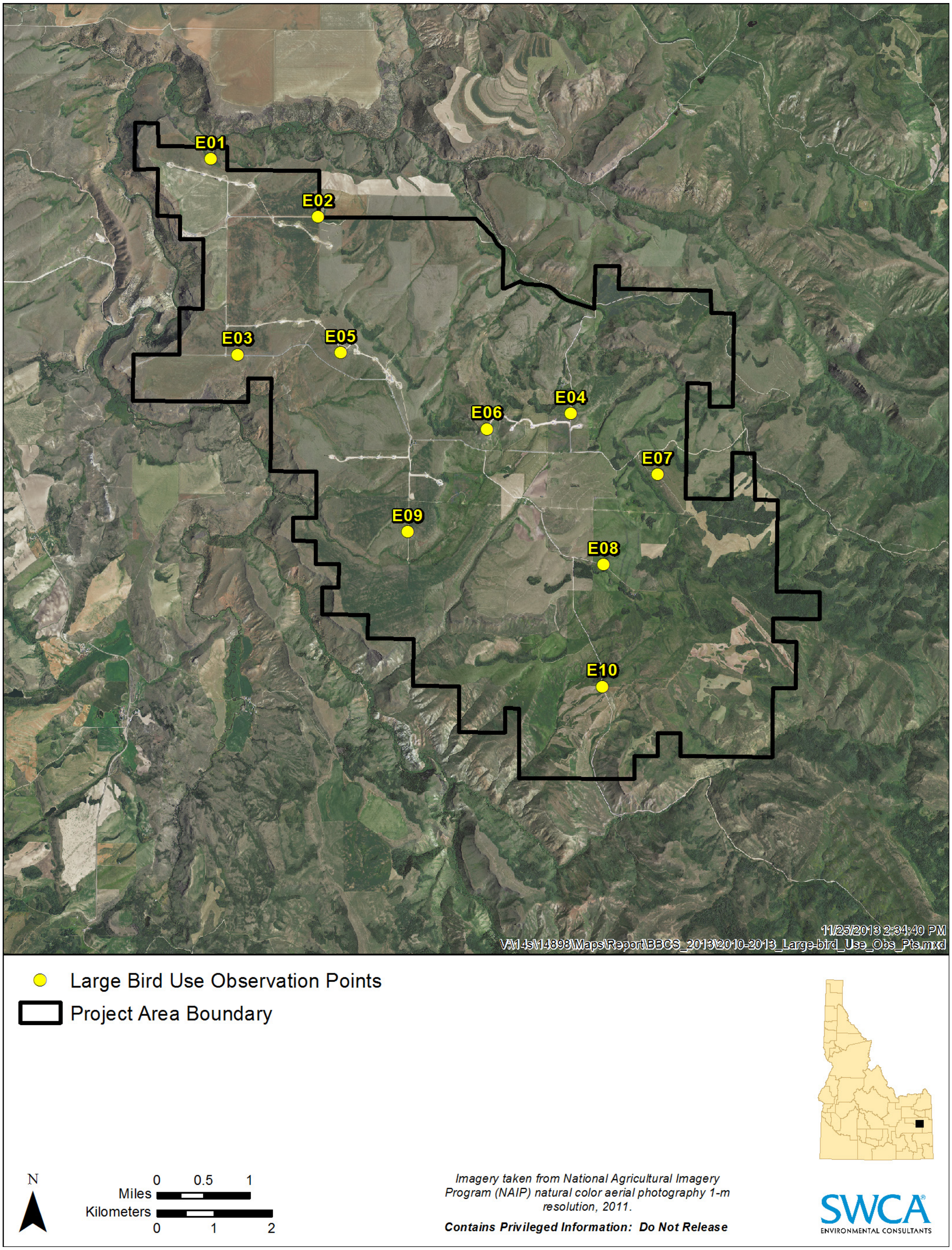

Figure 6. Large-bird use observation points, 2010–2013.

2.4 Passerine Bird Use Surveys

Passerine (i.e., songbird) bird use surveys were completed in fall 2009 and 2011 and spring 2010 and 2011 following coordination with USFWS. A species list by survey is included in Appendix D. Survey points were selected based on habitat type and relative abundance of each habitat type in the Project Area. This ensured that a variety of habitats located throughout the Project Area were represented during surveys. The Project Area is a mosaic of habitat types; the habitat types surveyed included juniper forest, aspen forest, big sagebrush, agricultural, perennial grassland, mesic shrub, and riparian. The general locations of these points were prescribed by the USFWS. The final locations and number of selected points were determined in the field.

2.4.1 Fall Migration

In fall 2009, eight observation points for conducting the passerine migration survey (SWCA 2011b) were selected based on the type of habitat and the habitat's prevalence in the Project Area (Figure 4). This ensured that a variety of habitats throughout the Project Area were represented. During the fall 2011 surveys (SWCA 2011c), the number of observation points was increased from eight to 18 in an effort to more thoroughly cover the expanded Project Area (see Figure 4). The survey for migrating passerine birds was conducted during the same three phases as the fall raptor migration survey (September 24–25, October 6–7, and October 20–21, 2009; and September 20–23, October 4–5, and October 17–20, 2011). Each observation point was surveyed three times. During each point count, a biologist surveyed the location for 30 minutes in 2009 and for 20 minutes in 2011. Surveys took place at dawn and at dusk. Data were collected in accordance with the habitat-based monitoring program for breeding birds of Nevada, established by the Great Basin Bird Observatory (GBBO 2003).

Passerine fall migration surveys were conducted independently from all other bird surveys. However, non-passerine bird species were documented if they were observed during the passerine fall migration surveys. In 2009, excluding unidentifiable birds, 21 species of birds were observed during fall passerine migration surveys. The most commonly documented species in the Project Area were common raven (23%), American robin (*Turdus migratorius*; 20%), horned lark (*Eremophila alpestris*; 10%), and greater sage-grouse (7%). In 2011, 899 observations of 37 species of birds were made during the fall passerine migration surveys (excluding unidentifiable birds). The most commonly documented species in the Project Area were American robin (52%), common raven (19%), European starling (*Sturnus vulgaris*; 3%), and western meadowlark (*Sturnella neglecta*) (3%).

Three sensitive passerine species were observed during the fall passerine migration surveys, including greater sage-grouse, sharp-tailed grouse, and Brewer's sparrow (*Spizella breweri*). The greater sage-grouse is listed by the USFWS as a candidate species. The sharp-tailed grouse is listed as state sensitive Type 2, which means it is rangewide or globally imperiled, and the Brewer's sparrow is listed as state sensitive Type 3(b) which means it is regionally or state imperiled. No sensitive species were observed in the rotor-swept area (RSA).

2.4.2 Spring Migration

In spring 2010, 12 observation points (PS1–PS12) for conducting the spring passerine migration survey (SWCA 2011b) were selected based on the type of habitat and the habitat's prevalence in the Project Area (see Figure 5). This approach to point selection ensured that a variety of habitats located throughout the Project Area were represented. The survey for migrating passerine birds was conducted during the same three phases as the spring raptor migration survey (April 30–May 2, May 6–8, and May 13–15, 2010). Each observation point was surveyed three times. During each point count, a biologist surveyed the location for 20 minutes.

Passerine spring migration surveys were conducted independently from all other bird surveys. However, non-passerine bird species were documented if they were observed during the passerine spring migration surveys. Excluding unidentifiable birds, 40 species of birds were observed during spring passerine migration surveys. The most commonly detected species included western meadowlark (16.6%), Brewer's sparrow (15.7%), vesper sparrow (*Pooecetes gramineus*; 15.4%), and common raven (15.1%).

A second season of spring migration data was collected in 2011 (SWCA 2011d). These spring migration surveys were conducted in the same manner as the 2010 spring surveys except that the number of points was raised to 16 due to the expanded Project Area (see Figure 6). Surveys for migrating passerine birds were conducted during the same three phases as the spring raptor migration surveys (April 19–20, April 27–29, and May 11–13, 2011). Each observation point was surveyed three times as in 2010.

Excluding unidentifiable birds, 395 observations of 36 species of birds were made during spring 2011 passerine migration surveys. The most commonly documented species in the Project Area were western meadowlark (17%), American robin (15%), and common raven (15%).

Four sensitive passerine species were observed during the spring migration surveys, including greater sage-grouse, sharp-tailed grouse, Brewer's sparrow, and sandhill crane (*Grus canadensis*). The sandhill crane is listed as Type 3(b), which means it is regionally or state imperiled. No sensitive species were observed in the RSA.

2.5 Resident Bird Surveys

In addition to the migrating bird studies in early summer 2010, SWCA biologists conducted a breeding bird point-count survey in the original Project Area (SWCA 2011b). This survey was conducted to determine the distribution and relative abundance of birds likely to be breeding in the Project Area. The breeding bird point-count survey was consistent with the habitat-based monitoring protocol for breeding birds of Nevada established by GBBO (2003). In accordance with GBBO protocol, each point-count transect consisted of 10 fixed-radius (100-m) point-count stations spread evenly along each linear transect. Each transect was surveyed between sunrise and 10:00 a.m. during acceptable weather conditions (no precipitation or high winds). The point-count stations were located approximately 250 m apart along each transect. Every survey point required 10 minutes of actual survey time, during which birds were detected and recorded during the time intervals of 0–3, 3–5, or 5–10 minutes. In accordance with GBBO protocol, two individuals conducted point-count surveys. An observer identified and called out bird detections, and the second person monitored time intervals, navigated to and from survey points, and recorded data. Data were recorded on a standard data collection form. Each individual bird was recorded on the data form, along with its approximate distance from the observer stationed at the center of the point (0−50 m, 50−100 m, or >100 m) and any evidence of territorial defense (e.g., singing) or breeding (e.g., carrying nest material or food). The same bird was not recorded twice per point-count. Environmental conditions such as temperature, cloud cover, and wind were recorded for each point-count station.

In cooperation with the USFWS, three point-count transects were deemed sufficient to sample the Project Area for breeding birds (Figure 7). Transects were positioned along potential turbine strings in habitats that were representative of the major vegetation communities in the Project Area. The vegetation communities consist of Basin and Wyoming big sagebrush (*Artemisia tridentata* and *A. tridentata* ssp. *wyomingensis*), agricultural land, perennial grassland, and aspen forest. These surveys were conducted from July 14 to 16, 2010. The total time spent conducting the breeding bird surveys was 300 minutes.

The 2010 breeding bird point-count survey identified 29 species of birds. The most common species included Brewer's sparrow, vesper sparrow, horned lark, cliff swallow (*Petrochelidon pyrrhonota*), violet-green swallow (*Tachycineta thalassina*), American robin, and common raven. Not every species of bird observed during the survey demonstrated evidence of breeding behavior, but it is assumed that most or all of these species breed in or near the Project Area because the survey was conducted during the breeding season. Additionally, several other species of birds were observed exhibiting breeding behavior during other survey efforts in the Project Area. Greater sage-grouse and sharp-tailed grouse were observed attending leks, and red-tailed hawk and common raven were observed nesting in the Project Area during raptor nest surveys. A female northern harrier was observed with one juvenile while biologists were traveling between point counts.

Five of the 29 species observed during the resident bird surveys are listed as state sensitive. However, two of these species, the American white pelican (*Pelecanus erythrorhynchos*) and Franklin's gull (*Leucophaeus pipixcan*) have no nesting habitat in the Project Area. Two of the species, Brewer's sparrow and Swainson's hawk, are known to nest in the Project Area. The last species, the short-eared owl (*Asio flammeus*), is not known to nest in the Project Area.

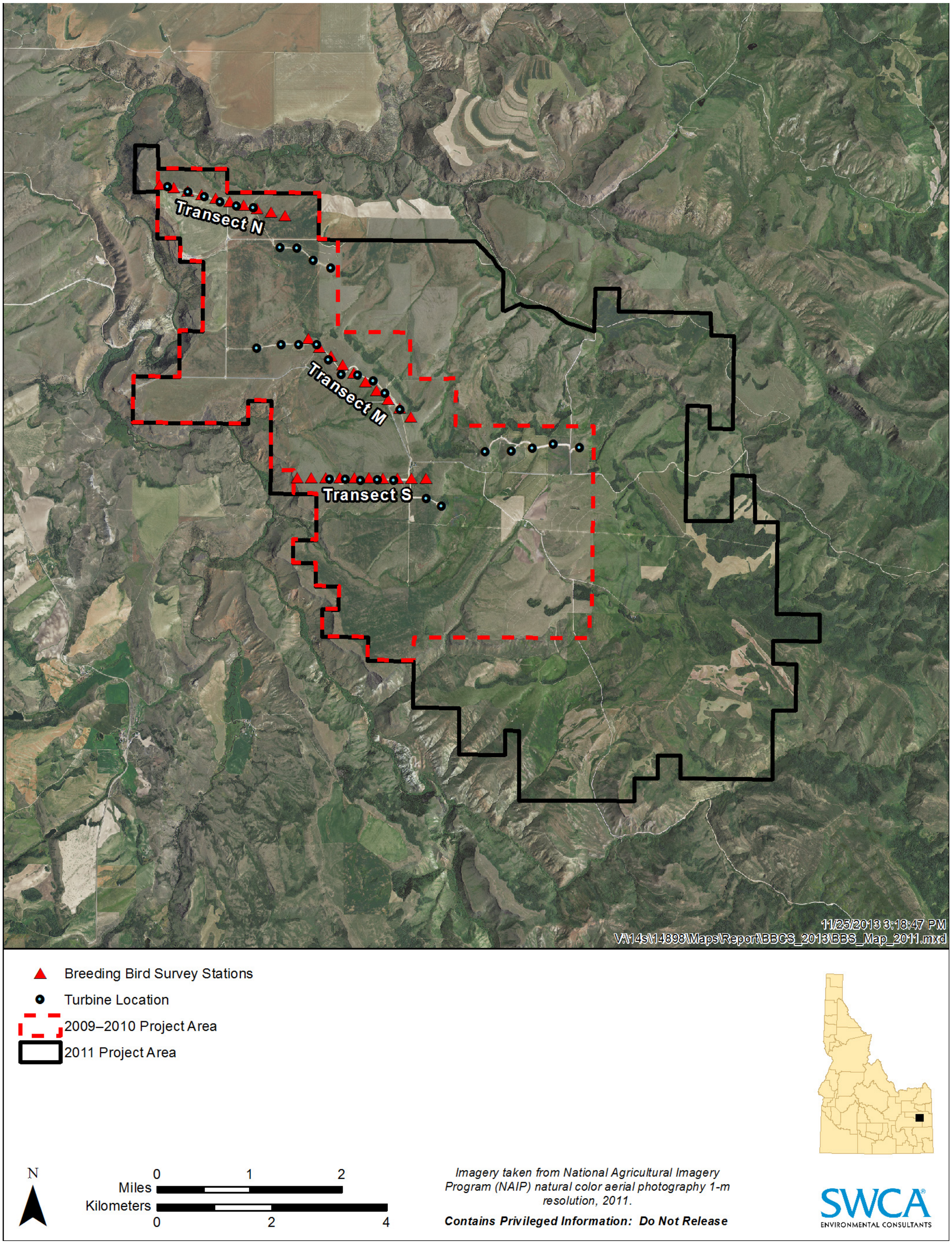

Figure 7. Spring breeding bird survey observation points, 2010.

2.6 Sage-Grouse Surveys

Sage-grouse surveys were completed in the winter and spring of 2010 and 2011. The final locations and number of selected points were determined in the field. Aerial surveys were conducted by helicopter to minimize survey time and to maximize searcher efficiency.

2.6.1 Winter Grouse Surveys

Surveys for wintering grouse were conducted on February 23 and March 1, 2010 in the original Project Area and a 1-mile buffer, and on March 1 and 2, 2011 in the expanded Project Area and a 1-mile buffer. Aerial surveys were conducted during which the pilot flew 1,640-foot transects covering the entire Study Area.

Three species of grouse—Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), greater sage-grouse, and ruffed grouse (*Bonasa umbellus*)—were observed during the survey. In total, 61 individual grouse were documented in 15 separate observations. Greater sage-grouse constituted 77% (47 individuals), Columbian sharp-tailed grouse constituted 13% (eight individuals), ruffed grouse constituted 8% (five individuals), and unknown grouse species constituted 2% (one individual) of the total number of observed grouse. Results of the 2010 and 2011 surveys are summarized in Table 3. The locations of observations are shown below in Figure 8.

Table 3. Summary of Winter Grouse Observation Results, 2010 and 2011

Species	Number of Observations			Total Number of Individuals Observed		
	2010	2011	Amount of Change	2010	2011	Amount of Change
Columbian sharp-tailed grouse	6	3	−3	89	8	−81
Greater sage-grouse	5	8	+3	36	47	+11
Ruffed grouse	0	3	+3	0	5	+5
Unknown grouse species	0	1	+1	0	1	+1
Total	**11**	**15**	**+4**	**125**	**61**	**−64**

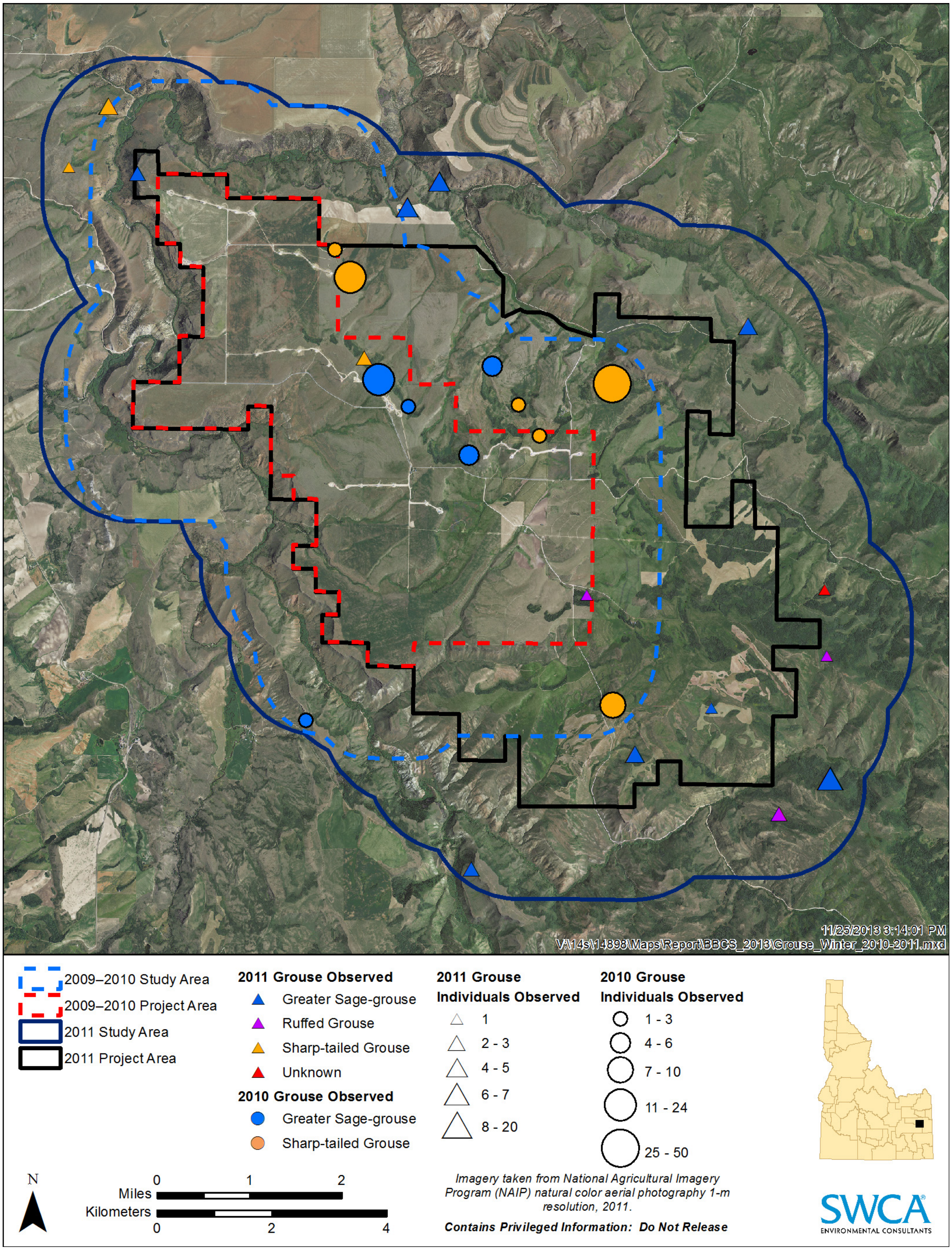

Figure 8. Winter grouse survey results, 2010–2011.

2.6.2 Spring Lek Surveys

Lek surveys were conducted on April 12 and 13, 2010, in the original Project Area and a 3-mile buffer, and on May 6, 2011, in the expanded Project Area and a 3-mile buffer. Prior to conducting the survey, the IDFG provided SWCA with a map of 13 known greater sage-grouse and Columbian sharp-tailed grouse leks near the original Project Area. Twelve of the leks were attributed to Columbian sharp-tailed grouse and one to greater sage-grouse. It is unknown when and by what methods these data were collected. The locations of these leks are shown in Figure 9.

Aerial surveys were conducted using north-south transects flown at approximately 328 to 492 feet above ground level at 0.5-mile intervals. Lek searches were conducted from 0.5 hour before sunrise to 1 or 1.5 hours after sunrise. Air speed was optimized to cover the survey area as safely and efficiently as possible.

In 2010, aerial transects were flown over the entire Study Area. Due to poor weather conditions in 2011, approximately half of the Study Area was surveyed by helicopter. Because the entire Study Area could not be surveyed via helicopter, the Study Area was revisited from May 21 to 23, 2011, for follow-up ground surveys of Leks 1 and 2. A single biologist visited Leks 1 and 2, which were first observed in 2010. The biologist visited the leks from 0.5 hour before sunrise to 1 or 1.5 hours after sunrise. Results of the 2010 and 2011 surveys are summarized in Table 4 and Figure 9.

Five active leks (four greater sage-grouse and one Columbian sharp-tailed grouse) were documented during the 2011 helicopter survey (see Table 4). An active lek is defined as any lek that is attended by male sage-grouse during the strutting season. Two of the greater sage-grouse leks, HB03 and HB04, were newly detected leks in 2011. They were found near Lek 5, which was active in 2010 but inactive in 2011. It is possible that some of the birds observed at HB03 and HB04 were the same birds in Lek 5 in 2010. The other two active greater sage-grouse leks (Leks 3 and 4) were also active in 2010. Leks 1 and 2 were not active in 2011 by the time they were visited. Therefore, it is unknown whether these two leks were active in 2011. Only one active Columbian sharp-tailed grouse lek was documented (Lek HB08). This was a newly discovered lek. The active Columbian sharp-tailed grouse lek from 2010, Lek 6, was found to be inactive in 2011.

In total, 29 individual grouse were observed (see Table 4) on five separate leks. Greater sage-grouse constituted 90% (26 individuals) and Columbian sharp-tailed grouse constituted 10% (three individuals) of observed grouse on leks. Because it can be difficult to differentiate between male and female grouse when males are not strutting, grouse were categorized as strutting males or non-strutting grouse.

One Columbian sharp-tailed grouse lek was documented in the Study Area. No strutting males were seen on the lek, but three non-strutting grouse were observed.

Four greater sage-grouse leks were documented in the Study Area, consisting of 26 individuals. More strutting males than non-strutting grouse were observed at all leks. Strutting males constituted 69% (18 individuals) of the grouse observed on all greater sage-grouse leks. The largest lek consisted of nine grouse.

Table 4. Spring Lek Observation Results, 2010 and 2011

Lek	Species	Total Number of Grouse		Amount of Change
		2010	2011	
Lek 1	Greater sage-grouse	7	0	−7
Lek 2	Greater sage-grouse	16	0	−16
Lek 3	Greater sage-grouse	3	8	+5
Lek 4	Greater sage-grouse	8	9	+1
Lek 5	Greater sage-grouse	3	0	−3
Lek 6	Columbian sharp-tailed grouse	6	0	−6
HB03	Greater sage-grouse	0	4	+4
HB04	Greater sage-grouse	0	5	+5
HB08	Columbian sharp-tailed grouse	0	3	+3
	Grouse total	**43**	**29**	**−14**
	Total number of active leks	**6**	**5**	**−1**

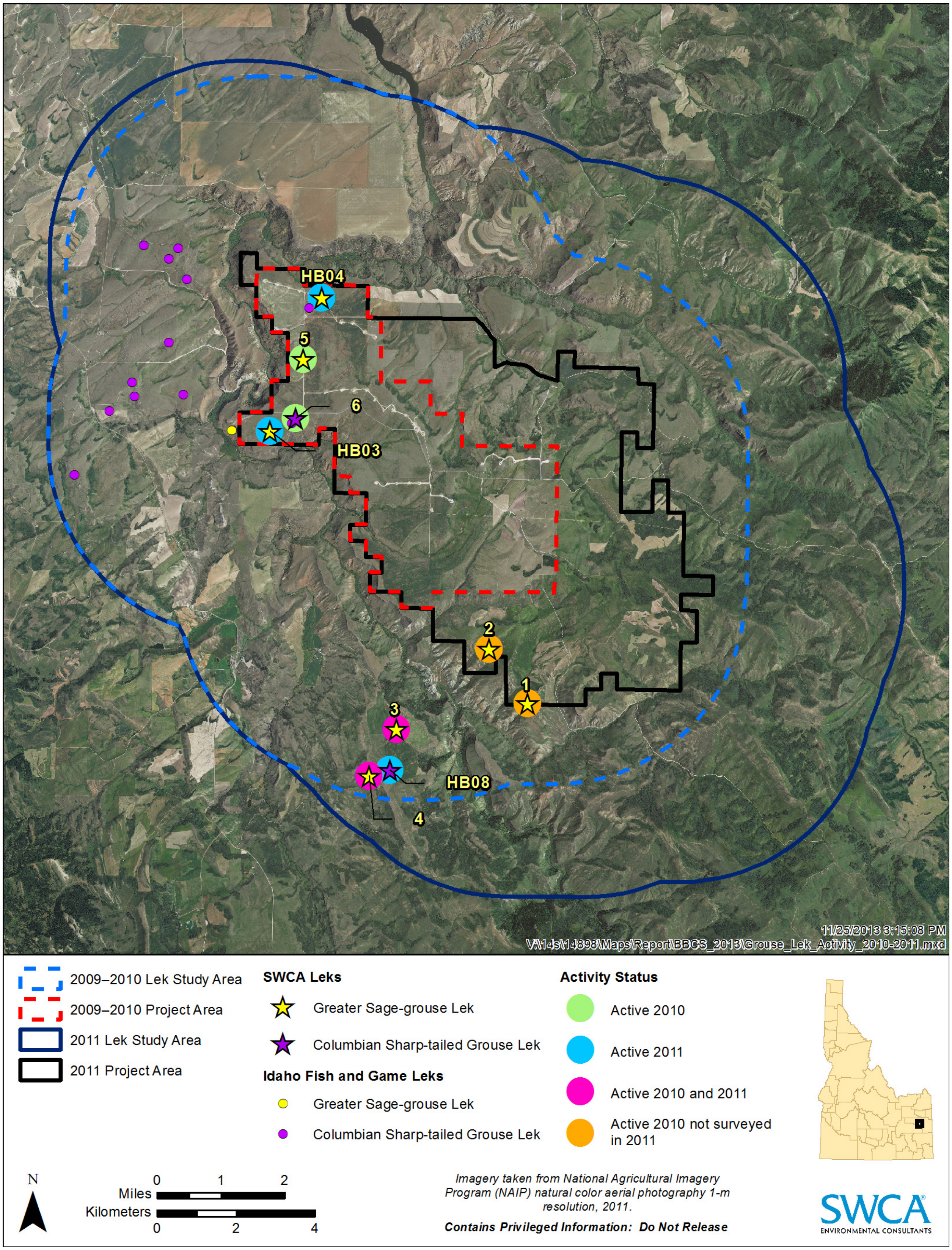

Figure 9. Grouse lek activity, 2010–2011.

2.7 Bat Surveys

Fourteen species of bats have been documented in the state of Idaho (IDFG 2005). All bats in Idaho are protected nongame species and managed by IDFG. Additionally, four of these bat species are listed as species of greatest conservation need under the *Idaho Comprehensive Wildlife Conservation Strategy*, one of which has the potential to be found in the Project Area, and two of which may wander through the Project Area (IDFG 2005). Habitat in the Project Area with potential to serve as roosting locations includes forested habitat (especially forest patches with large trees and snags) and rock crevices such as those that occur near the Willow Creek, Tex Creek, and Grays Lake Outlet drainages.

SWCA conducted a site characterization study using acoustic monitoring techniques for bats from March 10 to November 17, 2010 (SWCA 2011b). Acoustic monitoring systems (AnaBat) sampled bat activity at heights of 5 m and 50 m; the 50-m height sampled the RSA. Six AnaBat units were installed on three met towers in the Project Area (Figure 10). The systems on Met Towers 1 and 2 were located in agricultural/CRP habitat and sampled bat activity for a range of 155 to 224 days from March to November 2010. The survey period length covered a range because of electrical malfunctions and the decommissioning of one of the towers in mid-September. A third met tower location (Met Tower 1 East), which was located in the expanded Project Area, was sampled for a total of 30 days from mid-October to mid-November 2010. No bat calls were recorded at this location. The following discussion is based on the results of the two survey locations where bat calls were recorded in 2010 and therefore represents results of pre-construction acoustic monitoring in the original Project Area. Surveys were suspended during project construction (2012) but recommenced in March 2013. The data collected in 2013 have not yet been analyzed and are not included in this document.

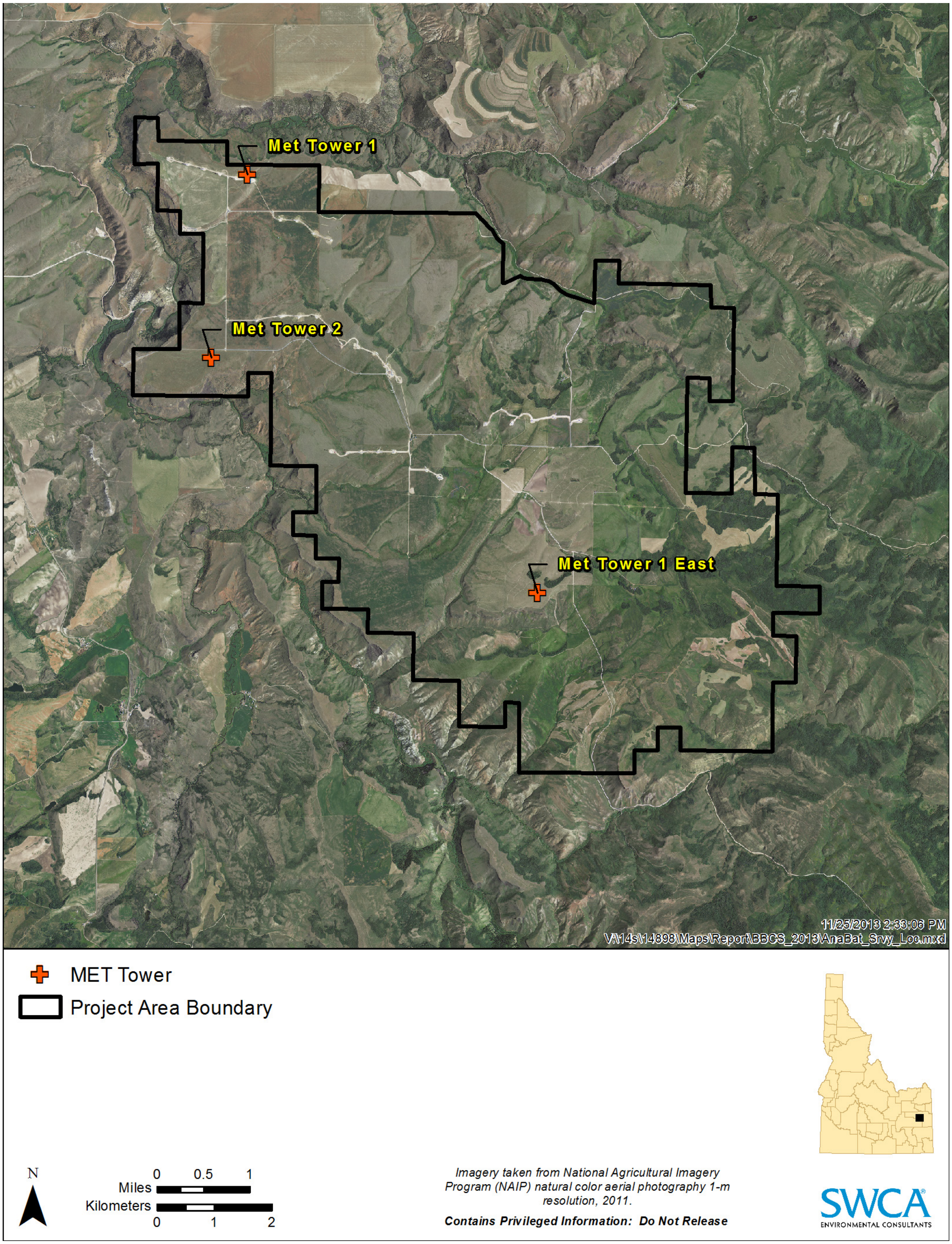

Figure 10. AnaBat monitoring system locations/meteorological towers.

The 2010 acoustic bat survey (SWCA 2011b) resulted in the identification of 10 bat species in the original Project Area (Table 5), including one species of greatest conservation need (IDFG 2005). This Project Area species list contains nine of the 14 bat species known to be present in Idaho, as well as one species that is not formally recognized as occurring in the state, the western red bat (*Lasiurus blossevillii*; IDFG 2010). All bat species recorded in the Project Area are in the Vespertilionidae family. Table 5 displays the total number of minutes recorded by the 2010 acoustic survey by species that were positively identified by their echolocation calls. This table and all further analysis do not include 135 recorded minutes identified as “Unknown 25,” a file that can only be identified to the group of species with a minimum frequency of 25 kHz (i.e., silver-haired [*Lasionycteris noctivagans*] and big brown bats [*Eptesicus fuscus*]). Of the species recorded, the little brown bat (*Myotis lucifugus*) was recorded the most, followed by the hoary (*Lasiurus cinereus*) and silver-haired bats. The species with the lowest amounts of activity were the Townsend’s big-eared (*Corynorhinus townsendii townsendii*), pallid (*Antrozous pallidus*), and western red bats.

Table 5. Bat Species Observed, 2010 Bat Survey

Common Name	Scientific Name	Total Number of Recorded Minutes	Percentage of Total Recorded Minutes
Little brown bat	*Myotis lucifugus*	246	31%
Hoary bat	*Lasiurus cinereus*	164	20%
Silver-haired bat	*Lasionycteris noctivagans*	127	16%
Yuma myotis	*Myotis yumanensis*	73	9%
Big brown bat	*Eptesicus fuscus*	69	9%
Western small-footed myotis	*Myotis ciliolabrum*	58	7%
Long-eared myotis	*Myotis evotis*	36	4%
Townsend’s big-eared bat*	*Corynorhinus townsendii townsendii*	22	3%
Pallid bat	*Antrozous pallidus*	4	>1%
Western red bat**	*Lasiurus blossevillii*	3	>1%
	Total	**802**	**100%**

Note: Nomenclature follows Hoofer et al. (2006), Wilson and Cole (2000), and Wilson and Reeder (1993).

* IDFG species of greatest conservation need (IDFG 2005).

** Not listed by IDFG as occurring in the state (IDFG 2005).

The little brown bat is a common species in the West. It is currently experiencing very high levels of mortality in eastern North America due to the spread of white-nose syndrome (WNS). It is estimated that over 5.5 to 6.7 million bats have been killed by WNS, at least 1 million of which are little brown bats (Kunz and Reichard 2010; USFWS 2012b). A status review of the species by USFWS was requested in 2010 (Center for Biological Diversity 2010). Currently USFWS is collecting information about this species because of its susceptibility to WNS to determine if, in addition to existing threats, the disease may be increasing the extinction threat to the species (USFWS 2011b).

Overall, bat activity levels recorded in the Project Area are relatively low compared to other sites sampled in the western United States (personal communication, Michael J. O’Farrell, Sole Proprietor, O’Farrell Biological Consulting, December 15, 2010). The CRP and agricultural habitat sampled in this study likely produces low insect biomass or insects unsuitable for bats and therefore does not attract high levels of bat activity (Henderson and Broders 2008; Ober and Hayes 2008). Also, bat activity is typically highest in riparian habitats, where bats can feed on aquatic insects and drink water (Grindal et al. 1999). Local riparian habitats, such as the Willow Creek and Tex Creek drainages, may serve as higher quality bat habitat than the CRP and agricultural habitat in the Project Area.

Although recorded activity is low, seasonal activity patterns are typical for the Project Area's latitude. Activity levels increase in the spring when bats rouse from hibernation and travel to maternity roosts or summer foraging sites. Activity levels are highest in the summer when resident bats are most actively foraging in the Project Area. Activity declines throughout the fall when bats are either beginning to enter hibernation or migrating through the area on their way to hibernacula or winter habitat.

3 RISK ASSESSMENT

Using the data gathered pursuant to UAMPS' various site assessments and field studies, as summarized in Section 2 above, UAMPS has analyzed the potential direct, indirect, and cumulative impacts of the Project to avian (non-eagle) and bat species. This analysis is presented in the following section and specifically addresses the likely impacts of the Project in the context of collision, electrocution, disturbance/displacement, and habitat fragmentation. Potential impacts to bald and golden eagles are presented in a stand-alone ECP.

3.1 Birds (non-eagle)

3.1.1 Collisions

Avian fatalities at wind energy facilities are distributed among many species. Despite the focus on wind development impacts to raptors (USFWS 2009, 2013a), passerines constitute the majority (roughly 75%) of bird fatalities at facilities in the United States, and these fatalities generally result in spring and fall peaks of avian fatality rates (Erickson et al. 2001; Erickson et al. 2004; Johnson et al. 2002; NWCC 2010). Specific species or families within the passerine group have not been shown to be particularly susceptible to turbine collision (Erickson et al. 2002), with a possible exception of the horned lark (Gritski et al. 2011; Kerlinger et al. 2006; Young et al. 2003). A relatively high number of fatalities for specific diurnal birds of prey and waterbird/waterfowl species have been reported at some facilities, particularly in California (e.g., red-tailed hawk, American kestrel, and American coot [*Fulica Americana*]; Anderson et al. 2004; Anderson et al. 2005; Erickson et al. 2001; Smallwood and Thelander 2005).

Factors influencing avian fatalities at wind energy facilities have been described for raptors and songbirds. For raptors, they include level of use and behavior of the birds at the site (NWCC 2010). Raptors have been killed in relatively high numbers in areas of high raptor abundance in the United States (Hoover and Morrison 2005; National Academy of Sciences [NAS] 2007); and certain species (e.g., red-tailed hawk, golden eagle) that hunt for prey in close proximity to turbines may be more susceptible to collision (Erickson et al. 2002; NAS 2007; NWCC 2010). Improved design at newer facilities has involved siting turbines away from high density areas of small mammal prey and away from physical features of the landscape that could concentrate raptors (e.g., canyons, ridgelines) (Hoover and Morrison 2005; Hunt 2002; NAS 2007). Migrating songbirds appear to be especially vulnerable during poor weather conditions that force them to lower altitudes and where wind facilities are situated in close proximity to stopover sites (e.g., riparian corridors, significant water sources) (Erickson et al. 2001; Johnson et al. 2002; Manville 2009).

Episodic nocturnal migrant mortality events have been recorded at buildings and similar structures (e.g., smoke stacks, oil flare stacks, communication towers); for example, Erickson et al. (2001) reviews multiple studies that reported thousands of birds killed in 2- to 4-day periods. However, similar episodic events are not known to occur at wind energy facilities (Erickson et al. 2001). The number of birds killed at wind energy facilities is considered to be substantially lower relative to the number killed by vehicles, buildings and windows, power transmission lines, communication towers, toxic chemicals, and feral and domestic cats (Erickson et al. 2001; NAS 2007). Erickson et al. (2001) estimated that wind turbines constitute 0.1% to 0.2% of avian collision fatalities. Locally breeding songbirds appear to experience lower mortality rates than migrant songbirds because many of these species tend not to fly at turbine rotor heights during the breeding season; evidence for this difference comes from the spring and fall peaks of avian fatality rates at other facilities and the lack of correlation between the birds recorded as fatalities versus the birds observed during pre-construction diurnal use counts (e.g., Erickson et al. 2002; Ferrer et al. 2011; NWCC 2010).

The Project Area does not contain the specific habitat features that are known to concentrate raptors—though raptors (e.g., red-tailed hawk, Swainson’s hawk) have been recorded during use counts and nest surveys and likely use the Project Area for hunting (see Sections 2.1 and 2.2). Vegetation communities within the Project Area include agricultural land (pasture/hay and CRP lands), annual and perennial grassland, big sagebrush steppe, and curl-leaf mountain mahogany woodland and shrubland. Lesser amounts of aspen forest and woodland (stringers) and lower montane riparian woodland and shrubland are present and could act as secondary stopover locations for migrant songbirds. Primary stopover locations are located outside of the Project Area in the form of riparian vegetation dominated by cottonwoods and willows associated with Willow Creek and Tex Creek. The Tex Creek IBA/WMA is located adjacent to the Project Area; as an IBA it provides essential nesting, migration, or wintering habitat for birds including greater sage-grouse, sharp-tailed grouse, gray partridge, and several migrant passerines. Agricultural/CRP land within the Project Area may support upland gamebirds, cranes, waterbirds/waterfowl, and grassland bird diversity, but is not expected to concentrate birds.

Section 2 describes birds most commonly documented during large-bird, passerine, and breeding bird surveys; it also lists sensitive bird species that were detected during these surveys. Because avian fatalities at wind energy facilities are distributed among many species/species groups, any of the species detected during these counts as well as those that were not detected (i.e., nocturnal migrants) may be at risk of collision. Red-tailed hawk (and by deduction other *Buteo* species, e.g., Swainson’s hawk, rough-legged hawk) may constitute some of the fatalities at Horse Butte because of their known susceptibility to collision, whereas species such as common ravens and turkey vulture have shown a disproportionately low number of fatalities relative to how abundant they are (Dorin and Speigel 2005; Erickson et al. 2001; Thelander and Rugge 2000). It is not expected that the Project would be detrimental to any avian species’ long-term persistence because the site is not expected to concentrate birds.

Collision risk has been reduced through measures taken during the design and construction phases of the Project. These avoidance and minimization measures are described in detail below in Sections 4.1 to 4.3 and include relocating or eliminating turbines through macro- and micro-siting, lighting minimization, and low-impact turbine and met tower design.

3.1.2 Electrocution

Utility lines (transmission and distribution) can potentially result in electrocution of bird species that have wing spans large enough that the bird can simultaneously contact two conductors or a conductor and grounded hardware (e.g., large raptors). Therefore, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. To protect birds from possible electrocution, APLIC recommends that lines in areas with eagles have a horizontal separation of 60 inches (150 cm) and a vertical separation of 40 inches (100 cm) between phase conductors or between a phase conductor and grounded hardware.

The risk of electrocution from the Project is likely to be low. The risk of electrocution has been reduced through measures taken during the design and construction phases of the Project. These measures are described in detail below in Sections 4.1 to 4.3 and include burying all of the collection lines and designing the two very short segments of overhead line from the Horse Butte substation to the Cattle Creek substation and from the Cattle Creek substation to the existing Palisades-Goshen 115-kV line following APLIC guidelines.

3.1.3 Disturbance/Displacement

In addition to mortality associated with wind farms, concerns have been raised that some bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in CRP grasslands containing turbines than in CRP grasslands without turbines. It was suggested that the reduced density may be due to avoidance of turbine noise and maintenance activities and reduced habitat quality as a result of access roads and gravel pads surrounding the turbines (Leddy et al. 1999). Reduced abundance of grassland songbirds was found within 50 m of turbine pads for a wind farm in Washington and Oregon, but the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (Erickson et al. 2004). Recent research at two sites in North and South Dakota (Shaffer and Johnson 2008) suggests that certain grassland songbird species (two of four studied) may avoid turbines by as much as 200 m, but these results have not been finalized or verified at additional sites. None of these studies have addressed whether these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent.

Construction activities and the presence of turbines and other Project features could potentially disturb or displace birds. As the Project contains CRP grasslands, similar displacement of songbirds may occur as in Leddy et al. (1999); however, with this and other studies described above the spatial and temporal scales are unclear, and whether these observations would translate to other sites is unknown. The risk of displacement and disturbance has been reduced through measures taken during the design and construction phases of the Project. These measures are described in detail below in Sections 4.1 to 4.3 and include relocating or eliminating turbines through macro- and micro-siting, burying all of the collection lines, designing the two very short segments of overhead line from the Horse Butte substation to the Cattle Creek substation and from the Cattle Creek substation to the existing Palisades-Goshen 115-kV line following APLIC guidelines, and minimizing surface disturbance to the maximum extent possible.

3.1.4 Habitat Fragmentation

Habitat fragmentation can exacerbate the problem of habitat loss for birds by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce avian productivity through increased nest predation and parasitism and reduced pairing success of males.

The construction of the Project has not likely significantly increased the degree of habitat fragmentation in the area because the majority of the wind farm is located on habitat that is already fragmented due to intensive agriculture, with land uses consisting mostly of CRP lands, homesteads, and access roads. Nevertheless, to the extent habitat fragmentation has occured; it has been reduced through measures taken during the design and construction phases of the Project. These measures are described in detail below in Sections 4.1 to 4.3 and include relocating or eliminating turbines through macro- and micro-siting, burying all of the collection lines, designing the two very short segments of overhead line from the Horse Butte substation to the Cattle Creek substation and from the Cattle Creek substation to the existing Palisades-Goshen 115-kV line following APLIC guidelines, and minimizing surface disturbance to the maximum extent possible.

3.1.5 Conclusion

In summary, the documented avian use of the site demonstrates that the Project may pose a risk to avian species. There is a risk of avian mortality resulting from collision with turbines or power lines and from electrocution by power lines. There is also a low risk of impacts to avian species due to disturbance or displacement from existing habitats and due to habitat fragmentation. UAMPS has undertaken measures to avoid and minimize the risks to avian species through the following measures, which are discussed in more detail in Sections 4.1 through 4.3 and 4.5, relocating or eliminating turbines through macro- and micro-siting, implementing avoidance measures in Project design, implementing impact minimization measures in construction and operation, and implementing advanced conservation practices.

3.2 Greater Sage-Grouse

3.2.1 Collisions

As is typical of open-country gallinaceous species, greater sage-grouse flight tends to be low to the ground and strongly unidirectional. Greater sage-grouse cannot maneuver quickly in flight due to high wing-loading (small wings in relation to heavy body weight) and are therefore at risk of collision with elevated objects, particularly those features that blend into the landscape such as wire fences. Mortality of greater sage-grouse from fence collisions has been reported across its range (Call and Maser 1985; Christiansen 2009; Danvir 2002; Stevens et al. 2012). Impacts from new fences constructed for this Project are likely to be low since the only fencing constructed on-site is around the electrical substation.

Other potential sources of collision include aboveground transmission lines, wind turbines, and vehicles (Braun 1998; Connelly et al. 2000; Connelly et al. 2004; Erickson et al. 2001; Johnson and Holloran 2010; Patten et al. 2005). New aboveground transmission lines are limited to two short segments approximately 150 feet long extending from the Horse Butte substation to the Cattle Creek substation and from the Cattle Creek collection substation to the existing Palisades-Goshen 115-kV transmission line. Impacts from new aboveground transmission lines are likely low due to the short length of these lines.

Greater sage-grouse do not typically fly at altitudes equivalent to the RSA of modern turbines. According to publicly available information, only one greater sage-grouse mortality has been attributed to collision with a wind turbine (Johnson and Holloran 2010). Therefore, risk of collision with the Project’s wind turbines is considered to be very low.

Mortality of greater sage-grouse from collision with vehicles is a possibility. This risk may be increased near active leks in spring and during low-light times of day. Combined, the total number of sage-grouse observed at the three leks (HB03, HB04, and Lek 5) nearest to turbines was three in 2010 and nine in 2011. Due to the low numbers of grouse observed at these leks and implementation of low speed limits within the Project Area, the risk of collision with vehicles is very low.

3.2.2 Electrocution

Electrical gathering lines for the Project have been placed primarily underground. The Project has two aboveground transmission lines. One line runs between the Horse Butte substation and Cattle Creek substation, and the other line from the Cattle Creek substation to the Palisades-Goshen 11k-kV transmission line. The combined length of these two transmission lines is 150 feet. Electrocution may occur if a greater sage-grouse comes into simultaneous contact with any energized part of the line (the conductor) and another energized part or grounded hardware. The Project transmission lines have been installed to APLIC (2006) standards, which minimizes the potential for electrocution. Due to the use of an underground electrical gathering system and the limited length of new transmission lines within the Project Area, the risk of electrocution is very low.

3.2.3 Disturbance/Displacement

Overall use of the Project by greater sage-grouse appears to be low. Three leks (HB03, HB04, and Lek 5) had a total of nine birds in 2011. The dynamics of lek utilization are complex with males and females moving between nearby leks during a single breeding season, and leks being formed, or reoccupied, and abandoned with natural population size fluctuations. It appears that two leks (HB03 and HB04) may have formed after Project construction in 2011 near an existing lek (Lek 5). Lek 5 had three sage-grouse present on surveys in 2010, but none in 2011. In 2011, HB03 and HB04 had four and five sage-grouse, respectively. Moreover, since the majority of the landcover where roads and turbines are placed is agricultural cropland, sage-grouse would not nest in these areas and no impacts to nesting birds are expected. Ample suitable nesting habitat occurs near these leks outside of the Project Area in the Tex Creek WMA.

Wind energy facility infrastructure alters the landscape characteristics through placement of tall structures (towers and transmission lines) and road networks (Braun 2006). Anticipated threats from these features include behavioral avoidance and auditory and visual disturbance (Connelly et al. 2004; Manville 2004; USFWS 2003, 2012a).

While older technology turbines produce noise levels (Dooling 2002) well above the threshold of 49 decibels (dBA) known to impact breeding birds (Inglefinger 2001), modern turbine technology has noise levels near or below the 49 dBA threshold. American Wind Energy Association (AWEA) documentation indicates that current turbine noise levels are between 35 and 45 dBA at 350 m (i.e., noise level similar to background noise in most homes) (AWEA 2009). Blickley et al. (2012) note that greater sage-grouse abundance decreases at leks near anthropogenic noise. This effect is greater at leks where the noise is intermittent than at leks with continuous noise. Although noise from the Project’s wind turbines may be continuous for relatively short periods time (e.g., hours), fluctuation in wind speeds across longer time periods (e.g., days, weeks) would necessitate that the wind turbines not spin for some portion of that time. The silence interspersed into the Blickley et al. (2012) noise study was at intervals of 30 seconds, a period much shorter than would occur at a wind energy facility. Therefore, it is unclear whether the intermittent noise inherent at a wind energy facility would have the same effect as demonstrated in Blickley et al. (2012).

One new lek (HB04) is approximately 150 feet from a wind turbine. Since this new lek may be a satellite to Lek 5, the overall impact of noise to the lekking behavior surrounding this lek is unclear. Greater sage-grouse may simply revert to using Lek 5, which is further from turbines. This movement back to a previous lek site would amount to no overall impact despite the abandonment of HB04.

Research into the effects of roads on greater sage-grouse is varied. Rogers (1964) found that 42% of leks were over 1 mile from the nearest improved road, but that 26% of leks were within 91 m of a county or state highway. Two leks were on an existing road. Connelly et al. (2004) also note the use of roadways as lek sites. In contrast, Craighead Beringia South (2008) reported that sage-grouse avoid areas within approximately 100 m of paved roads. None of the Project roads are paved and traffic would typically only consist of maintenance personnel on a less-than-daily basis.

Messmer et al. (2013) summarized the results of stakeholder meetings regarding the effects of tall structures on greater sage-grouse. The summary noted that, in 2010 when these meetings occurred, “that there were no peer-reviewed, experimental studies reported in the scientific literature that specifically documented increased avoidance or predation on sage-grouse because of construction, operation, and maintenance of tall structures” (Messmer et al. 2013:273). The authors further note that since 2010 no new information has been published, although some unpublished reports have begun to address the issue. Reports have been published indicating little to no effect on sage-grouse from tall structures. Preliminary results reported in Noone et al. (2013) found no negative correlation on demographic rates (e.g., male survival) with an approximately 290-km-long 345-kV transmission line. Results presented in Atamian et al. (2007) indicate that overhead transmission lines have little to no effect on greater sage-grouse. The effect that wind turbines and other tall structures (e.g., transmission line poles) would have on greater sage-grouse using the Project Area is not known.

3.2.4 Habitat Fragmentation

Greater sage-grouse is considered a sage-obligate species since it depends on sagebrush (*Artemisia* spp.) for a significant portion of its life history (Patterson 1952). Leks are generally located within or adjacent to nesting habitat. Greater sage-grouse nesting habitat consists of a healthy sagebrush ecosystem made up of sagebrush and a native herbaceous understory. No nests are known for the Project Area. Forbs provide nutrients for female egg production and may have a significant effect on reproductive success (Barnett and Crawford 1994). Early brood-rearing occurs close to nest sites, although movements of individual broods may be highly variable depending on local conditions (Connelly 1982; Gates 1983). Females with broods may use sagebrush habitats that have less canopy cover than nesting habitat (Martin 1970; Wallestad 1971). During the summer, hens may move their broods to more moist sites where more succulent vegetation is available (Connelly and Markham 1983; Connelly et al. 1988; Gates 1983; Gill 1965; Klebenow 1969; Savage 1968). The greater sage-grouse winter diet consists almost exclusively of sagebrush, so winter habitats must provide adequate amounts of sagebrush. In total, 47 sage-grouse were observed (in eight observations) during the winter grouse study. The largest group consisted of 20 birds with the remaining observations of eight or fewer individuals.

The results of habitat assessment surveys conducted in 2009 and 2010 are presented in Section 1.6 above, including the discrepancy in the number of acres identified as agriculture cropland between the 2006 NLCD (Fry et al. 2011) and Idaho GAP (Scott et al. 2002). The on-site habitat assessment surveys indicate that more agricultural land exists than is identified in the NLCD (Fry et al. 2011).

Greater sage-grouse habitat in the Project Area was previously fragmented from existing roads and agricultural croplands. Turbine strings and new access roads are primarily within existing agricultural croplands and therefore would contribute marginally to habitat fragmentation. Pre-existing fragmentation likely contributes to the low number of greater sage-grouse at lek sites and no nest sites. Low numbers of greater sage-grouse found during winter surveys indicate low use of the Project Area by this species.

3.2.5 Conclusion

In summary, greater sage-grouse use the Project Area is low based on lek and winter use surveys in 2010 and 2011. Furthermore, the Project Area is primarily agricultural cropland, and surface-disturbing activities have also occurred primarily in that habitat type. Risks of collision and electrocution have been minimized through implementation of low speed limits, APLIC (2006) standards, and other measures described in detail below in Sections 4.1 to 4.3 below. Disturbance/displacement and habitat fragmentation is expected to be very low to none since the Project footprint is located primarily within existing agricultural cropland.

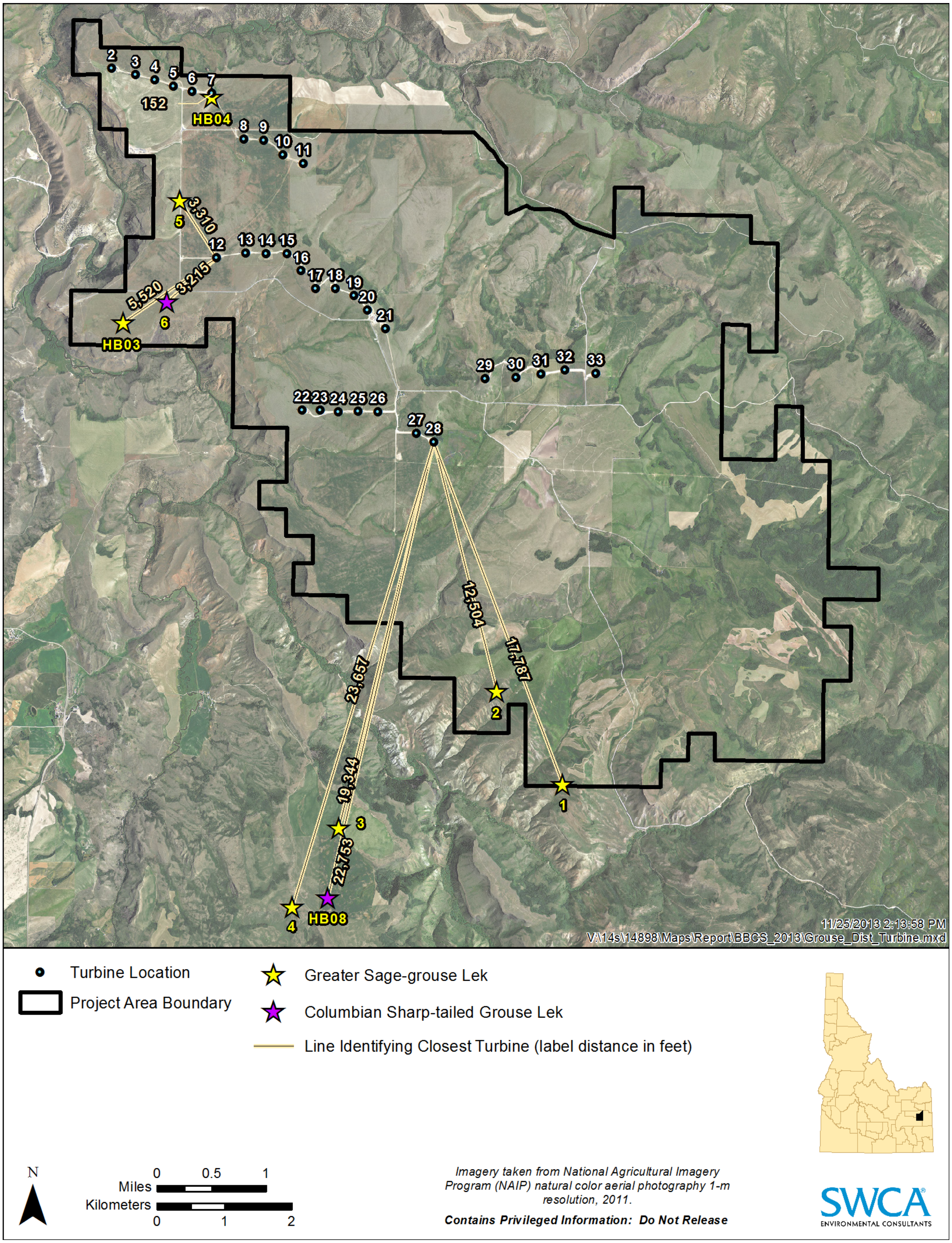

Figure 11. Leks documented in the expanded project area and distance to nearest turbine.

3.3 Bats

A synthesis paper of nationwide bat mortality studies conducted at operational wind facilities was published by Arnett et al. (2009). This study presents three unifying patterns associated with bat fatalities at wind farms that are relevant to the assessment of risk in this project-scale context. First, fatalities were heavily skewed toward migratory bats and were dominated by migratory tree-roosting bats (*Lasiurus* spp., such as the hoary and red bats, and *Lasionycteris* spp., such as the silver-haired bat). The species composition of fatalities at the studied wind facilities had a range of 9% to 88.1% hoary bat, 0.9% to 56% silver-haired bat, and 0.2% to 60.9% red bat (note, however, that only one facility recorded fatalities of western red bat; all others were of the eastern species [*Lasiurus borealis*]). Fatalities of bat species that roost/hibernate in caves and crevices have also been documented, such as the big brown bat, little brown bat, and Brazilian free-tailed bat (*Tadarida brasiliensis*). These species generally constitute a low percentage of documented fatalities (except for the Brazilian free-tailed bat, which constituted a high percentage of fatalities for studies conducted within its range). Second, the reported peak of turbine collision fatalities for silver-haired bats occurred in mid-summer through fall, and secondarily in spring, which are thought to be periods of migratory movements (Arnett et al. 2009). Third, most fatalities occurred on low wind-speed nights, where the median nightly wind speed was less than 6 m per second (Arnett et al. 2009). Many fatalities occurred on the low wind-speed nights immediately following the passage of storms or low-pressure cells.

Bat mortality at operational wind facilities is relatively low to moderate in the open habitats of the Rocky Mountain and Pacific Northwest regions (Arnett et al. 2009). The estimated mean fatality of the six studies located in the Pacific Northwest and Rocky Mountain regions that were summarized in Arnett et al. (2009) ranged from 0.8 to 2.1 bats per 2,000 m^2 of RSA (a standardization across turbine sizes). Fatality estimates in Midwestern, South Central, and Canada regions were comparable to the Pacific Northwest and Rocky Mountain regions. Nationwide, the highest levels of mortality to date have occurred along forested ridgelines in the eastern United States, with estimates ranging from 9.4 to 40.6 bats per 2,000 m^2 of RSA.

A relationship has been detected between turbine size and number of bat fatalities (Arnett et al. 2009; Barclay et al. 2007). At certain facilities larger turbines with greater RSA killed more bats; however, controlled studies have not been done on this subject. Additionally, a relationship between turbine height and number of bats kills has been observed, with bat mortality rising sharply at turbines greater than 60 m in height (Barclay et al. 2007).

Bat mortality occurs as a result of direct collisions with the turbine blades, barotrauma, or a combination of both means; it is difficult to attribute individual fatalities exclusively to one or the other (Grodsky et al. 2011). Barotrauma occurs when tissue damage to air-containing structures, such as the lung, takes place due to a rapid or excessive pressure change. This tissue damage is likely caused by rapid air-pressure reduction near moving turbine blades (Baerwald et al. 2008). When barotrauma alone is the cause of death, no external injuries are detectible.

A bat must be present in the RSA to be killed by the turbine blades. The purpose of installing a microphone 50 m (164 feet) high on the met towers in the Project Area was to sample baseline bat activity at an altitude where, when operational, the turbine blades would be spinning. Bat species with high levels of activity in the RSA during the pre-construction phase of the Project are assumed to be at a higher risk of mortality than those species that were typically recorded below the RSA. This statement assumes that bats are being killed randomly by collisions or barotrauma and are not attracted to the turbines (Cryan and Barclay 2009). However, in light of the lack of published data on this topic, this metric remains important to consider.

3.3.1 Risk Assessment Limitations

Accurate prediction of bat mortality also hinges on the question of whether migratory tree-roosting species are actually attracted to the turbine structures and are not simply randomly traveling through wind facilities. Bats could be attracted to turbines for foraging, roosting, breeding, or other activities (Cryan and Barclay 2009). This hypothesis is supported by the findings of Arnett et al. (2009) as described above, because if collisions were random, the proportion of each species of bat killed would be proportional to the presence of each species in the Project Area and not skewed toward migratory tree-roosting bat species. Although there is circumstantial evidence to suggest that attraction is occurring, it still remains uncertain, and further investigation is necessary.

It is difficult to accurately predict the level of risk to bats because pre- and post-construction monitoring studies conducted at wind farms have not documented a direct correlation between pre-construction bat use and post-construction mortality (Hein et al. 2013; NWCC 2010). In other words, bat species predicted to have the highest risk index based on the highest recorded use within the Project Area may not be the species documented as having the greatest number of fatalities during post-construction monitoring. Despite this limitation, acoustic surveys remain the most accurate and reliable way to document pre-construction bat activity in a project area.

Finally, due to inherent limitations of the acoustic survey protocol it is unknown whether the recorded acoustic data accurately reflect actual bat activity in the Project Area. The data may, however, suggest patterns of bat use at the two sample locations as baseline information for changes over time in the surveyed locations.

3.3.2 Risk Assessment Analysis

The presence of wind facilities increases the potential for direct and indirect impacts on bats in a variety of ways. For example, the construction of new roads increases habitat fragmentation, intensity of road barrier impacts, and potential for mortality from vehicle collisions (Berthinussen and Altringham 2012; Lesiński 2008; Zurcher 2010). These impacts affect all bat species indiscriminately.

Bats may also be negatively impacted by the reduction and disturbance of roosting, hibernating, and foraging habitats resulting from wind farm construction. Due to the configuration of the Project and the habitat types in which it is located, it is unlikely that hibernacula and roost habitat were destroyed during Project construction because the cliff and canyon habitat, where roosting and hibernating is most likely to occur, is located on the edges of the Project Area and outside of the area of direct disturbance. Tree removal can lead to a loss of available roosting habitat for some species; however, minimal tree removal occurred during Project construction.

The remainder of this section focuses on the risk of bat mortality due to the presence of wind turbines. For the purpose of this analysis, an assessment of the risk of mortality to individual bat species in the Project Area focused on the following three questions:

1. Are migratory tree-roosting species present in the Project Area?
2. Do individual species show high levels of activity in the Project Area during the spring and fall high-risk migration seasons?
3. Do individual species show high levels of activity in the RSA?

Table 6 displays the number of minutes recorded during the high-risk seasons (spring and fall) both in the RSA and below the RSA as well as the percentage that each species was recorded in that season (in relation to the total number of minutes for each species shown in Table 5). Further analysis of each high-risk attribute follows in the sections below.

Table 6. Recorded Activity In and Below the Rotor-Swept Area by High-Risk Season

Species	Spring High-Risk Season				Fall High-Risk Season			
	In RSA		Below RSA		In RSA		Below RSA	
	Minutes	% of Total Activity by Species	Minutes	% of Total Activity by Species	Minutes	% of Total Activity by Species	Minutes	% of Total Activity by Species
Little brown bat	1	<1%	17	7%	5	2%	204	83%
Hoary bat	5	3%	1	1%	56	34%	60	37%
Silver-haired bat	28	22%	12	9%	3	2%	54	43%
Yuma myotis	0	0%	8	11%	2	3%	47	64%
Big brown bat	1	1%	1	1%	0	0%	67	97%
Western small-footed myotis	0	0%	2	3%	0	0%	49	84%
Long-eared myotis	0	0%	2	6%	0	0%	31	86%
Townsend's big-eared bat	0	0%	1	5%	0	0%	21	95%
Pallid bat	0	0%	0	0%	0	0%	4	100%
Western red bat	0	0%	0	0%	1	33%	1	33%
Total number of recorded minutes	**35**		**44**		**67**		**538**	
Percentage of total recorded minutes		**4%**		**5%**		**8%**		**67%**

3.3.3 Migratory Tree-Roosting Species

Three migratory tree-roosting species were recorded in the Project Area: hoary, silver-haired, and western red bats. According to the data presented in Table 5, hoary bat calls made up 20% of all recorded data, silver-haired bat made up 16%, and western red bat made up less than 1% of recorded data. Hoary and silver-haired bats had the second and third highest activity levels (respectively) of recorded data among all species (see Table 5). According to Table 6, hoary bat and silver-haired bat are the species that occur most frequently in the RSA during the spring and fall high-risk seasons. The western red bat was one of several species that had a very low level of recorded data, and due to the extremely low sample size for this species it may not be well represented in this analysis.

3.3.4 Spring and Fall High-Risk Season Activity

As stated above, spring and fall migration periods have been identified as high-risk seasons for bat mortality. Most fatalities occur during fall migration for migratory species, with a pulse of silver-haired bat fatalities occurring during spring migration. For the purpose of this analysis, seasonal high-risk time periods have been defined that include but are not limited to migration periods. This is because the actual peak fatality of abundance may shift due to local conditions. The spring high-risk season is defined as April 15 through June 15, and the fall high-risk season is defined as July 15 through October 30 (Arnett et al. 2009). All other time periods are referred to collectively as the low-risk season. Table 6 displays the number of minutes recorded during the spring and fall high-risk seasons and the percentage of activity recorded in that season for each species. Note, however, that some species, such as the pallid and western red bats, have extremely low sample sizes (n ≤ 4) and may not be well represented in this analysis.

Figure 12 displays and ranks species activity during the spring high-risk season, with all minutes recorded during the season equaling 100%. The silver-haired bat has the highest recorded activity during this season, followed by little brown bat and Yuma myotis.

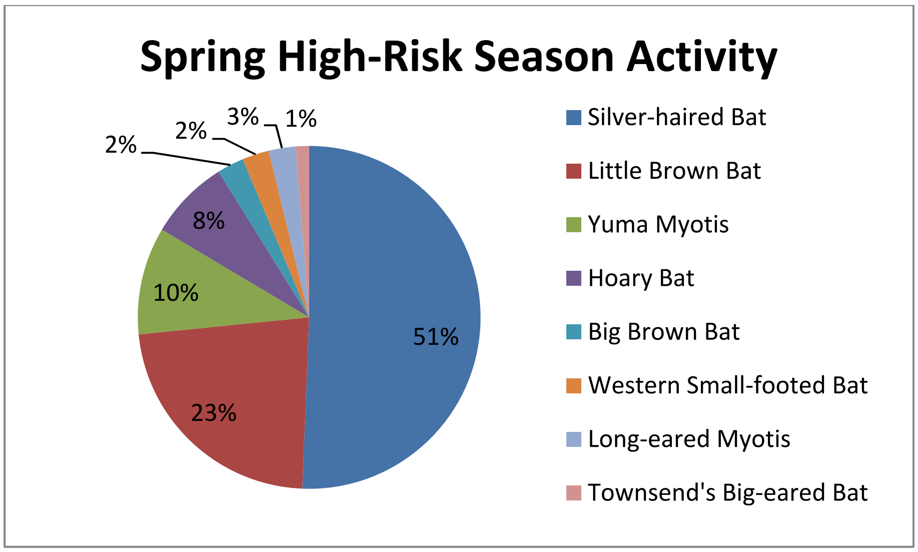

Figure 12. Spring high-risk season activity by species.

Figure 13 displays and ranks species activity during the fall high-risk season, with all minutes recorded during fall migration equaling 100%. The little brown, hoary, and big brown bats have the highest recorded activity during this season.

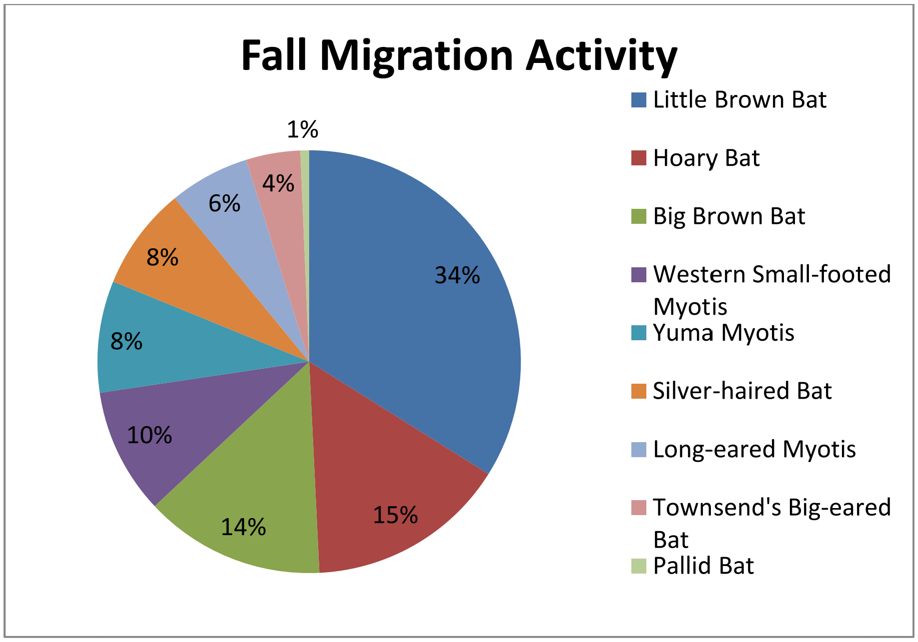

Figure 13. Fall migration activity by species.

3.3.5 *Overall Presence in Rotor-Swept Area*

Six of the 10 species recorded in the Project Area were recorded at a height equivalent to the RSA. Many species, such as the little brown bat, Yuma myotis, western red bat, and big brown bat, have extremely low sample sizes (n < 6) and may not be well represented in this analysis. The hoary and silver-haired bats are the only species with sample sizes greater than n = 6. Relatively high levels of activity of these two species were recorded in the RSA (60% and 31%, respectively).

Figure 14 displays and ranks species activity in the RSA, with all minutes recorded in the RSA equaling 100%. Note that 91% of recorded activity in the RSA is of the hoary and silver-haired bats combined.

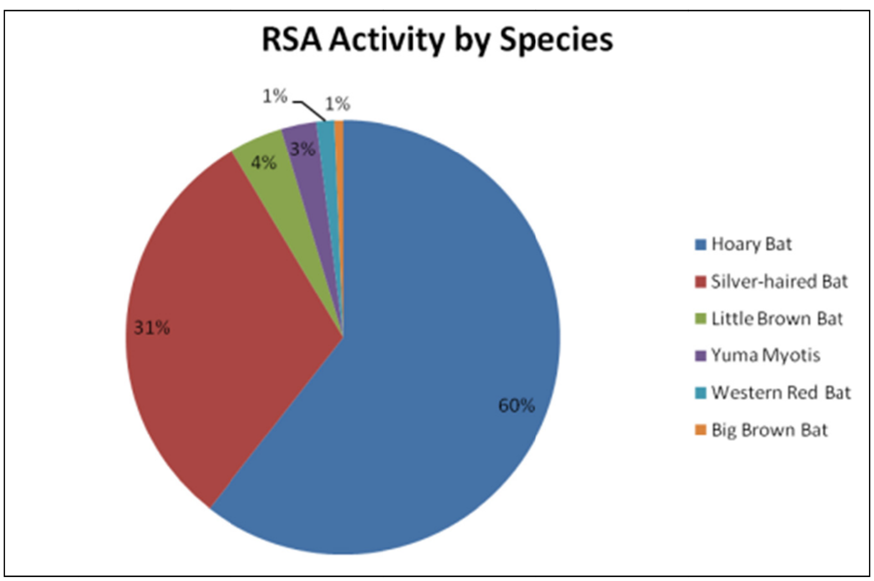

Figure 14. Rotor-swept area activity by species.

3.3.6 Discussion

Ten bat species were recorded in the Project Area, including one species of greatest conservation need, three migratory tree-roosting species, and one species that is not formally recognized as occurring in the state of Idaho. All detected species would be exposed to impacts resulting from Project construction and maintenance, such as habitat fragmentation, increased potential for mortality from vehicle strikes, road barrier effects, and destruction and disturbance of roosting, hibernating, and foraging habitats. Overall, the Project Area consists of habitat types that would not typically produce high levels of activity, and bat activity levels recorded in the Project Area are relatively low compared to other sites sampled in the western United States (personal communication, Michael J. O'Farrell, Sole Proprietor, O'Farrell Biological Consulting, December 15, 2010). However, migratory tree-roosting species were detected both during high-risk seasons and in the RSA. Following is an analysis of recorded activity for migratory tree-roosting bat activity in the RSA during the high-risk seasons that meets all three risk criteria listed in Section 3.3.2.

MIGRATORY TREE-ROOSTING BATS

The risk analysis above indicates that the species with the highest potential for mortality are migratory tree-roosting species with high levels of activity in the RSA during the spring and fall high-risk seasons. The western red bat was only recorded for a total of 3 minutes. Because of this small sample size, a more detailed risk assessment cannot be conducted for this species. Two migratory tree-roosting species, the hoary and silver-haired bats, were recorded during the high-risk seasons as well as in the RSA. For the hoary bat, 95 minutes of recorded activity occurred in the RSA, including 5 minutes (5%) during the spring high-risk season, and 56 minutes (59%) during the fall high-risk season (Figure 15). This activity implies potential for hoary bat fatalities to occur, especially during the fall high-risk season. Forty-seven minutes of silver-haired bat activity was recorded in the RSA, including 28 minutes (60%) during the spring high-risk season, and 3 minutes (7%) during the fall high-risk season (Figure 16). This recorded activity implies potential for silver-haired bat fatalities to occur, especially during the spring high-risk season.

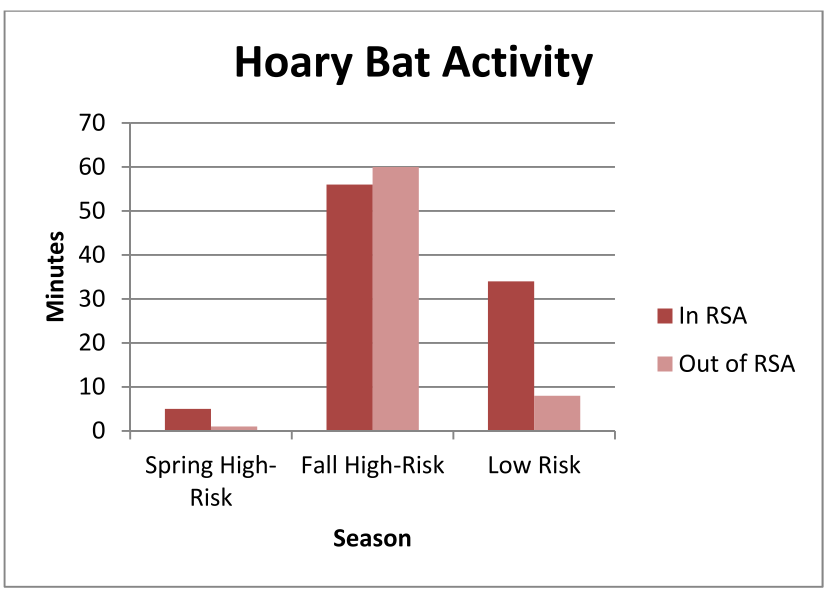

Figure 15. Recorded hoary bat activity in and out of the rotor-swept area by season.

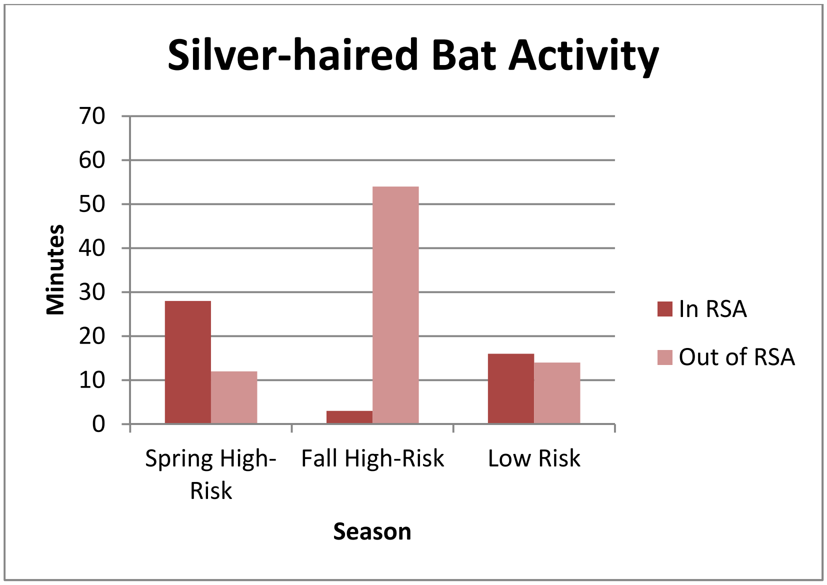

Figure 16. Recorded silver-haired bat activity in and out of the rotor-swept area by season.

OTHER SPECIES

Three other species were recorded in the RSA: big brown bat, little brown myotis, and Yuma myotis. All were recorded in the RSA at very low levels, with little brown myotis being recorded in the RSA the most of the three, at a total of 6 minutes. According to Arnett et al. (2009), fatalities of the big brown bat and little brown myotis have been documented at other wind facilities in North America, with big brown bat fatalities constituting up to 10.7% of documented fatalities, and little brown myotis constituting up to 24% of documented fatalities. Note, however, that fatalities of both species were considerably lower in the Rocky Mountains and Pacific Northwest regions (up to 1.6% and 10%, respectively). Arnett et al. (2009) does not report any documented fatalities of Yuma myotis. The low levels of activity recorded of these species in the RSA imply they may be at risk for mortality from the Project.

3.3.7 Conclusion

As stated above, Hein et al. (2013) found that activity recorded during the pre-construction phase is not a strong predictor of post-construction mortality risk, although there is a weak positive relationship. Because of this, it is unknown how accurately the patterns of activity recorded by this survey protocol can predict actual levels of bat mortality. However, it remains important to assess the three risk factors listed in Section 3.3.2 to form an estimate of whether the high-risk species are occurring in the RSA during the high-risk season.

In summary, when considering the recorded acoustic data from 2010, bat mortality is likely in the Project Area because:

- Migratory tree-roosting species are present in the Project Area, especially the hoary and silver-haired bats.
- Silver-haired, little brown, and hoary bats displayed the highest relative levels of recorded activity in the Project Area during the spring and fall high-risk seasons.
- The silver-haired and hoary bats accounted for 91% of the activity recorded in the RSA.

Because bats (including migratory tree-roosting species) are present in the RSA during the high-risk seasons, there is potential for bat mortality from collisions with and barotrauma from wind turbines. According to the accepted literature (Arnett et al. 2009), migratory tree-roosting species, such as the hoary, western red, and silver-haired bats, are the most likely to be killed. The exact reason that fatalities occur disproportionately to these species is still unclear (Cryan and Barclay 2009). If migratory tree-roosting species prove to be attracted to wind turbine structures, these species may be at a higher risk of mortality than baseline activity levels suggest. Additionally, it is important not to discount the potential for individuals of other species to be killed.

4 PLANNING AND DESIGN STANDARDS AND IMPACT-REDUCING CONSERVATION MEASURES

This section identifies avoidance and minimization measures that have been incorporated into the planning and design of the Project to reduce impacts to birds, and bats and their habitat during the construction, operation, and decommissioning of the Project. These measures are based on the best management practices provided in the Guidelines (USFWS 2012a) and use current Project data to address site-specific concerns. This section also includes detailed advanced conservation measures to specifically address potential impacts to avian and bat species.

4.1 Macro- and Micro-siting

Siting turbines for any wind energy project is an iterative process that includes many environmental, financial, and logistical considerations. At one point in the Project's history, UAMPS had proposed siting a string of turbines adjacent to Willow Creek. As noted in Section 2, several golden and bald eagle nests are located in the Willow Creek corridor. In response to concerns about the risk of collision for golden and bald eagles, UAMPS relocated or eliminated a string of seven proposed turbines that was originally sited within 0.5 mile of these nests. The USFWS accompanied UAMPS planners and engineers in the field and assisted with micro-siting turbines. In addition to considering the distance of a turbine to a nest, consideration was also given to topography and aspect of the nest with respect to the turbine. A few turbines are located within 0.5 mile of a red-tailed hawk nest, but in such cases the site-specific evaluation determined that the location of the turbine did not pose a high risk to the future breeding success of red-tailed hawks, nor did it increase the risk of collision of red-tailed hawks with the turbines.

4.2 Avoidance Measures in Project Design

The following avoidance measures were incorporated into the Project design:

- The Project has installed tubular turbines to reduce the ability of eagles to perch and therefore reduce risk of collision.
- The minimum number of lights has been installed to meet safety and Federal Aviation Administration (FAA) requirements as well as to reduce night sky lighting and impacts to birds and bats. FAA-approved red lights with short flash durations that emit no light during the "off phase" (i.e., those lights that have the minimum number of flashes per minute and the briefest flash duration allowable) will be used. Additionally, radar-activated lighting will be installed, and if approved by the FAA, will be used in place of continuously flashing lights.
- Auxiliary buildings use lights that are motion sensitive rather than steady burning, and light is cast downward.
- All electrical collection lines have been buried underground.
- Only two very short segments of electrical power line are aboveground (one from the Horse Butte substation to the Cattle Creek substation and one from the Cattle Creek substation to the existing Palisade-Goshen 115-kV line). These lines have been constructed to APLIC (2006) standards to reduce the likelihood of collision and electrocution.
- Guy wires can be hazardous to avian species; therefore, permanent met towers are unguyed. If met towers must be guyed, guy wires will have USFWS-approved bird diverters installed to minimize collision risk.

- UAMPS initially proposed three permanent met towers but subsequently reduced the number of met towers at the Project to one permanent met tower. Accordingly, the number of permanent met towers has been kept to the minimum needed to accurately assess the wind resource in the Project Area. Three temporary met towers are also deployed in the Project Area to assess the feasibility of Phase 2.
- Turbines have been placed away from any edge of Willow Creek Canyon or similar ridgelines by at least 50 m in order to establish and maintain a non-disturbance buffer between the canyon and ridgeline habitat and the Project. This distance was based on the risk factor analysis methods for individual turbines in the draft ECP Guidance (USFWS 2011a), which was the first version of the ECP Guidance to be released during turbine siting. The draft ECP Guidance defined *near*, in the context of individual turbine risk relative to placement adjacent to a ridge-crest or cliff edge, as "within 50 meters".
- Disturbance has been minimized by using existing roads, power lines, fences, and other infrastructure to the greatest extent practicable.
- The collection system in the vicinity of turbines 28 and 29 was moved to avoid two potential wetlands.
- The Operations and Maintenance building was originally going to be constructed on the Project site, but instead, the building was constructed in the town of Ammon to minimize the Project's footprint and eliminate operational lighting for the building within the Project site.

4.3 Impact Minimization Measures during Construction, Operation, and Decommissioning

The following impact minimization measures were implemented during construction and will continue to be implemented during operation and decommissioning as appropriate:

- Construction vehicle movement within the Project Area has been restricted to predesignated access, contractor-required access, and public roads.
- Vehicle collision risk with wildlife has been minimized by instructing Project personnel to drive at 25 miles per hour or less, be alert for wildlife, and use additional caution in low-visibility conditions.
- Surface restoration of temporary disturbance areas and restoration of construction roads not needed for operations included recontouring and reseeding with a seed mix approved by the Natural Resources Conservation Service, including seeding with native species as appropriate.
- Fire hazards from vehicles and human activities have been reduced (e.g., spark arrestors are used on power equipment, off-road driving is avoided).
- Management that indirectly results in attracting raptors to turbines, such as seeding forbs or maintaining rock piles that attract rabbits and rodents, has been avoided.
- Garbage and waste disposal on the Project site is managed to avoid creating attractive nuisances for wildlife.
- Stored parts and equipment, which may be used by small mammals for cover, have been moved away from wind turbines.
- When the Project is ready for decommissioning, the land used for operation of the facility will be restored to the original land use prior to construction within six months, according to the Use

Authorization from Bonneville County and the conditions of the lease agreement with the landowner.

- Restoration will include the removal of all facilities (whether above or below ground) related to operating the Project. Disturbed lands will be reseeded with flora appropriate for the land use (e.g., native, agricultural, CRP seed mixture). Local, state, and federal land management agencies will be consulted to determine the most appropriate seed mixture prior to seeding. A three-year weed abatement program will be implemented following reseeding.

4.4 Best Management Practices

The following best management practices have been and will continue to be implemented during operation of the Project to minimize impacts to avian and bat species.

- **Invasive Species Management.** UAMPS has implemented a weed abatement plan which includes a Natural Resource Conservation Service–approved seed mix to be used in the Project Area in conjunction with the CRP requirement. The seeds are obtained locally and are endemic to the area. UAMPS also consults with the County to manage invasive species.
- **Snow Management.** Snow banks can cause big game to run along roads, resulting in collisions with vehicles and increasing carcasses that are attractive to scavengers and eagles (USFWS 2011c). Therefore, snow banks along Project roads will either be removed or cuts will be created in snow banks at least every 500 feet that are large enough to allow ungulate movement across roads. This measure will reduce the prevalence of carcasses along roads, thereby preventing eagle attraction to the site and reducing the potential for collision.
- **Vegetation Management.** Natural materials (i.e., rock piles, woody debris piles) and tall vegetation (i.e., tall forbs, grass, weeds) will be removed/maintained beneath turbines to reduce shelter and forage for small mammals, thereby reducing prey availability for raptors and minimizing raptor foraging in proximity to turbines.
- **Wildlife Carcass Management Program.** Wildlife carcasses attract vultures, eagles, and other scavengers; therefore, the likelihood of collision increases when carcasses are present at a project site. UAMPS will work with local and state agencies to ensure the regular removal of any dead medium- and large-sized mammals from the area of the Project. If possible, UAMPS will work with IDFG to designate appropriate disposal areas for these carcasses that are safer and that could benefit the local eagle population. This measure is aimed at preventing eagle attraction to the site, reducing the potential for collision and impact to the regional eagle population. To reduce the likelihood of attracting eagles within the Project's footprint Project personnel will:
    - look for animal carcasses while traveling through the site. All carcasses identified will be reported to the site manager within 8 hours and removed from the site within 48 hours of notification.
    - look for kettles of vultures, eagles, or other scavenger birds that are circling in one area. Any kettles observed will be reported to the site manager within 8 hours, and the area below the kettle will be searched for carcasses within 24 hours. Any carcass found will be removed from the site within 48 hours of identification.
- **Power Line Marking.** Collision with power lines are a contributing factor impacting raptor populations. Therefore, improving visibility of those lines will help minimize overall mortality to raptor populations. As approved by the necessary entities, visual markers will be placed on BPA's existing 115-kV power lines out to ten miles from the Project Area to minimize collision by raptors.

- **Risk Assessment.** Annual post-construction reports will discuss bird and bat fatalities in the context of predicted risk to assess the effectiveness of mitigation and adaptive management measures. The first annual post-construction report will describe post-construction fatalities relative to the predicted risk and provide an updated predicted risk assessment based on use counts conducted during pre-construction and in year 1 post-construction. The second annual report will describe post-construction fatality relative to the updated predicted risk.

4.5 Worker Education Awareness Program

A worker education awareness program has been implemented and will continue during operation of the Project. A half-day training was given to all on-site personnel and Project operations staff on June 7, 2013. The program provided instruction on avoiding harassment and disturbance of wildlife (including birds and bats), especially during reproductive (i.e., courtship, nesting) seasons. This training taught workers how to identify bird and bat species that may occur in the Project Area, record observations of these species in a standardized format, and take appropriate steps when downed birds and bats are encountered.

5 POST-CONSTRUCTION MONITORING AND REPORTING

As the developer of an "on-ramp" project, construction of which was underway when the Guidelines were developed in March 2012, UAMPS intends to comply with Stages 4 and 5 of the Guidelines. Along these lines, UAMPS intends (in drafting this BBCS) to continue engaging in discussions with USFWS regarding the extent and design of post-construction studies to assess fatalities and habitat-related impacts and to conduct such post-construction studies for two years following commencement of operations. Additionally, as provided below, UAMPS will continue to communicate the results of these studies to USFWS. It is recognized that the post-construction monitoring plan—the methods and timeline described herein—may be adapted as the Project progresses based on new scientific developments and USFWS feedback.

The post-construction monitoring plan includes all available and viable measures planned to avoid and minimize impacts to eagles, as well as to non-eagle avian species and bat species which are the focus of this BBCS, that may occur during operation of the Project. However, as with any project, impacts that were not anticipated may occur during operation. This section provides methods to monitor and analyze both anticipated and unanticipated impacts that may occur during operation of the Project.

The primary objectives of post-construction monitoring and reporting are to document mean annual eagle, avian, and bat fatality rates; record species composition of fatalities; and assess possible disturbance effects on eagle nests adjacent to the Project Area. Additionally, post-construction surveys will inform an adaptive management process; for example, fatality data will allow for identification of temporal and spatial patterns of fatalities.

5.1 Post-construction Fatality Monitoring

Post-construction monitoring for avian and bat species is a critical component of this BBCS. The initial post-construction monitoring will be used to estimate the actual level of fatality, compared with the estimated fatality (which may be qualitative if a quantitative estimate is not available) in the pre-construction risk analysis. Post-construction monitoring will be completed concurrently for eagles, other birds, and bats.

One of the primary objectives of fatality monitoring is to determine whether individual turbines or strings of turbines are responsible for the majority of fatalities, and for any high-fatality turbines, to identify the factors associated with those turbines that might account for the fatalities and which might be addressed via conservation measures and advanced conservation practices (ACPs).

Detailed methods for these surveys are presented below. UAMPS may alter methods over time to incorporate new survey techniques and protocols as they become available.

5.1.1 Avian and Bat Fatality Surveys

Surveys for avian, eagle, and bat fatalities were initiated in September 2012 and will continue for two years following commencement of Project operations until August 2014 to evaluate fatality levels from operation of the Project. Following the detailed two-year fatality survey period, UAMPS will implement an internal monitoring program to be conducted by on-site workers to track fatalities for the rest of the life of the Project (see Section 5.3). Project personnel will report birds (including eagles) injured or killed due to Project operation, as well as any actions taken to address such events, to the USFWS BIMRS, maintained by the USFWS OLE. Per wildlife collection permit (Permit MB03589B-0) stipulations, reporting and disposition of carcasses will be handled differently for eagles, threatened and endangered species, and other migratory species and bats. As recommended by Strickland et al. (2011), approximately one-third (10; 31%) of the operating turbines will be systematically searched for carcasses. These 10 turbines will be chosen at random and stratified based on risk (i.e., proximity to ridgelines, habitat type, and proximity to active eagle nests) prior to the initial survey. UAMPS will communicate with the USFWS prior to final turbine selection. The same 10 turbines will be sampled each survey period to account for correction bias correction factors when estimating fatality rates.

Consistent with other long-term post-construction avian fatality surveys at wind energy facilities (Erickson et al. 2003; Erickson et al. 2004; Strickland et al. 2011; Young et al. 2003), but adapted for the Project, these surveys will occur throughout the year to evaluate the overall impacts to birds and bats. The 10 operating turbines will be surveyed at varying levels of frequency throughout the year. During peak spring migration (March 16–May 15) and peak fall migration (August 16–November 15), operating turbines will be surveyed every seven days. During other times of the year (November 16–March 15, May 16–August 15) operating turbines will be surveyed every other week. After year 1, carcass removal studies will inform an adaptive process to determine whether monitoring intervals are appropriate for the site (see Section 5.1.3). Surveys will be conducted across a four- or five-day period during each survey session. Personnel trained and tested in proper search techniques will conduct the surveys.

Survey plots will be 134 × 134 m (17,956 m^2), centered on the wind turbine mast. Most birds and bats killed by wind turbines are found within 63 m of the turbine (reviewed by Young et al. 2003); therefore, surveying a plot that measures 134 × 134 m will ensure that all areas within 63 m of the turbine are surveyed. Searchers will look incidentally outside the 134 m × 134 m plots when conducting the survey. Although circular survey plots have been used for other fatality surveys (Baerwald et al. 2009; Kerns and Kerlinger 2004), Young et al. (2003) employed rectangular plots for ease of use, and others (e.g., Arnett et al. 2009; Erickson et al. 2000; SWCA 2013b; Thompson et al. 2011) have used a similar plot shape (e.g., 126 × 120 m, 100 × 100 m, 120 × 120 m, 150 × 150 m) for fatality surveys. Transects will be spaced at 6-m (20-foot) intervals, with surveyors searching for 3 m (10 feet) on both sides of each transect (Arnett et al. 2009; Erickson et al. 2003; Erickson et al. 2004). After year 1, the distances at which carcasses were located from the turbine mast will be examined. Potential adjustment of the sampling frames will be based on the 95% confidence interval of the median distance of carcasses from turbine masts.

Data collected for each carcass will include, but will not be limited to, species, age, sex, estimated time since death, condition, type of injury, cover type, global positioning system (GPS) coordinates, distance to nearest wind turbine generator location, distance to nearest road, and distance to nearest structure. On the night before each survey session, wind speed, wind direction, temperature, and barometric pressure will be recorded using data collected by the met towers. In the field, surveyors will record wind speed, direction, temperature, sky conditions, precipitation events, and visibility at time of survey. All observed carcasses will be photo-documented and identified to the lowest taxonomic level possible using field notes, *The Sibley Guide to Birds* (Sibley 2000), and *Peterson Field Guide to Mammals of North America* (Reid 2006) as primary references.

Per the USFWS (2013a:Appendix H) recommendation, data on eagle carcasses found will include the date, species, age and sex when possible, band number and notation if wearing a radio transmitter or auxiliary marker, observer name, turbine or pole number or other identifying characteristic, distance of carcass from turbine or pole, azimuth of carcass from turbine or pole, decimal-degree latitude longitude or UTM coordinates of the turbine/pole and carcass, habitat surrounding the carcass, condition of the carcass (entire, partial, scavenged), description of the carcass (e.g., intact, wing sheared, in pieces), rough estimate of time since death (e.g., less than one day, more than one week) and how estimated, digital photograph of the carcass, and information on carcass disposition.

Searcher efficiency studies and carcass removal studies will be done to quantify searcher bias and determine the rate at which carcasses are removed by scavengers or by other means. The results of these studies will be used to develop correction factors to estimate adjusted fatalities for the Project and for each surveyed turbine, as appropriate. Additionally, survey intervals may need to be adjusted based on the findings for these studies to ensure the use of precise correction factors, using methods similar to those described by Huso (2008, 2011).

5.1.2 Searcher Efficiency Studies

The primary objective of searcher efficiency studies is to estimate the percentage of bird and bat carcasses that searchers are able to find. Estimates of searcher efficiency are then used as a correction factor to calculate adjusted fatality. Searcher efficiency studies will closely follow methods described in previous studies (Arnett et al. 2009; Erickson et al. 2003; Erickson et al. 2004). Searchers will search for carcasses using the same methods presented in Section 5.1.1. The studies will be conducted four times per year (once per season) for up to two years following commencement of Project operations. The studies will be conducted for each two-person searcher team. Searcher efficiency studies will be completed during each season to account for different field conditions (i.e., snow, dense spring vegetation, dry summer vegetation) that may affect the ability of the surveyors to locate carcasses. Seasons will be defined as described by Erickson et al. (2003): spring migration (March 16–May 15), breeding season (May 16–August 15), fall migration (August 16–October 31), and winter (November 1–March 15). Although seasonal studies will not address fluke events, such as snow in June, they will address field conditions relevant to the overall time period.

Separate searcher efficiency rates will be determined for the following categories:

- Bats
- Large birds, defined here as
    - raptors (Falconiformes [diurnal birds of prey] and vultures);
    - waterfowl (Anseriformes, or ducks, geese, and swans); and
    - waterbirds (bitterns, herons, egrets, ibises, and cranes)
- Small birds (nonlarge bird species, primarily passerines)

Carcasses of species that approximate the size of each species in these categories will be used for searcher efficiency studies, and these carcasses will be obtained from RodentPro. Mouse carcasses will be used to represent bats, quail carcasses will be used to represent small birds, and chicken carcasses will be used to represent large birds (Erickson et al. 2000; SWCA 2013b). These surrogates are proposed as they are readily available and used by other similar studies; however, we will examine using other representative carcasses (e.g., bats to represent bats, pheasants to represent large birds) during the course of the study. Carcasses will be distributed throughout five of the survey plots, in locations unknown to the searchers.

Prior to initiating the searcher efficiency study, carcass locations will be randomly generated but constrained, so that no more than three carcasses will be located at any one turbine at a time to avoid predator swamping. An additional biologist who is not participating in the searcher efficiency studies will plant carcasses at these predetermined turbines. Carcasses will be dropped from waist level so that they land in a random position and location. The position and location will be recorded for later comparison with actual fatalities. The biologist will record the location of each carcass with a GPS unit, as well as ground cover type, vegetation, turbine number, date, and time.

When surveyors locate a placed carcass, they will record the location using a handheld GPS unit, which will be compared in GIS to the locations recorded during placement. The percentage of planted mice, quail, and chickens located by surveyors will be used to generate a correction factor (by turbine as appropriate) to estimate the actual number of bats or birds killed, based on the number of observed fatalities

Searcher efficiency rates are expressed as the proportion of study carcasses that are detected by searchers in the searcher efficiency studies. These rates will be grouped by carcass size and season for the adjusted fatality estimate. The data will not be stratified by vegetation cover type, as the adjusted fatality estimate analysis only allows for one to two covariates (i.e., season and/or carcass size) and vegetation cover type is similar throughout the site (i.e., limited by sample size). In order to have an adequate sample size, 10 carcasses per stratum (i.e., bats, large birds, small birds) per season will be used.

5.1.3 Carcass Removal Studies

The objectives of the carcass removal studies are to document the length of time carcasses remain in the surveyed area and are available to be found by searchers and to determine the appropriate frequency of carcass searches for turbine-associated fatalities within the search plots. Carcass removal studies will be completed seasonally and concurrently with the searcher efficiency studies described above. Different seasonal rates for carcass removal are necessary to address changes in scavenging throughout the season, as well as over time, because scavengers adapt to novel food sources.

Carcasses will be placed as described for searcher efficiency studies. They will be checked at intervals similar to those used by Erickson et al. (2003) and Young et al. (2003) on days 1, 2, 3, 5, 6, 7, 10, 14, 21, and 28 following placement, or until they are all removed. Separate carcass removal rates will be determined for bats, small birds (passerines), and large birds (raptors). All animals used in the carcass removal studies will be handled with disposable nitrile gloves or an inverted plastic bag to avoid leaving a scent on the carcasses and interfering with the scavenger removal study (Arnett et al. 2009).

The mean carcass removal rate will be derived from the carcass removal studies and will be used to adjust the search interval. For example, if the mean number of days that a carcass persists is six days (other studies have shown a range of two to 52 days), then search intervals of 12 days would be recommended. The appropriate frequency of searches will be investigated after year 1. Estimates of the probability that a carcass was not removed in the time between surveys, and therefore was available to be found by searchers, will be used to adjust carcass counts for removal bias (Huso 2011; Huso et al. 2012).

5.1.4 Adjusted Fatality Estimates

Unadjusted (observed) fatalities (i.e., raw carcass counts) and adjusted fatality estimates (raw carcass count data adjusted for imperfect detectability) will be presented in annual reports to be submitted during the first quarter in each of the first two years following commencement of Project operations, as discussed in greater detail in Section 5.3. Adjusted fatality estimates are based on observed carcasses found during formal carcass searches, the probability that a searcher will miss a carcass (searcher efficiency correction factor), the probability that a carcass will be removed before a searcher can locate it (carcass persistence correction factor), and the proportion of turbines searched to the total number of turbines at the facility. There are several statistical estimators available for calculating adjusted avian fatality estimates. In instances when searcher efficiency is low and carcass persistence time is short, sophisticated statistical estimators (e.g., Erickson et al. 2004, Huso 2011, Korner-Nievergelt et al. 2011) tend to overestimate the number of fatalities (Korner-Nievergelt et al. 2011). Huso (2011) showed that her estimator was more reliable than two commonly used estimators (Johnson et al. 2003 and Kerns and Kerlinger 2004), while Korner-Nievergelt et al. (2011) showed the estimators (Erickson et al. 2004, Huso 2011, and Korner-

Nievergelt et al. 2011) performed similarly. Korner-Nievergelt et al. (2011) suggest that there may be no estimator that produces unbiased estimates in all situations due to heterogeneity in carcass persistence time and detectability related to carcass coloration and size; predator behavior; microclimate; season; vegetation height, type, and density; and differing search intervals and study periods between studies.

Avian fatality estimates will be calculated using an industry-accepted statistical estimator; searcher efficiency and carcass persistence results may inform the specific estimator used. The statistical estimator used in Huso (2011) and Huso et al. (2012) is currently thought to be reliable for reducing biases in the data. The estimator also can account for unsearched areas within the search plot. Adjusted avian fatality estimates will be presented by summary groups (i.e., birds overall, small birds, and large birds) per year for the total Project Area, per turbine per year, and per MW per year. Because adjusted fatality estimates are calculated for summary groups and not for individual species, if an eagle fatality is found, raw carcass data will be presented by eagle species.

5.1.5 Permits and Surveyor Qualifications

SWCA will be conducting the post-construction avian fatality and disturbance monitoring on UAMPS' behalf. SWCA is UAMPS' environmental contractor for the project and sub-permittee on the USFWS's Special Permit–Utility (SPUT) permit (50 CFR 21.27) approved by USFWS on April 16, 2013 and IDFG's Scientific Collection Permit issued April 9, 2013. Among other things, these permits authorize the collection, transport, and temporary possession of migratory birds and bats found dead on utility property, structures, and rights-of-way for fatality monitoring purposes. SWCA biologists will be responsible for the proper handling and reporting of bird fatality and disturbance over the course of the Project. The biologists listed in the SPUT permit were responsible for characterization of the baseline avian conditions in and around the Project Area. Full descriptions of each biologist's background and expertise, including resumes, are included in the SPUT permit. The biologists are highly qualified to conduct baseline avian surveys (for large birds and passerines), eagle use surveys, avian nest surveys, avian migration surveys, avian fatality and disturbance surveys, and eagle tagging and telemetry.

5.1.6 Detection Procedures and Protocols

Per wildlife collection permit (Permit MB03589B-0) stipulations, the USFWS Eastern Idaho Field Office (FO) and OLE will be notified within 24 hours if any federally listed species or eagle is detected during avian fatality surveys. Any state-listed species fatality will be reported to IDFG within 48 hours.

If any eagle carcasses are found, the local USFWS Eastern Idaho FO and USFWS OLE will be contacted immediately to communicate the best course of action. OLE preference regarding eagle carcass handling and disposition will be determined prior to conducting fatality searches. A freezer will be available at the Project's Operations and Maintenance building located nearby in Ammon, Idaho, for storage as needed. When a dead eagle is found, the following information will be recorded on a fatality data sheet: date, species, age and sex (if possible), band number and notation if wearing a radio-transmitter or auxiliary marker, observer name, turbine or pole number or other identifying characteristic, distance of the carcass from the turbine or pole, azimuth of the carcass from the turbine or pole, decimal-degree latitude and longitude or UTM coordinates of the turbine or pole and carcass, habitat surrounding the carcass, condition of the carcass (entire, partial, scavenged), description of the carcass (e.g., intact, wing sheared, in multiple pieces), a rough estimate of the time since death (e.g., less than one day, more than one week) and how estimated, a digital photograph of the carcass, and information on carcass disposition.

5.2 Long-Term Project Monitoring

Following the completion of the initial two years of post-construction monitoring, UAMPS will implement an internal monitoring program, which will be used by on-site Project personnel to record avian and bat fatalities over the long-term duration of operation. The intent of this monitoring program will be to ensure that the turbines at the site are frequently inspected for possible avian or bat impacts and that if impacts are identified, they are recorded, agencies are notified, and mitigation measures are identified and implemented. The monitoring program will be used for the life of the Project beginning after the first two years of post-construction monitoring studies. The main purposes are as follows:

- To provide a means of recording and collecting information on incidental avian and wildlife species found dead or injured within the Project Area by on-site Project personnel.
- To provide a set of standardized instructions for on-site Project personnel to follow in response to wildlife incidents in the Project vicinity.
- To keep on-site Project personnel mindful of wildlife interactions.

The following occurred during the first year of operations and will continue through the duration of operations:

- A worker education awareness program has been provided to all contractors, Project operations staff, and other personnel who will be on-site on a regular basis. This training, which will be offered annually throughout the Project's operational period, teaches them how to identify bird and bat species that may occur in the Project Area, record observations of these species in a standardized format including photo documentation, and take appropriate steps when downed birds and bats are encountered.
- Standardized data forms have been prepared and provided to on-site Project personnel, and a supply of these forms will be maintained.

The following will occur during operation, beginning in the fourth year after construction:

- Each time a turbine is visited by on-site Project personnel (typically at least once per month), it will be searched for carcasses via pedestrian survey.
- Pedestrian surveys to search for carcasses will cover the area immediately surrounding the turbine (concentric circles out to 10 m).

The following will occur if dead or injured birds or bats are found at the Project by on-site Project personnel:

- The Project manager will be notified immediately, and the Project manager will in turn notify the USFWS. If the fatality of an eagle or a species listed under the ESA is recorded, the finding will be reported within 24 hours, if not sooner, and entered into BIMRS within five days of observation. If other migratory bird species fatalities are observed, they will be reported and entered into the BIMRS within 10 days of observation). The location will be recorded using a GPS unit.
- An Avian and Wildlife Reporting form will be filled out, and photos will be taken. This information will be turned in to the Project manager and provided to the USFWS.
- The animal will not be moved or removed by any individual who does not have the appropriate permits.

- Permits are required to handle wildlife. The Project manager will coordinate with the USFWS to arrange transportation and treatment of an injured threatened or endangered species or eagle. At the Project's cost, animals that are approved for removal/relocation will be taken to a local USFWS-approved rehabilitation center or disposed of as recommended by the USFWS. Non-eagle carcasses and parts will be legally distributed via licensed repositories.

5.3 Reporting

5.3.1 Initial Monitoring Reporting

Annual reports will be completed in the first quarter of each of the first two years following commencement of Project operations and provided to the USFWS for review. Reports will detail the findings of fatality surveys and avian use counts. Annual reports will also include a validation of risk assessments based on pre-construction data by comparison with post-construction data indicating realized impacts to birds and bats from Project operation.

Fatality data will first be assessed for bats, large birds, and small birds by sample area to determine the estimated fatality for the Project during that survey period using the following equation:

$$M_E = (M_O/T_S)(T_A)(C_E)(C_S).$$

M_E equals the total estimated fatality for a sample area for bats, large birds, or small birds. M_O equals the actual mortality observed in a sample area. T_S is the number of turbines surveyed in a sample area. T_A equals the total turbines in a sample area. The searcher efficiency (C_E) and carcass removal rates (C_S) will be calculated for each sample area and applied. The most recent acceptable methods (such as Huso 2011 and Huso et al. 2012) will be used to determine searcher efficiency and scavenger rate correction factors. Estimated fatality for the entire Project during a survey period would be calculated by adding the M_E values for all sample areas.

Overall fatality data for each category (bats, large birds, and small birds) will be presented per MW per year, per turbine per year, and per 100,000 m^2 RS) per year. Species-specific fatality data will be presented as raw data. Adjusted fatality estimates will be presented for both eagle species; however, it should be noted that caution must be used when interpreting adjusted fatality estimates for groups with fewer than five observed fatalities (Huso et al. 2012). Because adjusted fatality is calculated by groups (i.e., carcass type, season, sensitivity classification), correction factors are not generally used to adjust individual species numbers.

UAMPS has set up an account in the BIMRS database for submission of documentation on bird fatalities. The data will be entered into this system within five business days following completion of the survey round's tracking sheets. If golden or bald eagle fatalities are recorded, the data will be reported to the USFWS within 24 hours, or sooner, and entered into BIMRS within five days of observation. These data will be available for review and broad-scale evaluations by the USFWS OLE, as is done for the electric utility industry (APLIC 2006).

5.3.2 Long-Term Monitoring Reporting

After the first two years following commencement of Project operations, the data will be logged in a tracking spreadsheet maintained by the Project manager and presented in annual reports to the USFWS. As allowed by law, confidentiality will be maintained between UAMPS and all agencies reviewing the Project reports.

6 COMPENSATORY MITIGATION MEASURES AND ADAPTIVE MANAGEMENT

6.1 Adaptive Management Process

The mitigation measures and adaptive management techniques described in this section have been developed to offset any bird or bat mortality associated with operation of the Project that could affect species' populations. Federally listed species (i.e., ESA-listed or USFWS Birds of Conservation Concern [USFWS 2008]) are considered the species most in peril; therefore, it is assumed that mortality of those species would have the greatest effect on populations and species' persistence. Similarly, state-listed species have been identified as having the most conservation concern and, like federally listed species, it is assumed that mortality would have greater implications on the persistence of the populations of those species. Therefore, addressing federally and state-listed species in this BBCS effectively ensures that population-level impacts to all avian and bat species would not occur. If at some time a new species becomes more imperiled, it would be added to the state list, federal list, or both lists and therefore added to this BBCS. Conversely, if a species is removed from listing because of its recovery, it would also be removed from the BBCS.

As defined in the USFWS *Land-Based Wind Energy Guidelines* (USFWS 2012a:59), adaptive management is "an iterative decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood." The most effective way to implement an adaptive management process is by utilizing a tiered mitigation approach combined with monitoring. The following steps were used to form the tiered approach proposed here:

1. **Develop mortality thresholds.** Using pre-construction site-specific data and regional data and though coordination with wildlife management agencies and resource experts, mortality thresholds that represent the best understanding of how much mortality a species or group of species can withstand before having population-level effects were determined. Thresholds were developed for special-status species only, as these species are the most imperiled and mortality is most likely to have population-level impacts on those species.

2. **Develop mitigation phases.** The first phase uses the most simple mitigation method (i.e., the lowest-cost method) to address the specific cause of mortality. If it is unknown how to mitigate for a specific mortality, an offset may be used. As mitigation phases increase, so does the level of mitigation needed, and consequently the cost.

3. **Develop mitigation phase costs.** A cost for each mitigation phase was developed by assessing types of increasing mitigation that may be used. The ultimate cause for mortality and mitigation response are unknown until they occur; therefore, a dollar amount based on "types" of mitigation that would be appropriate for increasing phases of mitigation was used.

4. **Implement a monitoring program.** A monitoring program was developed to assess impacts from operation (see Section 5.2 above). Each time a threshold is exceeded, a progressively higher mitigation phase is implemented.

The outcome of this tiered approach is a focused set of mitigation measures utilized to address real-time project-specific impacts, without having extraneous mitigation measures that do not address the actual problem(s).

6.2 Avian and Bat Fatality Thresholds

Fatality thresholds have been developed for avian and bat species known to occur or that may occur in the Project Area. For purposes of developing fatality thresholds, the more sensitive a species is to population declines (based on listing status) the lower the fatality threshold for that species. For this BBCS, species for which thresholds have been designated are provided protection by federal (ESA, MBTA) and/or state regulations, which protect against unlawful take. Currently, there are no federally listed threatened or endangered bird or bat species likely to occur in the Project Area (see Appendix B). Because a separate ECP has been developed that includes a specific adaptive management process for bald and golden eagles (SWCA 2013a), these species have been excluded from thresholds in this BBCS.

Observation of other federally or state-listed species not listed in Appendix B or Appendix C or changes in federal or state listing status for avian and bat species occurring within the Project Area may result in the addition, removal, or reclassification of species for mitigation thresholds. These thresholds do not permit take but have been developed to address the greater concern posed by potential population impacts to those species in order to ensure that impacts are not substantial.

Thresholds have been developed for implementation of non-operational mitigation as well as operational mitigation. Operational mitigation includes measures that change how turbines operate, such as delayed start-ups and temporary shutdowns. Non-operational mitigation includes measures that do not affect daily operation of the facility, such as compensatory mitigation and habitat enhancement (on- or off-site). Non-operational mitigation thresholds address fatality that occurs more or less randomly over time, whereas operational mitigation thresholds address episodic mortality events. Non-operational mitigation thresholds have been developed though coordination with local and regional USFWS and IDFG wildlife biologists and other experts to assess each species' regulatory and conservation status and general vulnerability to population decline (Table 7). If mortality thresholds are exceeded, phased mitigation as defined in Section 6.3 will be implemented.

Species-specific fatality thresholds are based on actual observed fatalities; they will not have searcher efficiency or carcass persistence correction factors applied, because the factors correct for observations of all species but do not provide a way to correct for species-specific fatality.

It is recognized that the thresholds developed for the Project are somewhat arbitrary, but in lieu of numbers and trends data for many avian and bat species/species groups, the thresholds provide a means for implementing a mitigation strategy that meets Project operation and conservation objectives.

Note for purposes of this BBCS and for fatality reporting, large bird and small bird are defined as follows:

- Large birds
  - Diurnal birds of prey and vultures (*Accipitriformes*)
  - Waterfowl (ducks, geese, and swans; *Anseriformes*)
  - Other large waterbirds (e.g., bitterns, coots, cranes, egrets, grebes, herons; *Gruiformes*, *Podicipediformes*, *Pelicaniformes*)
  - Large upland gamebirds (e.g., grouse, turkey; *Galliformes*)
- Small birds
  - Primarily passerines (*Passeriformes*)
  - Small upland gamebirds (e.g., partridge; *Galliformes*)

Table 7. Annual Non-operational Mitigation Fatality Thresholds for Avian and Bat Species

Sensitivity	Threshold Category	Threshold Value* Large Birds (non-eagles)	Threshold Value* Small Birds	Threshold Value* Bats
High	Threatened or endangered species under the Endangered Species Act	1†	1†	1†
Moderate	U.S. Fish and Wildlife Service candidate species or Idaho S1 or S2 species of greatest conservation need	5	15	15
Low	*Birds only:* U.S. Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 9 species *and* not listed as candidate, or Idaho S1, S2, S3 or S4 species of greatest conservation need	10	30	NA
	Bats only: Not listed as candidate, or Idaho S1, S2, S3 or S4 species of greatest conservation need	NA	NA	30

* For a given species, the number of individuals killed or injured and non-releasable per 50 MW of nameplate capacity per year, rounded to the nearest integer.

† Does not authorize take. Take of a listed species requires formal consultation with the USFWS under Section 10 of the ESA.

S1 = Critically imperiled: at high risk because of extreme rarity (often five or fewer occurrences), rapidly declining numbers, or other factors that make it particularly vulnerable to rangewide extinction or extirpation.

S2 = Imperiled: at risk because of restricted range, few populations (often 20 or fewer), rapidly declining numbers, or other factors that make it vulnerable to rangewide extinction or extirpation.

S3 = Vulnerable: at moderate risk because of restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or extirpation.

S4 = Apparently secure: uncommon but not rare; some cause for long-term concern due to declines or other factors.

Operational mitigation thresholds have been developed to address episodic fatality events. These events would either involve (1) a specific “problem” turbine or group (< 5) of adjacent turbines where a high level of fatality occurs over a short time period (two consecutive survey weeks or less), or (2) when a high level of fatality occurs in a certain season in consecutive years. The operational mitigation thresholds for birds and bats are described in Table 8. As with non-operational mitigation, species-specific operational fatality thresholds will not have searcher efficiency or carcass persistence correction factors applied.

As described above, the adaptive management process has two separate mitigation tracks that work together to address long-term mortality (non-operational mitigation), as well as episodic events (operational mitigation). A flowchart depicting the adaptive management process is presented in Figure 17. It should be noted that Figure 17 is a hypothetical example and does not reflect actual surveys or findings.

Table 8. Annual Operational Mitigation Fatality Thresholds for Avian and Bat Species

Sensitivity	**Threshold Value* Large Birds (non-eagles)**	**Threshold Value* Small Birds**	**Threshold Value* Bats**
High	2 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 2 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	2 individuals at a single turbine or group (<5) of adjacent turbines over a short time period *or* 2 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	2 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 2 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)
Moderate	5 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 5 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	15 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 15 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	15 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 15 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)
Low	10 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 10 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	30 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 30 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)	30 individuals at a single turbine or group (< 5) of adjacent turbines over a short time period *or* 30 individuals at the facility in a given season in consecutive years (i.e., spring 2013 and spring 2014)

* For a given species, the number of individuals killed or injured and non-releasable per 50 MW of nameplate capacity, rounded to the nearest integer, per year.

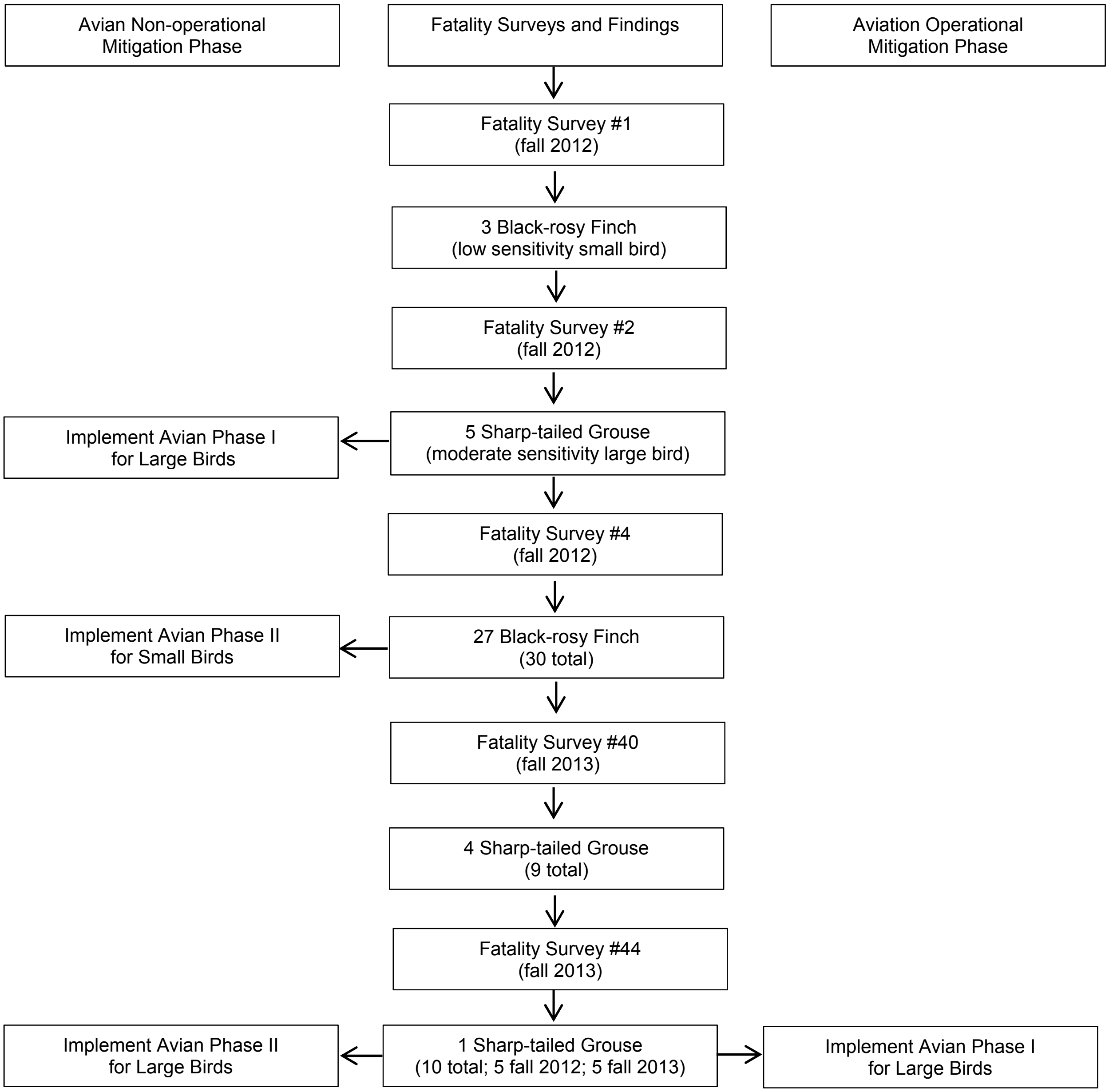

Figure 17. Hypothetical example of adaptive management process.

6.3 Mitigation Measures and Adaptive Management

6.3.1 Non-operational Measures

The following mitigation measures shown in Table 9 and described in detail below will be applied each time non-operational mitigation thresholds (shown in Table 7) are exceeded for either a bird or bat species. Each time a threshold for that group is exceeded, the next phase will be implemented. For example, if the threshold for sharp-tailed grouse (Idaho S1; moderate sensitivity large bird) is exceeded, Phase I for large birds would be implemented. If 12 months later the threshold for eared grebe (USFWS Bird of Conservation Concern; low sensitivity large bird) is exceeded, Phase II for large birds would be implemented.

Table 9. Non-operational Mitigation Phases

Mitigation Phase	Large Birds (non-eagles)	Small Birds	Bats
Phase I	• Contribute $10,000 • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring	• Contribute $10,000 • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring	• Contribute $10,000. • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring
Phase II	• Contribute $15,000 • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring	• Contribute $15,000. • If less than 1 year of monitoring remains, conduct 1 year of mortality monitoring	• Contribute $15,000. • If less than 1 year of monitoring remains, conduct 1 year of mortality monitoring
Phase III	• Contribute $30,000 • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring	• Contribute $30,000. • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring	• Contribute $30,000. • If less than 1 year of monitoring remains, conduct 1 full year of mortality monitoring
Final Phase	• Contribute $45,000 ($100,000 total contribution over all phases for this group)	• Contribute $45,000 ($100,000 total contribution over all phases for this group)	• Contribute $45,000 ($100,000 total contribution over all phases for this group)

MONETARY CONTRIBUTIONS

Money would either be placed into an escrow account or be deposited into an agreed-upon interest-bearing account and marked specifically for purposes of bird and bat research, habitat improvements (on- or off-site), non-operational on-site mitigation, and/or compensatory mitigation. Through a memorandum of agreement, all representatives from HBW, the USFWS, and the IDFG would develop a cooperative agreement setting forth rules about how to fund and implement projects. Other participating agencies may elect to contribute funding to this fund.

A $10,000 initial mitigation phase payment would be made for each fatality group (i.e., large bird, small bird, bat), to offset take. The payment increases for each progressive phase to account for potentially more in-depth mitigation. Each group would have a maximum payment of $100,000 total if all phases of mitigation are implemented.

If all species groups reach the final phase, a maximum contribution would be $300,000. Final mitigation measures represent maximum response levels for the Project based on models that have been completed to ensure a commercially viable project.

MORTALITY MONITORING

If non-operational avian or bat fatality thresholds are exceeded and less than 1 year of fatality monitoring remains, 1 full year of monitoring will be completed starting from the month after mitigation is applied. The additional monitoring time will allow for a complete year of study to determine if mitigation successfully reduced fatality. This additional fatality monitoring will follow the basic methods described in Section 5.1; however, search timing, searcher intervals, search area, and other search methods may be adjusted to target the specific species being monitored for.

6.3.2 Operational Measures

The following mitigation measures from the appropriate phase shown in Table 10 and described in detail below will be applied each time operational mitigation thresholds (see Table 8) are exceeded for a large bird, small bird, or bat species. Each time a threshold for a group is exceeded, the next phase will be implemented, and phases previously applied will continue to be applied for the life of the project, as appropriate. For example, if a bat threshold is exceeded and Phase I cut-in speed curtailment is triggered, that curtailment measure will remain for the life of the project.

The determination of how to implement operational mitigation will be determined by HBW, USFWS, and IDFG. If a consensus cannot be made on how to implement operational mitigation, the USFWS will have final authority for species of birds and bats protected under the ESA or MBTA, and IDFG will have final authority for other sensitive birds and bats. If any bird or bat species impacted by the project become(s) federally listed, final authority for bats would shift to the USFWS for the listed species.

If operational mitigation is triggered following the initial detailed 2-year post-construction monitoring study, HBW, USFWS, and IDFG may determine whether to immediately implement the appropriate phase mitigation measure or to conduct additional focused monitoring. Focused monitoring would follow similar methods to the initial post-construction plan but would concentrate on determining which turbine(s) are problem turbines, when and why the problem is occurring, and possible solutions. This focused study would allow operational mitigation to better address specific problems, resulting in greater success in reducing mortality. Combined with results from wind energy projects elsewhere, these data could have significant inferential value in helping understand and reduce risk factors.

Table 10. Operational Mitigation Phases

Mitigation Phase	Large Birds/Raptors (non-eagles)	Small Birds	Bats
Phase I	Implement shutdowns for up to 180 *turbine* hours annually	Implement shutdowns for up to 180 *turbine* hours annually *or* Implement up to 120 *facility* hours of cut-in speed curtailment at 5.0 m per second (m/s) annually	Implement up to 120 *facility* hours of cut-in speed curtailment at 5.0 m/s annually
Phase II	Implement shutdowns for up to an additional 180 *turbine* hours annually	Implement shutdowns for up to an additional 180 *turbine* hours annually *or* Implement up to 120 *facility* hours of cut-in speed curtailment at 5.5 m/s annually *or* Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.0 m/s annually	Implement up to 120 *facility* hours of cut-in speed curtailment at 5.5 m/s annually *or* Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.0 m/s annually
Final Phase	Implement shutdowns for up to an additional 180 *turbine* hours annually	Implement shutdowns for up to an additional 180 *turbine* hours annually *or* Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.5 m/s annually *or* Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.0 m/s annually	Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.5 m/s annually *or* Implement up to an additional 60 *facility* hours of cut-in speed curtailment at 5.0 m/s annually

Note: The tiered mitigation phases presented in this table refer to the terms turbine hours and facility hours. For Phase I large birds, for example, shutdowns for 180 turbine hours equates to shutdowns of 1 turbine for 6 hours for 30 days. For Phase I bats, cut-in speed curtailment for 120 facility hours equates to the whole facility (32 turbines) for 4 hours for 30 days (or 3,840 turbine hours).

TURBINE CUT-IN SPEED CURTAILMENT FOR BATS

Raising turbine cut-in speeds from the manufactured speed (usually 3.5–4.0 m per second [m/s] for modern turbines) by 1.5 to 3.0 m/s has been shown to substantially reduce bat fatalities. Most studies have found at least a 50% reduction (reviewed by Arnett et al. 2013).

Based on the wind resource at the site (operation viability), cut-in speed curtailments will not exceed 5.5 m/s. Phase I mitigation would include cut-in speed curtailment at 5.0 m/s for up to 4 hours per night during the four most high-use weeks (30 days; i.e., 120 total facility hours). Concentrated bat activity periods typically occur in the first 4 hours after sunset (O'Farrell and Bradley 1970), and the most concentrated period of fall migration is between July 15 and October 30. Post-construction fatality studies, pre-construction monitoring data, and knowledge of bat migration timing at nearby sites will inform specific dates to implement curtailment. HBW, USFWS, and IDFG may review the curtailment applied and recommend a different combination of hours per day, not to exceed 120 facility hours (e.g., 6 facility hours per night for 20 days). For Phase II, cut-in speed curtailment would either increase by 0.5 m/s, to a maximum cut-in speed of 5.5 m/s not to exceed 120 facility hours, or cut-in speed curtailment would remain at 5.0 m/s for more hours than Phase I, not to exceed 180 facility hours. For the Final Phase, cut-in speed curtailment would either remain at 5.5 m/s not to exceed 180 hours, or would remain at 5.0 m/s not to exceed 240 hours. For each phase, HBW, USFWS, and IDFG will work together to determine the minimum amount of cut-in speed curtailment time potentially effective based on data collected and will not use the maximum allowable time as an initial starting place. For example, data may indicate that a specific species is killed each year during the same two-week window in the fall. In that case, facility shutdowns would be limited to 56 hours per year (i.e., 4 hours per night for 14 days).

TURBINE CUT-IN SPEED CURTAILMENT AND TURBINE SHUTDOWNS FOR BIRDS

“Feathering” and changes in turbine cut-in speed may benefit bats *and* birds (Manville 2009), but there are different explanations for bat fatalities than for bird fatalities. Bat fatalities are limited to specific species during specific periods of time and weather conditions (i.e., low-wind periods); in contrast, avian fatalities, which encompass many taxonomic groups (but especially passerines), appear to be explained by many factors (Barclay et al. 2007; Ellison 2012; Grodsky and Drake 2011; Hoover and Morrison 2005; Kunz et al. 2007; NAS 2007; NWCC 2010). Factors influencing avian fatalities at wind energy facilities have been described for raptors and songbirds. For raptors, they include level of use and behavior of the birds at the site (NWCC 2010). Raptors have been killed in relatively high numbers in areas of high raptor abundance in the United States (Hoover and Morrison 2005; NAS 2007); and certain species (e.g., red-tailed hawk, golden eagle) that hunt for prey in close proximity to turbines may be more susceptible to collision (Erickson et al. 2002; NAS 2007; NWCC 2010). Improved design at newer facilities has involved siting turbines away from areas of high small mammal prey densities and away from physical features of the landscape that could concentrate raptors (e.g., canyons, ridgelines) (Hoover and Morrison 2005; Hunt 2002; NAS 2007). Migrating songbirds appear to be especially vulnerable during poor weather conditions that force them to lower altitudes and where wind facilities are situated in close proximity to stopover sites (e.g., riparian corridors, significant water sources) (Erickson et al. 2001; Johnson et al. 2002; Manville 2009).

Soaring birds that rely on thermals to generate lift (e.g., raptors) migrate during the day whereas most long-distance migrants (e.g., passerines) are nocturnal migrants. Nocturnal migrants typically use tail winds that are not too strong, migrate an hour after sundown, and peak around midnight. Peak spring migration for the Project is considered to be March 16 through May 15 while peak fall migration is considered to be August 16 through November 15 (see Section 5.1.1).

While changing cut-in speeds has not explicitly been shown to be effective for reducing bird fatalities at wind energy facilities, increased cut-in speed curtailment will be used as an operational mitigation option with an assumption that it would reduce impacts to nocturnal migrants. Thus, the cut-in speed curtailment option would be informed by the fatality data—if, for example, nocturnal migrant songbirds are killed at the facility during a predictable time period.

Constrained shutdowns or cut-in speed curtailment will be used to address episodic avian fatality events. Episodic events would either involve (1) a specific “problem” turbine or set of turbines (defined as two or more turbines that are connected because of a topographic or other environmental feature) where mortality repeatedly occurs, or (2) a turbine or set of turbines where a high level of mortality occurs in a certain season in consecutive years.

HBW will coordinate with the USFWS and IDFG to review avian fatality data collected during monitoring (see Section 5.1) and determine if shutdowns, altering cut-in speeds, or both are appropriate measures.

For large birds, Phase I mitigation would include turbine shutdowns for up to 180 facility hours annually at the appropriate seasonal and daily times. Shutdowns would be restricted to 6 hours per day. However, any combination of shutdown times and number of turbines could be implemented with the maximum shutdown amount allowed. For Phase II, shutdowns for an additional 180 facility hours would be applied, for a total of 360 facility hours. For the Final Phase, shutdowns for an additional 180 facility hours would be applied, for a total of 540 facility hours. If the Final Phase is reached, shutdowns for large birds will not exceed 540 facility hours.

For small birds, Phase I would either include turbine shutdowns for up to 180 turbine hours annually or increased cut-in speed to 5.0 m/s for up to 120 facility hours. Shutdowns and cut-in speed curtailment will be restricted to 6 hours per day. Each progressive phase would involve additional hours of shutdowns, increased cut-in speed to a maximum of 5.5 m/s, or a combination of additional hours and increased cut-in speed as specified in Table 10. For each phase, HBW will work with the USFWS and IDFG to determine the minimum amount of shutdown hours and cut-in speed curtailment time potentially effective based on data collected and will not use the maximum allowable time as an initial starting place. If the Final Phase is reached, shutdowns for small birds will not exceed 540 turbine hours; cut-in speed curtailment will not exceed 240 facility hours.

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Appendix A

Correspondence between UAMPS, SWCA Environmental Consultants, and U.S. Fish and Wildlife Service

From: Shawn Childs
Sent: Wednesday, January 20, 2010 1:55 PM
To: Ty_Matthews@fws.gov
Cc: 'Nathan Hardy'; Thomas Sharp
Subject: UAMPS Horse Butte Wind Project - Biological Survey Protocol

Ty,

Thank you for meeting with us last week to discuss UAMPS's proposed Horse Butte Wind Project. I've attached the biological survey protocol you asked for during our meeting. We're scheduled to conduct sage-grouse winter use surveys at the end of the first week in February so please let me know if you have any concerns about our proposed survey protocol as soon as you can.

In our meeting you asked that a few more observation points be added to our spring raptor migration survey. We would like to talk with you in more detail about the number and placement. Thomas Sharp is leading these field surveys. I think it's best that he coordinate directly with you on this subject.

Please call or email me if you have any questions or concerns.

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HORSE BUTTE WIND PROJECT
SCOPE OF WORK AND
BIOLOGICAL SURVEY PROTOCOL

SWCA Environmental Consultants
January 20, 2010

INTRODUCTION

UAMPS is seeking to develop the Horse Butte Wind Project, a 40-megawatt wind power generating facility to be located on private land approximately 15 miles east-southeast of Twin Falls in Bonneville County, Idaho. The following presents a scope of work and survey protocol for completing a variety of biological surveys in the project area. These activities will be undertaken in support of environmental regulatory compliance requirements associated with the transmission interconnection agreement with Bonneville Power Administration, Bonneville County permitting, and applicable environmental laws such as the National Environmental Policy Act (NEPA), Endangered Species Act, Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act. Data analysis and reporting for those surveys will be completed under this scope of work.

Vegetation Mapping and Sensitive Plant Surveys

The existing vegetation community classification and mapping of the project area is based on Idaho Gap Analysis Program (GAP) data, which is quite coarse and inadequate for characterizing plant communities or assessing impacts to vegetation and wildlife habitats at the project-area scale. It is anticipated that a more accurate vegetation classification and mapping effort will be required for describing baseline vegetation and wildlife habitat conditions prior to the development of the Horse Butte Wind Project. On-the-ground data collection will be used to refine data on the species composition of the various vegetation communities and to "ground-truth" existing aerial photography. Vegetation characterization points will be used to map the distribution and abundance of different plant communities and calculate the total area of each of these communities in the project area.

Vegetation Characterization Points

Twenty vegetation characterization points will be randomly distributed throughout the project area and plotted on a map using GIS. Each randomly plotted vegetation characterization point location will be recorded using a Trimble XT GPS unit and dominant plant species will be recorded. Each vegetation characterization site will consist of a circular area with a radius of 2-10 meters from the center point, depending on vegetation type. Common plant species will be recorded and unknown plants will be collected at each site. Vegetation communities will be characterized by visually estimating the percent cover of the major plant species present at each site. Each major species will be determined to be rare (< 5% cover), few (5–25% cover), moderate (26–50% cover), or common (> 50% cover). Sample site characteristics including approximate slope, aspect, topographic position, and landform type will also be recorded in the field notes. Other information recorded in the field notes will include date, general location of sampling site, observations on weather, wildlife, and disturbance, and the names of the investigators conducting the work. Digital photographs will be taken to document plant communities. Individual vegetation characterization data will be compared to the Idaho GAP plant community classification for the same location. The digital GIS data containing vegetation characterization point locations will be overlaid on digital aerial photographs for use in aerial photo interpretation.

Vegetation Mapping

Once the vegetation characterization point data has been collected it will be overlaid on a digital aerial photograph along with the GAP community data. Vegetation associations will be delineated by hand drawing polygons on hardcopy maps using vegetation characterization point data to identify the plant communities on the aerial photographs. The hand-drawn delineations will then be digitized using Arc View 9.0. The result will be an accurate vegetation map of the project area that can be used in describing the project area and assessing project-related impacts to plant communities and wildlife habitats. Although the resulting map may include wetland communities, it will not constitute a wetland delineation as defined by Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual and other related agency regulations and guidance.

Sensitive Plant Surveys

There is potential for one state-listed special status plant species, the western sedge (*Carex occidentalis*) to occur in the Horse Butte project area. These plants occur in mountain brush and forest communities and can only be positively identified while in fruit during the spring and early summer. Should it appear that these communities would be impacted by construction of the wind farm, SWCA biologists will conduct a survey for this species in appropriate areas. It is assumed that this survey could be carried out in conjunction with vegetation characterization fieldwork described above. If found, western sedge locations would be recorded via GPS and included in the project GIS and associated vegetation maps.

Avian Studies

Greater Sage-Grouse Listing Status Tracking and Project Impact Evaluation

U.S Fish and Wildlife Service has been ordered by a U.S District Court (Idaho) to issue a 12-month finding on or before 26 February 2010 as to whether or not listing Greater Sage-Grouse is warranted. The species, known to occur on the Horse Butte project site, was first proposed for listing in 2001 and since that time a compelling case for the listing has been made by environmental groups. There is a strong likelihood that the Service will find listing warranted in at least portions of the species' range. Impacts of the potential listing on the proposed project depend not just on the on the outcome of the 12-

month finding, but the suitability of the project site to support the Greater Sage-Grouse as well.

An inherent challenge to determining the impact of listing on the Horse Butte Wind Project includes a current lack of understanding of the extent to which Greater Sage-Grouse occupy the project site. While it is known that some individuals occupy portions of the project site, the habitat quality and population density have not yet been fully determined. The relevant biological field surveys will not be completed until the spring of 2010. Whether the species is listed as threatened or endangered, or alternatively, the Service finds that the listing is warranted, but precluded (the most likely outcome of the February decision) it will be important to determine the level of project-related impact to the species. Options for securing Endangered Species Act (ESA) regulatory certainty from the Service include a Candidate Conservation Agreement with Assurances (CCAA), for non-listed candidates, or species that are likely to become candidates for listing, or a Habitat Conservation Plan (HCP) for listed species. Both strategies require an acceptable (by the Service) assessment of impacts, including an estimation of incidental take, and appropriate mitigation. Both strategies provide long-term certainty. It will be important at the outset of the project to establish a dialogue with both the Service and Idaho Fish and Game as appropriate take and mitigation determinations and habitat impact calculations will require agency approval. BPA may have specific procedures they require. Our conversations with the BPA environmental lead will establish any consultation procedures for BPA.

SWCA will track the listing process for the Greater Sage-Grouse and depending on the outcome of the finding and the sage-grouse surveys of the project area, develop mitigation strategies and conservation plans as appropriate.

Grouse Surveys

Seven Greater Sage-Grouse and one Columbian Sharp-tailed Grouse were observed on the project site by SWCA biologists in September, 2008. Both of these species are listed as special status species by the State of Idaho and the Greater Sage-Grouse is currently under consideration for federal listing under the Endangered Species Act. Accordingly, it is important to gain a better understanding of how these species currently use the project area. Grouse, though generally considered non-migratory, have four distinct life stages during which somewhat different habitat types are used. These life stages consist of: 1) breeding or lekking, 2) nesting, 3) brood-rearing, and 4) wintering. This task will allow SWCA to determine how the project site is currently being used by these two species and, thus, how potential project-related impacts to grouse can be avoided or minimized.

SWCA biologists will conduct aerial surveys for Greater Sage-Grouse leks (i.e., breeding grounds) in suitable habitat within 3 miles of the project area. Lek locations will be recorded via GPS. For leks found within the project area, SWCA biologists will conduct ground-based counts of males and females. Idaho Game and Fish survey/count protocols will be used.

Productivity within sage-grouse populations is important for population stability (Connelly et al. 2000). Accordingly, brood surveys will be conducted within the study area. Windshield brood surveys have been a common practice within sage-grouse populations (Connelly et al. 2003). Additionally, use of pointing dogs during late brood-rearing activities has proven effective for locating and monitoring sage-grouse broods (Connelly et al. 2000, Connelly et al. 2003, Dahlgren et al. 2006). Windshield surveys will be conducted on existing roads within the project boundary. Randomly placed transects will also be delineated within the project area, and pointing dogs will be used to collect flush count data according to distance sampling protocol (Buckland et al. 1993). By using these methods brood locations can be delineated and, provided that data meet distance sampling assumptions, brood density estimates for the project area can be obtained. Sage-grouse nests usually hatch from late May to late June, and chicks start to fly and are able to escape mammalian predators at around 3 weeks of age. Thus, pointing dogs will be used from mid-July through August so that young flightless chicks will not be at risk (Dahlgren et al. 2006).

All sage-grouse seasonal habitats are important for conserving sage-grouse populations (Connelly et al. 2000). Accordingly, winter habitats are important and may or may not occur within breeding areas (Connelly et al. 2000). Aerial surveys can be used to locate wintering grouse, especially if there is snow cover. The study area (including a 1-mile buffer) will be surveyed via helicopter in November or December and February. Transects will be ½ mile apart, and the aircraft will fly as low to the ground as safety considerations allow (increases the probability of detecting grouse). Locations of detected grouse will be marked. If there is little to no snow cover on the study area, ground surveys can be used with ATVs, pointing dogs, or simple walking surveys. Winter aerial surveys for Greater Sage-Grouse will be conducted in conjunction with winter big game surveys described below.

<u>Spring Migration Surveys</u>

Spring migration surveys for both songbirds and raptors will be conducted during early April, late April, and early May, 2010, to identify early, mid- and late-season migrants. Migratory songbird surveys will be performed at four evenly distributed points throughout the project area. During each of these three periods, biologists will survey one of the four locations for one hour during dawn and one at dusk each day, thereby taking two days to complete surveys each survey period. At each survey location, two biologists will record bird activity following the habitat-based monitoring program for breeding birds established by the Great Basin Bird Observatory (GBBO) (GBBO 2003). Unlike breeding bird point-counts, these surveys will concentrate on birds not known to breed in the area and are likely migrating through the project area.

Raptor migration surveys will be performed on the same days that migratory songbird surveys are completed. For approximately eight hours between dawn and dusk, two biologists will observe migrating raptors from observation point(s) located at project highpoints. These surveys will be completed two days a week during the early, mid- and late season migration periods. Northbound raptor migration will be sampled using similar techniques to those employed by HawkWatch International (HWI) during their exploratory surveys of potential raptor migration sites with wind power generation potential in Nevada (Smith 2005). A single observation point will be staffed by two observers. Raptor migration will be monitored for approximately 8 hours each survey day, depending upon weather (surveys will not be interrupted unless extreme conditions exist) (Smith 2005). Observers will use high-quality 10x binoculars and a 60x spotting scope to observe and identify raptors. *The Sibley Guide to Birds* (Sibley 2000) and *Hawks from Every Angle* (Ligouri 2005) will serve as primary references for raptor identification.

Modified HWI raptor migration data forms will be used to record observations. The following data will be recorded: UTM coordinates of the count site, physical description of the count site area, elevation of the count site, the name of the observers, daily observation start/end times, date, wind speed, pressure, temperature, wind direction, percent cloud cover (estimated), precipitation class, and an assessment of thermal life conditions, which may be indicative of migrant activity. These data will be recorded for each hour of observation on the half-hour (Smith 2005).

Migrant raptors typically exhibit a direct, continuous flight pattern, usually in the predominant seasonal direction (north in spring, south in fall); the flight pattern of resident raptors is usually different as they move along non-migratory routes for short distances (Smith 2005). For every raptor that is determined to be a migrant, several pieces of data will be recorded including: species, age, sex, and color morph of each observed migrant raptor (when possible and/or applicable), time of migrant passage, lateral direction at closest point to the observers, lateral distance of each migrant from the observer, and flight altitude based on three categories: less than 32m (below the rotor-swept area, 32m - 128m (within the rotor-swept area), and above 128m (above the rotor-swept area).

<u>Fall Migration Surveys</u>

Fall migration surveys for raptors will be conducted during the months of September, October and early November, 2009, to identify early, mid- and late-season migrants. Migratory songbird surveys will be performed at four previously selected survey points during the same time periods. During each of these three periods, biologist will survey one or two of the locations for one hour during dawn and dusk each day, taking two days to complete surveys each survey period.

Raptor migration surveys will be performed on the same days that migratory songbird surveys are completed. For approximately eight hours between dawn and dusk two biologists will observe migrating raptors from the previously selected raptor migration observation point(s) situated within or adjacent to the project area and identified during the spring migration surveys. These surveys will be completed two days a week during the early, mid- and late season migration periods. Counting and analysis methods used in the fall migration study will be identical to those employed in the spring migration survey described above.

Raptor Nest Surveys

Nest searches for raptors will be performed for the project area and a one-half mile buffer surrounding the three turbine strings. This survey will be conducted via helicopter in mid-February, 2010. Raptors are not colonial nesters and their nests are typically located well away from each other. Raptor nests located in the tops of trees or on cliff bands are often not visible from the ground. When nests are visible from the ground, it is typically difficult or impossible to determine activity status unless chicks have hatched and grown large enough to be visible above the edge of the nest or unless an adult bird is actively incubating or feeding young. The use of a helicopter will allow biologists to cover a large area in short amount of time, thus maximizing searcher efficiency. From the air it is usually possible to determine species and nest activity status through observation of adults, eggs, or young present in the nest. In addition to the pilot, two observers and a GIS specialist/observer will conduct the aerial survey.

Although the survey will cover the entire project area and proposed transmission line corridor, ridge tops, cliff bands, and vertical exposures will be surveyed in particular. Large trees and small shrubs provide potentially suitable structures for some raptor nests and will be surveyed to the extent feasible. Nest locations found within the project area and within the one-half mile buffer (if any) will be documented by noting the species, UTM coordinates, nest contents (where possible), and behavior.

Breeding Bird Surveys

Point-count surveys will be conducted generally following the habitat-based monitoring program for breeding birds established by the Great Basin Bird Observatory (GBBO 2003). Point-count transects corresponding to the proposed location of turbine strings will be established and surveyed over the course of three mornings during the 2010 breeding season. Surveys will be completed between sunrise and 10:00 a.m. during acceptable weather conditions (no precipitation or high winds). Point-count transects will consist of at least five fixed-radius (100-m) point-count stations. Point-count stations will be located at least 200m apart along each transect. One survey point will require 10 minutes of actual survey time, during which birds will be distinguished as observed during the 0-3, 3-5, or 5-10 minute time intervals. It is anticipated that two transects corresponding to the southern two turbine strings can be completed in a single morning. The northern turbine string will be surveyed on the second morning. In order to determine species and relative abundance of birds in other portions of the project area, additional point count stations will be established in the various plant communities/habitats present on the site. These stations will be surveyed on the second morning, following completion of the northern turbine string transect, and on the third morning.

Data to be recorded will be outlined in a standard data collection form. Each individual bird will be recorded on the data form along with their approximate distance from the observer stationed at the center of the point (0-50 m, 50-100 m, or >100 m), and any evidence of territorial defense (e.g., singing) or breeding (e.g. carrying nest material or food). The same bird will not be recorded twice per count. Environmental conditions such as temperature, cloud cover, and wind, will be recorded for each point-count station. In addition, habitat assessment vegetation transects of each point-count station are required in the GBBO protocol. Because point-count transects are situated within one vegetation community, vegetation transects will be completed within one of the ten point-count circles for each of the four transects. These habitat and vegetation data will be outlined in a standard data collection form.

Bat Monitoring

Under this task, SWCA proposes to establish two AnaBat acoustic monitoring stations on each of two met towers located within the project area. One AnaBat detector will be located at or near the top of the tower (at a height within the rotor-swept area of the turbines proposed for use in the project) and the second detector will be located 3-5 meters above ground near the bottom of the tower. AnaBat data will be collected for a minimum of one sampling season (March 15-November 15) prior to construction.

Each acoustic monitoring station will contain a microphone (i.e., transducer) encased in a protective shroud utilizing a reflector plate to collect bat vocalizations. The reflector plate is oriented to provide a horizontal, multi-lobed volume of detection providing a 45° spread from the plate. The remaining equipment consists of an AnaBat SD1 or AnaBat II bat detector, a Compact Flash Zero Crossings Analysis Interface Module (CF ZCAIM), a 10-watt solar panel, a rechargeable battery, and a solar charge controller encased in a weatherproof NEMA case. The detector and CF ZCAIM are from Titley Electronics, Ballina, New South Wales, Australia. Other station components will be purchased from EME Systems, Berkeley, California. Each station will use 512 MB or greater Compact Flash cards that will be changed monthly. Where possible, each station will utilize power from existing solar panels associated with the corresponding met tower. Each CF ZCAIM will be programmed to start approximately 1 hr before sunset and stop 0.5 hr after sunrise. Once placed, each station will operate all night, every night throughout the seven-month sampling period in order to document seasonal changes in this highly mobile mammal community.

As with any electronic set-up, minor problems may be encountered. Under this task, the units will be prepared and installed over a period of three days, and tested over the following two-week period. If it is determined from the testing that any changes need to be made to the units, the alterations will be made and the final set-up will be completed.

It is impossible to predict how much data will be collected at any particular monitoring station. Likewise, there is always the possibility of extraneous noise (e.g., insects, wind) that can take up memory space. A third problem that can arise at any time is equipment failure and/or vandalism. For these reasons, it is important to regularly check the equipment and exchange memory cards. This will ensure minimal gaps in data and allow a timely examination of data. It is anticipated that it will take one day per month to collect data from the four stationary AnaBat units. It is anticipated that the two met tower-based AnaBat units will be deployed in the summer of 2009 and collect data into the summer of 2010.

Digital data files stored on CF memory cards will be downloaded and interpreted with CFCread software, which provides a copy of the original data file, and AnaBat sequence files of vocalizations in individual nightly folders. SWCA will sub-contract to Dr. Michael J. O'Farrell, a leading expert on bats and AnaBat technology, to assist with AnaBat data interpretation for Horse Butte. Data files will be transferred to Dr. O'Farrell for analysis. Identification of species, using new WinAnaLook software, will follow the methods of O'Farrell et al. (1999) based on frequency characteristics, call shape, and comparison with a comprehensive library of vocal signatures developed by O'Farrell and colleagues. Thus, species richness (# species verified as present) will be obtained for each location. A key feature of the AnaBat system is that each file saved to the computer is named with a time/date code. Thus, activity data can be derived for each monitoring station. An index of activity, or the magnitude of each species contribution to spatial use, will be obtained using the sum of 1-minute time increments for which a species is detected as present (Miller 2001).

Big Game Surveys

The Horse Butte project area has been identified as having potential to contain big game migration corridors and winter range habitat. Accordingly, SWCA will conduct aerial (helicopter-based) surveys of the project area to 1) derive an empirical estimate of the numbers of mule deer, elk, and pronghorn currently using the property, and 2) identify corridors used by these species in moving from summer to winter ranges. The first aerial survey will be conducted immediately following the first major snowstorm of the year. Substantial snowfall forces big game to migrate to lower elevation winter range and provides an excellent medium for registering tracks, thus indicating movement corridors. Flight paths, animal concentrations, and movement corridors will be recorded via GPS and input to the project GIS database. The second aerial survey will be conducted during mid-winter to determine whether big game are using the project area as winter range. Data to be recorded will include species, number of animals, and (to the extent possible) age of males based on antler size.

Biological Survey Report

Data Compilation and Review

Under this Task, SWCA will compile and review all vegetation, big game, bird and bat survey results obtained under the tasks described above and draft a report describing our findings and providing a preliminary assessment of potential impacts and potential impact avoidance and minimization measures. Additional references that may be helpful in interpreting the results of the Horse Butte biological studies and drafting the report include: *Assessing the Impacts of Wind Energy Development on Nocturnally Active Birds and Bats* (Kunz et al. 2007), *Impact of Wind Energy and Related Human Activities on Grassland and Shrub-Steppe Birds* (NWCC 2007a), the National Wind Coordinating Collaborative (NWCC) *Mitigation Toolbox* (NWCC 2007b), and *Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions* (NWCC 2004). These publications will be reviewed and used in drafting the discussion and mitigation sections of the report.

Administrative Draft Report

SWCA will prepare an Administrative Draft 2009 Biological Survey Report. The report will summarize the results of all surveys conducted from 2009 through summer 2010 and provide a detailed analysis of the data collected. A map of vegetation communities/wildlife habitats and sensitive plant locations (if any) will be provided with the report. The importance of the project area as nesting habitat for breeding raptors and songbirds will be analyzed, as well as the value of this area as a flyway for migrating raptors. Construction and operation of the proposed wind farm development will be briefly examined to determine potential effects to the resident bird population. Analysis for birds will discuss data analysis, results, interpretation, and recommendations.

Documentation of the bat survey results will include a detailed assessment of the importance of the project area as foraging habitat or as a movement corridor for bat species. Similar to the bird study portion of the report, development of the proposed wind farm will be briefly analyzed to identify potential project-related effects on bat populations. Up to three hard copies and one electronic copy of this report will be submitted to UAMPS for review in July 2010.

Final Draft Report

SWCA will incorporate responses to UAMPS comments on the Administrative Draft Report and finalize the Draft Report. Up to five hard copies and one electronic copy of this report will be sent to appropriate agencies for review. Up to three hard copies and one electronic copy of the draft report will also be provided to UAMPS for review.

Final Report

Once comments from all participating reviewers have been received, SWCA will collate them into response categories. One response will be made for each category and incorporated into the final text. Up to 10 hard copies, five for UAMPS and five for participating agencies will be printed. Up to six CD's, three for UAMPS and three for the reviewing agencies will also be provided.

CULTURAL RESOURCES SURVEYS

The need for an archaeological survey of the project area will be determined following coordination with BPA regarding interconnection NEPA requirements.

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JAN 25 2010

Subject: Horse Butte Wind Project Biological Survey
File #: 970.1000 TAILS#: 14420-2010-TA-0172

Dear Mr. Hardy:

The Fish and Wildlife Service (Service) understands that Utah Associated Municipal Power Systems (UAMPS) is proposing to develop the Horse Butte Wind Project, a utility-scale wind energy farm approximately 15 miles east-southeast of Idaho Falls, Idaho. The Service received the Horse Butte Project Scope of Work and Biological Survey Protocol on 01/20/2010 via e-mail. Below are the Service's comments and recommendations on the survey protocol for your use and consideration.

COMMENT #	PAGE	PARAGRAPH	SENTENCE	COMMENT
1	1	1	1	The project is near Idaho Falls, Not Twin Falls.
2	1	2		What are the habitat classifications that will be delineated? How fine will you go?
3	2			Once the vegetation layer is completed, will it be verified through ground truthing?
4				Will the sage-grouse, big game, and raptor aerial survey be done simultaneously?
5	3	4		The Idaho Fish and Game should have some active/historical lek sites around the project. You should coordinate with them to get locations of these leks in addition to your aerial surveys.
6	4	1		Productivity of sage-grouse is a hard parameter to obtain. I commend you on your efforts to do so. With that said, I don't know that the density of sage grouse will be high enough for you to get a good estimate of

COMMENT #	PAGE	PARAGRAPH	SENTENCE	COMMENT
				presence/absence, habitat preference, or species densities from brood surveys. How many, how long, and how often will you do "windshield surveys"/pointing surveys? Most likely, many assumptions will be broken in trying to estimate sage-grouse chick densities using distance sampling. A better approach may be to use a presence/absence test.
7	4			The Service recommends increasing the number of point counts for songbirds to at least 10. It is more important to do shorter (ie. 20 min) point counts at more sites (ie. 2 per morning/2 per evening) over a broad area and differing habitats to achieve a better understanding of the avian community in the project area.
8	4			As with songbirds, the Service strongly recommends increasing the number of raptor migration observation points in the area to at least 10 for the same reasons as stated in comment #4.
9	5	2	2	It is important to include a drawing of the flight path of all observed raptors, migrants and residents. This could reveal important flight corridors and areas of high use
10	5	3		Again recommend that observation points are increased to at least 10 points.
11	6	1		It will be difficult to identify the species of bird using a nest in February. Many raptors have not begun building or repairing nest at this time. A follow up to identify species, productivity, condition of nest, and locate any nests built after first survey is recommended.
12				The Service strongly recommends at least 2 years of post construction survey work. This may include, but is not limited to, avian and bat mortality monitoring, grouse use surveys, and breeding bird surveys.

The above comments are being provided pursuant to the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and Fish and Wildlife Act of 1956. This information is being provided to assist you in making an informed decision regarding site selection, project design, compliance with applicable laws, and to determine whether a permit to cover anticipated take of species is appropriate under the ESA.

The Service supports the development of wind power as an alternative energy source; however, wind farms can have negative impacts on wildlife and their habitats if not sited and designed with potential wildlife and habitat impacts in mind. Selection of the best sites for turbine placement is enhanced by ruling out sites with known, high concentrations of birds and/or bats passing within the rotor-swept area of the turbines or where the effects of habitat fragmentation will be detrimental. In support of wind energy generation as a wildlife-friendly and renewable source of power, development sites with comparatively low bird, bat, and other wildlife values, would be preferable and would have relatively lower impacts on wildlife.

Because of the potential for wind energy projects to impact endangered bird, bat, or other listed species, they are subject to the ESA (16 U.S.C. 1531-1544) section 9 provisions governing "take", similar to any other development project. Take incidental to a lawful activity may be authorized through the initiation of formal consultation if a Federal agency is involved. If a Federal agency, Federal funding, or a Federal permit are not involved in the project, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA may be obtained upon completion of a satisfactory habitat conservation plan for the listed species. However, there is no mechanism for authorizing incidental take "after-the-fact."

The MBTA (16 U.S.C. 703-712) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of Interior. Bald and golden eagles are afforded additional legal protection under the BGEPA (16 U.S.C. 668-668d). Unlike the ESA, neither the MBTA nor its implementing regulations (50 CFR Part 21) provide for permitting of "incidental take" of migratory birds.

While the MBTA has no provisions for allowing unauthorized take, the Service recognizes that some birds may be killed at structures such as wind turbines even if all reasonable measures to avoid it are implemented. The Service's Office of Law Enforcement carries out its mission to protect eagles, migratory birds, and species listed as endangered or threatened not only through investigations and enforcement, but also through fostering relationships with industries that proactively seek to mitigate their negative impacts on these wildlife resources. While there is no mechanism under the MBTA to absolve individuals, companies, or agencies from liability if they follow recommended guidelines (see below), the Service's Office of Law Enforcement and Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals, companies, or agencies who have made good faith efforts to avoid the take of migratory birds.

The Service's voluntary Interim Guidance on Avoiding and Minimizing Impacts from Wind Turbines may be helpful as you evaluate your proposed wind energy site (this guidance can be found at http://www.fws.gov/habitatconservation/wind.html). The guidance contains a pre-development site evaluation and ranking process to assess potential project impacts, as well as recommendations for conducting post-construction monitoring. The guidance also contains more information on the applicable laws and permitting aspects in Appendices 3 and 5.

Thank you for the opportunity to provide comments on the Horse Butte Project Scope of Work and Biological Survey Protocol. Please contact Ty Matthews of the Service's Eastern Idaho Field Office (208-237-6975 x 115) if we can be of further assistance as your project is designed and implemented.

Sincerely,

for Damien Miller, Supervisor
Eastern Idaho Field Office

cc: Shawn Childs (SWCA)
Thomas Sharp (SWCA)
Gary Vecellio (IDFG)

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.

Salt Lake City Office
257 East 200 South, Suite 200
Salt Lake City, UT 84111
Tel 801.322.4307 Fax 801.322.4308
www.swca.com

US Fish and Wildlife Service
Eastern Idaho Field Office
Ty Matthews
4425 Burley Dr. Suite A
Chubbuck, Idaho 83202

Dear Mr. Matthews,

We appreciate the Service's comments and recommendations on our proposed survey protocol for assessing vegetation and wildlife resources at UAMPS's Horse Butte Wind Project. We have carefully examined your comments and recommendations and have made adjustments to the survey protocol, as appropriate. Our responses to your comments are provided below.

Comment #1

The project is near Idaho Falls, not Twin Falls

Response

Correct.

Comment #2

What are the habitat classifications that will be delineated? How fine will you go?

Response

Several habitat types were identified in the project area using Idaho Gap analysis Program (GAP). These are Agricultural Land, Aspen, Bitterbrush, Douglas Fir, Low Sagebrush, Big Sagebrush, Riparian, Perennial Grassland, Utah Juniper, and Warm Mesic Shrubs. GAP data is created at a 1:100,000 scale and is therefore quite coarse relative to the size of the Horse Butte project area. Ultimately, habitat classifications will be delineated to the 5-acre scale. This will be accomplished through review of aerial photography and "ground-truthing".

Comment #3

Once the vegetation layer is completed, will it be verified through ground truthing?

Response

Yes. See answer to Comment # 2.

Comment # 4

Will the sage-grouse, big game, and raptor aerial survey be done simultaneously?

Response

Yes. These surveys are scheduled to be conducted in February 2010.

Comment # 5

The Idaho Fish and Game should have some active/historical lek sites around the project. You should coordinate with them to get locations of these leks in addition to your aerial surveys.

Response

SWCA will coordinate with the Idaho Fish and Game Department to obtain existing lek data for the project area, if available.

Comment # 6

Productivity of sage-grouse is a hard parameter to obtain. I commend you on your efforts to do so. With that said, I don't know that the density of sage grouse will be high enough for you to get a good estimate of presence/absence, habitat preference, or species densities from brood surveys. How many, how long, and how often will you do "windshield surveys"/pointing surveys? Most likely, any assumptions will be broken in trying to estimate sage-grouse chick densities using distance sampling. A better approach may be to use a presence/absence test.

Response

We will re-evaluate both the need and the type of survey used to characterize sage-grouse productivity.

Comment #7

The Service recommends increasing the number of point counts for songbirds to at least 10. It is more important to do shorter (ie. 20 min) point counts at more sites (ie. 2 per morning/2 per evening) over a broad area and differing habitats to achieve a better understanding of the avian community in the project area.

Response

SWCA will increase the number of songbird point counts to twelve and survey for 20 minutes at each point. The attached map shows the proposed location of each point count. The exact locations of the additional points may be changed depending on access and other variables that the biologists are better able to assess when in the field.

Rationale

SWCA agrees that there are benefits to having more points spread out throughout the project area to better characterize the avian community in the project area. The original survey protocol for migratory passerines states that SWCA would conduct 1-hour surveys at four evenly distributed points throughout the project area. These 1-hour surveys would be conducted at dawn and dusk each day, thereby taking two days to complete surveys for each survey period. Minor revisions were made to this protocol prior to surveys conducted in fall 2009. A total of eight observation points were selected based on the diversity and abundance of habitat types found in the project area. Less time (30 minutes) was spent at each of the eight observation points during fall surveys.

Comment #8

As with songbirds, the Service strongly recommends increasing the number of raptor migration observation points in the area to at least 10 for the same reasons as stated in comment #4.

Response

SWCA agrees that some raptors could be missed by only using one observation point. However, 10 observation points is excessive. We believe that 3 observation points will be sufficient to cover the project area. SWCA has plotted 5 potential raptor migration observation points on the attached map. The locations were chosen based on on-site experience with the topography, viewsheds, and habitat types in the project area. The final location of each observation point will be determined by conditions in the field.

Rationale

The project area is not very large, only approximately 5 miles long and X miles wide. The number of ideal raptor observation points, i.e., points that are higher in elevation and provide a broad view of the surrounding landscape, within the project area is relatively low. The use of fewer observation points is more efficient as less time is spent moving between points during the observation time.

Comment # 9

It is important to include a drawing of the flight path of all observed raptors, migrants and residents. This could reveal important flight corridors and areas of high use.

Response

The flight path of all observed raptors, migrants and residents will be drawn on the maps contained within the post-survey report.

Comment #10

Again recommend that observation points are increased to at least 10 points.

Response

See response to Comment # 8.

Comment # 11

It will be difficult to identify the species of bird using a nest in February. Many raptors have not begun building or repairing nest at this time. A follow up to identify species, productivity, condition of nest, and locate any nests built after first survey is recommended.

Response

SWCA has scheduled the helicopter survey for raptor nests in February 2010 and a ground survey for raptor nests in May. During the May survey, SWCA biologists will reexamine all of the nests identified during the February surveys from the ground using binoculars and spotting scopes. Biologists will identify which nests are active and which are inactive, as well as what species are nesting in each active nest. Biologist will identify the status, species, and to the best of their ability from the ground, determine how many chicks or eggs are in each nest. Cliff and tree habitat will also be scanned to see if any new nests were built since the helicopter survey.

Rationale

We agree that if the helicopter survey is being conducted before the nests are active then it is prudent to do a ground survey to determine species, document behavior and locate any additional or alternative nest sites built after the February helicopter survey. The determination of what species occurs in which nests is important as it will determine the need for spatial and temporal buffers from the nest sites. Additionally, it may affect the placement of turbine strings.

Comment # 12

The Service strongly recommends at least 2 years of post construction survey work. This may include, but is not limited to, avian and bat mortality monitoring, grouse use surveys, and breeding bird surveys.

Response

UAMPS and SWCA will work with The Service to determine an appropriate post-construction survey plan.

Again, thank you for your comments and recommendations. Please let me know if you have any further questions or concerns.

Respectfully,

Shawn Childs, Natural Resources Program Director
SWCA Environmental Consultants

cc: Nathan Hardy (UAMPS)
Gary Vecellio (IDFG)

From: Ty_Matthews@fws.gov [mailto:Ty_Matthews@fws.gov]
Sent: Monday, June 28, 2010 1:29 PM
To: Shawn Childs
Subject: Re: UAMPS Horse Butte Wind - Breeding Bird Surveys

Shawn,

This looks good. Thanks for your constant efforts on behalf of conservation. My only suggestion, and it is only a suggestion, is that instead of classifying distance into 3 categories, try to estimate the distance (possibly using a range finder). Pooling distances together can always occur later in analysis.

I am look forward to seeing the project area up close.

Ty Matthews
Fish and Wildlife Biologist
Eastern Idaho Field Office
Chubbuck, ID 83202
W: 208-237-6975 ext. 115
C: 208-329-0453

"Shawn Childs" <schilds@swca.com>

06/25/2010 02:15 PM

To <Ty_Matthews@fws.gov>
cc "Thomas Sharp" <tsharp@swca.com>
Subject UAMPS HOrse Butte Wind - Breeding Bird Surveys

Ty,

We are still planning to conduct surveys for breeding birds. Please review the proposed protocol below. We plan to conduct the surveys along the proposed turbine strings (site-specific) but we could do a broader, area-wide survey to capture birds breeding and nesting in representative habitat types. Please let me know if you have a preference.

Thank you,

Shawn Childs

Breeding Bird Surveys

Point-count surveys will be conducted generally following the habitat-based monitoring program for breeding birds established by the Great Basin Bird Observatory (GBBO 2003). Point-count transects corresponding to the proposed location of turbine strings will be established and surveyed over the course of three mornings during the 2010 breeding season. Surveys will be completed between sunrise and 10:00 a.m. during acceptable weather conditions (no precipitation or high winds). Point-count transects will consist of at least five fixed-radius (100-m) point-count stations. Point-count stations will be located at least 200m apart along each transect. One survey point will require 10 minutes of actual survey time, during which birds will be distinguished as observed during the 0-3, 3-5, or 5-10 minute time intervals. It is anticipated that two transects corresponding to the southern two turbine strings can be completed in a single morning. The northern turbine string will be surveyed on the second morning. In order to determine species and relative abundance of birds in other portions of the project area, additional point count stations will be established in the various plant communities/habitats present on the site. These stations will be surveyed on the second morning, following completion of the northern turbine string transect, and on the third morning.

Data to be recorded will be outlined in a standard data collection form. Each individual bird will be recorded on the data form along with their approximate distance from the observer stationed at the center of the point (0-50 m, 50-100 m, or >100 m), and any evidence of territorial defense (e.g., singing) or breeding (e.g. carrying nest material or food). The same bird will not be recorded twice per count. Environmental conditions such as temperature, cloud cover, and wind, will be recorded for each point-count station. In addition, habitat assessment vegetation transects of each point-count station are required in the GBBO protocol. Because point-count transects are situated within one vegetation community, vegetation transects will be completed within one of the ten point-count circles for each of the four transects. These habitat and vegetation data will be outlined in a standard data collection form.

Shawn Childs
Natural Resources Program Director
SWCA Environmental Consultants
257 East 200 South, Suite 200
Salt Lake City, Ut. 84111
Office 801.322.4307
Cell 435.881.6505

From: Ty_Matthews@fws.gov [mailto:Ty_Matthews@fws.gov]
Sent: Thursday, July 08, 2010 6:17 AM
To: Shawn Childs
Subject: Re: UAMPS Horse Butte Wind Project - Breeding Bird Surveys

Shawn

looks good. Thanks for all your help.

Ty Matthews
Fish and Wildlife Biologist
Eastern Idaho Field Office
Chubbuck, ID 83202
W: 208-237-6975 ext. 115
C: 208-329-0453

"Shawn Childs" <schilds@swca.com>

07/07/2010 03:02 PM

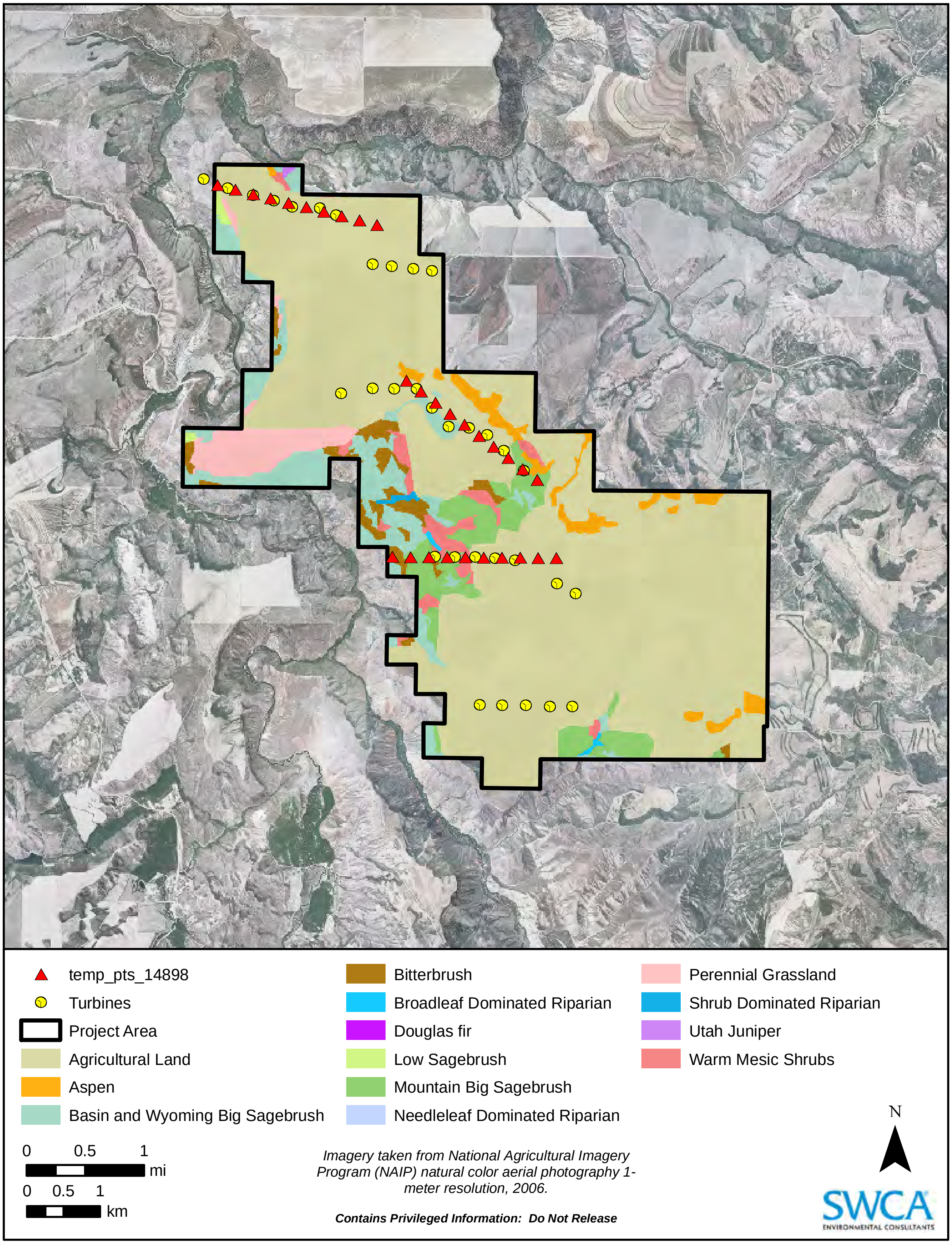
To <Ty_Matthews@fws.gov>
cc "Nathan Hardy" <Nate@uamps.com>, "Thomas Sharp" <tsharp@swca.com>
Subject UAMPS Horse Butte Wind Project - Breeding Bird Surveys

Ty,

SWCA is planning to conduct breeding bird surveys in the Horse Butte Wind Project Area. The attached map shows the location of each of the 30 survey point-count stations. We believe the location of the 3 point-count transects adequately capture all of the habitat types in the project area, which is why there are no transects in the southern portion of the project area. Will you please review and let me know if you have any concerns with the location of these points? We plan to have biologists in the field as early as tomorrow or Friday, but as late as Monday.

Thank you,

Shawn Childs
Natural Resources Program Director
SWCA Environmental Consultants
257 East 200 South, Suite 200
Salt Lake City, Ut. 84111
Office 801.322.4307
Cell 435.881.6505



Imagery taken from National Agricultural Imagery Program (NAIP) natural color aerial photography 1-meter resolution, 2006.

Contains Privileged Information: Do Not Release

SWCA ENVIRONMENTAL CONSULTANTS

From: Ty_Matthews@fws.gov [mailto:Ty_Matthews@fws.gov]
Sent: Wednesday, November 30, 2011 6:49 AM
To: Shawn Childs
Subject: Re: Horse Butte Wind Project - Winter Eagle Use Surveys

The workplan seems adequate. I only have one question. How will the observation points be stratified throughout the project area? You should have an idea of high use areas from last years surveys. Are you going to adjust the points to capture more of those areas?

Ty Matthews, Ph.D.
Fish and Wildlife Biologist
Eastern Idaho Field Office
Chubbuck, ID 83202
W: 208-237-6975 ext. 115
C: 208-220-9543

"Shawn Childs" <schilds@swca.com>

11/29/2011 04:15 PM

To <Ty_Matthews@fws.gov>
cc "Nathan Hardy" <Nate@uamps.com>, "Thomas Sharp" <tsharp@swca.com>
Subject Horse Butte Wind Project - Winter Eagle Use Surveys

Ty,

During our last meeting in Chubbuck you recommended UAMPS conduct a site-specific survey to better understand resident winter eagle use in or near the Horse Butte Wind project area associated with Idaho Department of Fish and Game's carcass disposal program. UAMPS would like to move forward with conducting a survey. I've attached the survey methodology we propose to use to obtain this information. We believe it is important to get The Service's support of the survey methodology. Please review the attached document and provide me with any comments or suggestions you may have at your earliest convenience. We would like to get started as soon as possible.
Please let me know if you have any questions or concerns.
Thank you,

Shawn Childs
Office Director

SWCA Environmental Consultants
1220 SW Morrison, Suite 700
Portland, Oregon 97205
P 503.224.0333 | C 435.881.6505

SCOPE OF WORK FOR WINTER EAGLE USE SURVEYS

SWCA will coordinate with IDFG to gain a better understanding of the method in which carcasses are placed on the Tex Creek WMA. This would include one SWCA biologist meeting with the Tex Creek WMA Manager on-site to discuss their carcass program, observe where the carcasses are placed, and document the number and timing of carcass placement on the WMA.

Surveys will be conducted twice per month during the winter season (November 1– January 30) for a total of 6 surveys. Between two and four observation points will be established in the project area. Two biologists will perform the survey at each observation point for up to a total of 6 hours a day. Observation points will be placed on high points taking into consideration viewshed and topography to ensure that the project area is adequately sampled and views surrounding each point are maximized.

All raptors, not just eagles, observed during each survey will be recorded. The estimated distance to each observed bird will be recorded to the nearest meter. Perch locations and flight paths of large birds and other species of interest will be mapped via GPS/GIS and assigned observation numbers. The behavior of raptors and other large birds and the habitat in which or over which they occur will be recorded. Behaviors to be recorded will include: perching, soaring, flapping, flushed, circle-soaring, hunting and other. Vegetation types within which or over which observations are made will be recorded. Flight tracks and vegetation types (at first observation) will be identified on the data sheet. The flight direction of observed birds will also be recorded on the data sheet map. Approximate flight height above ground level (AGL) at first observation will be recorded to the nearest meter and / or flight categories. The approximate lowest and highest flight heights observed will also be recorded. Weather information, including temperature, wind speed, wind direction and cloud cover, will be recorded hourly. The date, start and end times of the observation period, plot number, species, number of individuals, sex and age class if possible, distance from plot center when first observed, closest distance, height, activity, and vegetation type will be recorded.

Due to snow cover, drifted snow, and mud, access to many of the survey points from a 4-wheel drive vehicle may be problematic. Therefore, snowmobiles and/or ATVs will be required to access each observation point.

Reports

SWCA will compile and review survey results obtained during the surveys described above and draft a report describing our findings. The report will summarize the results of the survey and provide a detailed analysis of the data collected. SWCA will submit an electronic copy of the Draft Report to UAMPS for comments, edits, and input. SWCA will incorporate responses to UAMPS comments on the Draft Report and produce a Final Report. One electronic copy of this report will be sent to UAMPS and USFWS for review.

From: Ty_Matthews@fws.gov [mailto:Ty_Matthews@fws.gov]
Sent: Friday, December 09, 2011 7:11 AM
To: Shawn Childs
Subject: RE: Horse Butte Wind Project - Winter Eagle Use Surveys

This sounds good. Do these spots have high visability? Keep me informed on how they are going.

Ty Matthews, Ph.D.
Fish and Wildlife Biologist
Eastern Idaho Field Office
Chubbuck, ID 83202
W: 208-237-6975 ext. 115
C: 208-220-9543

"Shawn Childs" <schilds@swca.com>

12/07/2011 11:24 AM

To <Ty_Matthews@fws.gov>
cc "Nathan Hardy" <Nate@uamps.com>, "Thomas Sharp" <tsharp@swca.com>
Subject RE: Horse Butte Wind Project - Winter Eagle Use Surveys

Ty,

Here's a map showing a total of 10 eagle observation points, 6 in the Horse Butte Project area. We currently plan to survey for 20-25 minutes at each point.
This is a different survey design than what we had initially proposed - fewer observation points for a long period of time. We originally envisioned documenting resident eagles flying to and from a specific area within the Tex Creek WMA to feed on big game carcasses. Since there is no formal IDFG carcass program, we believe this new survey design is best to document resident eagle use across the entire project area. We still intend to do a total of 6 surveys.
Please let me know if you believe this is adequate. We plan to begin the survey next Tuesday, so I look forward to your input before we put boots on the ground.

Please call me if you have any questions or concerns.

Thank you,
Shawn

From: Ty_Matthews@fws.gov [mailto:Ty_Matthews@fws.gov]
Sent: Wednesday, November 30, 2011 6:49 AM
To: Shawn Childs
Subject: Re: Horse Butte Wind Project - Winter Eagle Use Surveys

The workplan seems adequate. I only have one question. How will the observation points be stratified throughout the project area? You should have an idea of high use areas from last years surveys. Are you going to adjust the points to capture more of those areas?

Ty Matthews, Ph.D.
Fish and Wildlife Biologist
Eastern Idaho Field Office
Chubbuck, ID 83202
W: 208-237-6975 ext. 115
C: 208-220-9543

"Shawn Childs" <schilds@swca.com>

11/29/2011 04:15 PM

To <Ty_Matthews@fws.gov>
cc "Nathan Hardy" <Nate@uamps.com>, "Thomas Sharp" <tsharp@swca.com>
Subject Horse Butte Wind Project - Winter Eagle Use Surveys

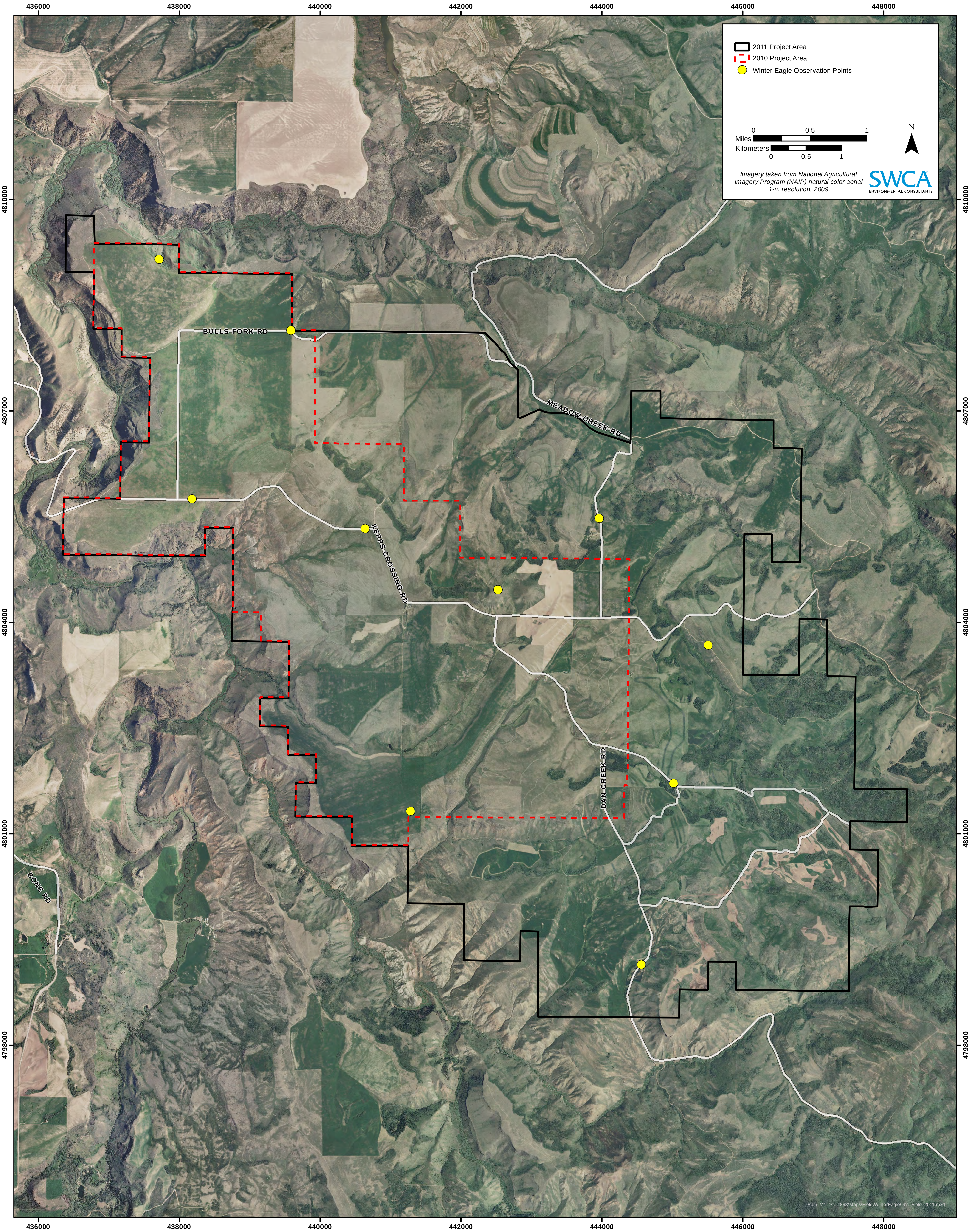
Ty,

During our last meeting in Chubbuck you recommended UAMPS conduct a site-specific survey to better understand resident winter eagle use in or near the Horse Butte Wind project area associated with Idaho Department of Fish and Game's carcass disposal program. UAMPS would like to move forward with conducting a survey. I've attached the survey methodology we propose to use to obtain this information. We believe it is important to get The Service's support of the survey methodology. Please review the attached document and provide me with any comments or suggestions you may have at your earliest convenience. We would like to get started as soon as possible.

Please let me know if you have any questions or concerns.
Thank you,

Shawn Childs
Office Director

SWCA Environmental Consultants
1220 SW Morrison, Suite 700
Portland, Oregon 97205
P 503.224.0333 | C 435.881.6505



2011 Project Area
2010 Project Area
Winter Eagle Observation Points
0 0.5 1
Miles
Kilometers
0 0.5 1
N
Imagery taken from National Agricultural Imagery Program (NAIP) natural color aerial 1-m resolution, 2009.
SWCA
ENVIRONMENTAL CONSULTANTS
BULLS FORK RD
MEADOW CREEK RD
KEPPS CROSSING RD
DAN CREEK RD
BONE RD
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Path: V:\14s\14898\Maps\Field\WinterEagleObs_Field_2011.mxd

Appendix B

USFWS – Idaho Fish and Wildlife Office Endangered, Threatened, Proposed, and Candidate Species

United States Department of the Interior Fish and Wildlife Service Idaho Fish And Wildlife Office
1387 S. Vinnell Way, Room 368 Boise, Idaho 83709 Telephone (208) 378-5243
http://www.fws.gov/idaho

U.S. Fish and Wildlife Service -Idaho Fish and Wildlife Office Endangered, Threatened, Proposed, and Candidate Species With Associated Proposed and Critical Habitats in Idaho 10/23/2013

This Letter and Species List

The U.S. Fish and Wildlife Service (Service) is providing this letter in response to your inquiry regarding federally listed, proposed, and candidate species, and proposed and designated critical habitats that may occur in Idaho. Use the attached Species List to ensure compliance with Sections 7 and 9 of the Endangered Species Act (Act). As a federal agent or designated non-federal representative, use this list in conjunction with best available information to assess whether a proposed action may affect these species or their habitats. If you determine a proposed action may affect a species or their habitats, contact the Service to initiate informal or formal consultation. This list is only valid for a period of 90 days.

Candidate Species Conservation

Though Candidate species have no protection under the Act, they are included in the Species List for early planning consideration. Candidate species could be proposed or listed during the project planning period. The Service advises project proponents to evaluate potential effects to Candidate species that may occur in the project area. Should the species be listed, this may expedite Section 7 consultation under the Act.

Effects Beyond Idaho

If the anticipated effects of an action extend beyond the range of Idaho, please contact the appropriate Service Contact for lists of species and habitats occurring in those adjacent states.

U.S. Fish and Wildlife Service Contacts

Idaho -Idaho Fish and Wildlife Office, Bob Kibler, bob_kibler@fws.gov, (208) 378-5255 Montana -Montana Ecological Services Field Office, (406) 449-5225 Nevada -Nevada Fish and Wildlife Office, (775) 861-6300 Oregon -LaGrande Field Office, (541) 962-8584 Utah -Utah Ecological Service Field Office, (801) 975-3330 Washington -Eastern Washington Field Office, (509) 891-6839 Wyoming -Wyoming Ecological Services Field Office, (307) 772-2374

NOAA Fisheries Species

Listed or proposed species that are under National Marine Fisheries Service's (NOAA Fisheries) jurisdiction do NOT appear on the Service's Species Lists. In Idaho, please contact NOAA Fisheries at (208) 378-5696 or visit NOAA Fisheries' webpage at http://www.nwr.noaa.gov/Species-Lists.cfm for consultation information.

Additional Information

To obtain additional information about the Act, please visit one of the Service's internet sites at http://www.fws.gov/endangered/laws-policies/index.html; http://www.fws.gov/idaho/agencies.htm; or speak with a Service Contact.

This list was revised by the USFWS on 11/04/2013 .

U.S. Fish and Wildlife Service • Idaho Fish and Wildlife Office

CANDIDATE, PROPOSED AND LISTED SPECIES & PROPOSED AND DESIGNATED CRITICAL HABITAT IN IDAHO

	Herps	Birds		Mammals						Fish		Mollusks				Plants							
Common Name	**Columbia Spotted Frog (Great Basin Population)**	**Greater Sage-Grouse**	**Yellow-Billed Cuckoo**	**Canada Lynx**	**Grizzly Bear**	**Northern Idaho Ground Squirrel**	**Selkirk Mountains Woodland Caribou**	**Southern Idaho Ground Squirrel**	**North American Wolverine**	**Bull Trout**	**Kootenai River White Sturgeon**	**Banbury Springs Lanx**	**Bliss Rapids Snail**	**Bruneau Hot Springsnail**	**Snake River Physa**	**Goose Creek Milkvetch**	**MacFarlane's Four-O'Clock**	**Packard's Milkvetch**	**Slickspot Peppergrass**	**Spalding's Catchfly**	**Ute Ladies'-Tresses**	**Water Howellia**	**Whitebark Pine**
Scientific Name	*Rana luteiventris*	*Centrocercus urophasianus*	*Coccyzus americanus*	*Lynx canadensis*	*Ursus arctos horribilis*	*Spermophilus brunneus brunneus*	*Rangifer tarandus caribou*	*Spermophilus brunneus endemicus*	*Gulo gulo luscus*	*Salvelinus confluentus*	*Acipenser transmontanus*	*Lanx sp.*	*Taylorconcha serpenticola*	*Pyrgulopsis bruneauensis*	*Haitia (Physa) natricina*	*Astragalus anserinus*	*Mirabilis macfarlanei*	*Astragalus cusickii var. parkardiae*	*Lepidium papilliferum*	*Silene spaldingii*	*Spiranthes diluvialis*	*Howellia aquatilis*	*Pinus albicaulis*
Ada		C	P							T					E				P-PCH				
Adams		C		T		T		C	P	T-DCH													C
Bannock		C	P						P														
Bear Lake		C		T					P														
Benewah				T					P	T-DCH										T		T	
Bingham		C	P						P												T		
Blaine		C	P	T					P	T-DCH													C
Boise			P	T					P	T-DCH													C
Bonner				T	T		E		P	T-DCH													C
Bonneville		C	P	T	T				P												T		C
Boundary				T-DCH	T		E-DCH		P	T-DCH	E-DCH												C
Butte		C		T					P	T-DCH													C
Camas		C	P	T					P	T-DCH													C
Canyon															E				P-PCH				
Caribou		C		T					P														
Cassia		C	P												E	C							
Clark		C	P	T	T				P														C
Clearwater				T					P	T-DCH													C
Custer		C	P	T					P	T-DCH													C
Elmore		C	P	T					P	T-DCH			T		E				P-PCH				C
Franklin		C		T					P														
Fremont		C	P	T	T				P												T		C
Gem		C						C	P	T-DCH									P-PCH				C

Table Key: C = Candidate Species P= Proposed Species T=Threatened Species E=Endangered Species PCH= Proposed Critical Habitat DCH=Designated Critical Habitat

This list was revised by the USFWS on 11/04/2013 .

U.S. Fish and Wildlife Service • Idaho Fish and Wildlife Office

CANDIDATE, PROPOSED AND LISTED SPECIES & PROPOSED AND DESIGNATED CRITICAL HABITAT IN IDAHO

	Herps	Birds		Mammals						Fish		Mollusks				Plants							
Common Name	**Columbia Spotted Frog (Great Basin Population)**	**Greater Sage-Grouse**	**Yellow-Billed Cuckoo**	**Canada Lynx**	**Grizzly Bear**	**Northern Idaho Ground Squirrel**	**Selkirk Mountains Woodland Caribou**	**Southern Idaho Ground Squirrel**	**North American Wolverine**	**Bull Trout**	**Kootenai River White Sturgeon**	**Banbury Springs Lanx**	**Bliss Rapids Snail**	**Bruneau Hot Springsnail**	**Snake River Physa**	**Goose Creek Milkvetch**	**MacFarlane's Four-O'Clock**	**Packard's Milkvetch**	**Slickspot Peppergrass**	**Spalding's Catchfly**	**Ute Ladies'-Tresses**	**Water Howellia**	**Whitebark Pine**
Scientific Name	*Rana luteiventris*	*Centrocercus urophasianus*	*Coccyzus americanus*	*Lynx canadensis*	*Ursus arctos horribilis*	*Spermophilus brunneus brunneus*	*Rangifer tarandus caribou*	*Spermophilus brunneus endemicus*	*Gulo gulo luscus*	*Salvelinus confluentus*	*Acipenser transmontanus*	*Lanx sp.*	*Taylorconcha serpenticola*	*Pyrgulopsis bruneauensis*	*Haitia (Physa) natricina*	*Astragalus anserinus*	*Mirabilis macfarlanei*	*Astragalus cusickii var. parkardiae*	*Lepidium papilliferum*	*Silene spaldingii*	*Spiranthes diluvialis*	*Howellia aquatilis*	*Pinus albicaulis*
Gooding		C										E	T		E								
Idaho				T					P	T-DCH							T			T			C
Jefferson		C	P	T					P												T		
Jerome		C											T		E								
Kootenai			P	T					P	T-DCH										T		T	
Latah				T					P											T		T	
Lemhi		C	P	T					P	T-DCH													C
Lewis										T-DCH										T			
Lincoln		C	P																				
Madison		C	P	T					P												T		
Minidoka		C	P												E								
Nez Perce				T						T-DCH										T			
Oneida		C																					
Owyhee	C	C	P							T-DCH				E	E				P-PCH				
Payette		C						C		T					E			C	P-PCH				
Power		C	P																				
Shoshone				T					P	T-DCH										T		T	C
Teton				T	T				P														C
Twin Falls	C	C											T		E								
Valley				T		T			P	T-DCH													C
Washington		C				T		C	P	T-DCH					E								C

Table Key: C = Candidate Species P= Proposed Species T=Threatened Species E=Endangered Species PCH= Proposed Critical Habitat DCH=Designated Critical Habitat

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CANDIDATE, PROPOSED AND LISTED SPECIES & PROPOSED AND DESIGNATED CRITICAL HABITA

	Herps	Birds		Mammals						Fish		Mollusks				Plants			
Common Name	**Columbia Spotted Frog (Great Basin Population)**	**Greater Sage-Grouse**	**Yellow-Billed Cuckoo**	**Canada Lynx**	**Grizzly Bear**	**Northern Idaho Ground Squirrel**	**Selkirk Mountains Woodland Caribou**	**Southern Idaho Ground Squirrel**	**North American Wolverine**	**Bull Trout**	**Kootenai River White Sturgeon**	**Banbury Springs Lanx**	**Bliss Rapids Snail**	**Bruneau Hot Springsnail**	**Snake River Physa**	**Goose Creek Milkvetch**	**MacFarlane's Four-O'Clock**	**Packard's Milkvetch**	**Slickspot Peppergrass**
Scientific Name **Ada Adams Bannock Bear Lake Benewah Bingham Blaine Boise Bonner Bonneville Boundary Butte Camas Canyon Caribou Cassia Clark Clearwater Custer Elmore Franklin Fremont Gem**	*Rana luteiventris*	*Centrocercus urophasianus* **C C C C C C C C C C C C C C C C C Table Key: C = Candidate Species**	*Coccyzus americanus* **C C C C C C C C C C C C**	*Lynx canadensis* **T T T T T T T T T T T-DC H T T T T T T T T T T T T P= Proposed Species**	*Ursus arctos horribilis*	*Spermophilus brunneus brunneus* **T**	*Rangifer tarandus caribou* **E E-DC H**	*Spermophilus brunneus endemicus* **C**	*Gulo gulo luscus* **P P P P P P P P P P P P P P P T-D CH P T-D CH P T-D CH P P C P T-D CH T= Threatened Species E= Endangered Species**	*Salvelinus confluentus* **T T-DC H T-DC H T-DC H T-DC H T-DC H T-DC H E-DC H T-DC H T-DC H**	*Acipenser transmontanus*	*Lanx* sp.	*Taylorconcha serpenticola*	*Pyrgulopsis bruneauensis*	*Haitia (Physa) natricina* **E E E C T E PCH= Proposed Critical Habitat**	*Astragalus anserinus*	*Mirabilis macfarlanei*	*Astragalus cusickii var. packardiae*	*Lepidium papilliferum* **P-PCH P-PCH P-PCH T P-PCH DCH=Designated Critical Habitat**

U.S. Fish and Wildlife Service • Idaho Fish and Wildlife Office

CANDIDATE, PROPOSED AND LISTED SPECIES & PROPOSED AND DESIGNATED CRITICAL HABITA

	Herps	Birds		Mammals						Fish		Mollusks				Plants			
Common Name	**Columbia Spotted Frog (Great Basin Population)**	**Greater Sage-Grouse**	**Yellow-Billed Cuckoo**	**Canada Lynx**	**Grizzly Bear**	**Northern Idaho Ground Squirrel**	**Selkirk Mountains Woodland Caribou**	**Southern Idaho Ground Squirrel**	**North American Wolverine**	**Bull Trout**	**Kootenai River White Sturgeon**	**Banbury Springs Lanx**	**Bliss Rapids Snail**	**Bruneau Hot Springsnail**	**Snake River Physa**	**Goose Creek Milkvetch**	**MacFarlane's Four-O'Clock**	**Packard's Milkvetch**	**Slickspot Peppergrass**

Appendix C

Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Table C1. Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Protection Status USFWS	**State Status IDFG	Potential for Occurrence in the Project Area
Birds*				
American avocet	*Recurvirostra americana*	–	S5B, PNS	**Unlikely to occur.** The Project Area does not contain marshes or other wetland habitat.
American three-toed woodpecker	*Picoides dorsalis*		S2, PNS	**Unlikely to occur.** The Project Area does not contain any suitable aspen-conifer habitat for the species.
American white pelican	*Pelecanus erythrorhynchos*	–	S1B, PNS	**Likely to occur.** Although the Project Area is outside the breeding and wintering range of the species, and there is very little if any suitable habitat around the Project Area, this species, a flock of 16 migrating through the area has been documented during site-specific surveys.
Black swift	*Cypseloides niger*	BCC[±]	S1B, PNS	**Unlikely to occur.** The Project Area is outside of their known range and there is no breeding habitat present.
Black rosy-finch	*Leucosticte atrata*	–	S3, PNS	**May occur.** The Project Area occurs within the species' wintering range.
Black tern	*Chlidonias niger*	BCC[±]	S1B, PNS	**Unlikely to occur.** The Project Area has very little suitable habitat though they may migrate through the area.
Black-chinned sparrow	*Spizella atrogularis*	BCC[±]	–	**Unlikely to occur.** The Project Area is outside of their known range.
Black-crowned night-heron	*Nycticorax nycticorax*	–	S2B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species.
Black-necked stilt	*Himantopus mexicanus*	–	S3B, PNS	**Unlikely to occur.** The Project Area is at the edge of the breeding range of the species, and there is no suitable habitat.
Blue grosbeak	*Passerina caerulea*	–	S1B, PNS	**Unlikely to occur.** Although the Project Area is outside the breeding and wintering range of the species, the species may migrate through the area.
Boreal owl	*Aegolius funereus*	–	S2, PNS	**Unlikely to occur.** The Project Area is at the southern edge of the breeding range of the species, and there is not much suitable habitat.
Brewer's sparrow	*Spizella breweri*	BCC[±]	S3B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented during site-specific surveys.
Burrowing owl	*Athene cunicularia*	–	S2B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species.
California gull	*Larus californicus*	–	S2B, S3N, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented within the Project Area during site-specific surveys.
Calliope hummingbird	*Selasphorus calliope*	BCC[±]	–	**Unlikely to occur.** The Project Area is at the southern edge of the breeding range of the species, and there is not much suitable habitat (aspen thickets).
Caspian tern	*Hydroprogne caspia*	–	S2B, PNS	**Unlikely to occur.** The Project Area has very little suitable habitat though they may migrate through the area.
Cattle egret	*Bubulcus ibis*		S2B, PNS	**Unlikely to occur.** The Project Area is outside of the known breeding range of this species though they may move through the area during post-breeding dispersal; typically associated with wetland/riparian habitats.
Clark's grebe	*Aechmophorus clarkii*	–	S2B, PNS	**May occur.** The Project Area is within known geographic and elevational range of this species. There is some suitable habitat around the Project Area.

Table C1. Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Protection Status USFWS	**State Status IDFG	Potential for Occurrence in the Project Area
Common loon	*Gavia immer*	–	S1B, S2N, PNS	**Unlikely to occur.** The Project Area is outside the breeding and wintering range of the species.
Eared grebe	*Podiceps nigricollis*	BCC±	–	**Likely to occur.** The Project Area is within the breeding range of the species. Though the Project Area does not contain suitable habitat for breeding, the species may move through the area to nearby wetlands.
Ferruginous hawk	*Buteo regalis*	BCC±	S3B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. There is potentially suitable nesting habitat within the Project Area. This species *has not* been documented during site-specific surveys.
Flammulated owl	*Psiloscops flammeolus*	BCC±	S3B, PNS	**Unlikely to occur.** The Project Area does not contain montane forest habitat with brushy understory, which is typical habitat for this species.
Forster's tern	*Sterna forsteri*	–	S1B, PNS	**Unlikely to occur.** The Project Area has very little suitable habitat though the species may migrate through the area.
Franklin's gull	*Leucophaeus pipixcan*	–	S2B, PNS	**Unlikely to occur. May migrate/wander.** Although the Project Area is within the breeding range of the species, the Project Area does not contain suitable habitat. The species may migrate through the Project Area.
Grasshopper sparrow	*Ammodramus savannarum*	–	S2B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented during site-specific surveys.
Great egret	*Ardea alba*	–	S1B, PNS	**Unlikely to occur.** Although the Project Area is outside the breeding and wintering range of the species, the species may migrate through the Project Area.
Greater sage-grouse	*Centrocercus urophasianus*	C BCC±	S2, GB	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented during site-specific surveys.
Green-tailed towhee	*Pipilo chlorurus*	BCC±	–	**Likely to occur.** The Project Area is within the known breeding range of the species and contains suitable breeding habitat. This species has been documented during site-specific surveys.
Harlequin duck	*Histrionicus histrionicus*	–	S1B, GB	**May occur.** The Project Area is within known geographical and elevational range of this species. There is some suitable habitat around the Project Area.
Hooded merganser	*Lophodytes cucullatus*	–	S2B, S3N, GB	**Unlikely to occur.** The Project Area lies outside the species' range.
Juniper titmouse	*Baeolophus ridgwayi*	–	S2, PNS	**May occur.** The Project Area is within known geographic and elevational range of this species. There is some suitable habitat around the Project Area.
Lesser goldfinch	*Spinus psaltria*	–	S2B, PNS	**May occur.** Although the Project Area is north of the range of this species, this species has been documented in the Project Area during site-specific surveys.
Lesser scaup	*Aythya affinis*	–	S3, GB	**May occur.** The Project Area is within known geographic and elevational range of this species. There is some suitable habitat around the Project Area.
Lewis's woodpecker	*Melanerpes lewis*	BCC	S3B, PNS	**Unlikely to occur. Migration only.** Although the Project Area lies outside of the species' range, the species may migrate through the Project Area.
Loggerhead shrike	*Lanius ludovicianus*	BCC	–	**Unlikely to occur.** The Project Area is outside of the range of this species.

Table C1. Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Protection Status USFWS	**State Status IDFG	Potential for Occurrence in the Project Area
Long-billed curlew	*Numenius americanus*	BCC	S2B, PNS	**May occur.** The Project Area occurs within the species' range and there is some potentially suitable habitat.
Marbled godwit	*Limosa fedoa*	BCC	–	**Unlikely to occur. Migration only.** Although the Project Area lies outside of the species' range, the species may migrate through the Project Area.
Merlin	*Falco columbarius*	–	S2B, S2N, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species.
Mountain quail	*Oreortyx pictus*	–	S1, GB	**Unlikely to occur.** The Project Area is outside of the range of this species.
Northern goshawk	*Accipiter gentilis*	–	S3	**Unlikely to occur. May wander.** Although the Project Area is within the geographic and elevational range of the species, suitable breeding habitat does not occur within the Project Area.
Northern pintail	*Anas acuta*	–	S5B, S2, GB	**May occur.** The Project Area is within known geographic and elevational range of this species. There is some suitable habitat around the Project Area.
Olive-sided flycatcher	*Contopus cooperi*	–	S3B	**Unlikely to occur.** Although the Project Area is within the known geographic and elevational range of the species, no suitable breeding habitat is present within the Project Area. The species may migrate through the Project Area.
Peregrine falcon	*Falco peregrinus*	DM BCC	S2B, T	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species.
Pinyon jay	*Gymnorhinus cyanocephalus*	BCC	S1, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented during site-specific surveys.
Pygmy nuthatch	*Sitta pygmaea*	–	S1, PNS	**Unlikely to occur.** The Project Area is outside the known geographic and elevational range of the species.
Red-necked grebe	*Podiceps grisegena*	–	S2B, PNS	**Unlikely to occur.** The Project Area is outside the breeding and wintering range of the species, but the species may migrate through the area.
Sage thrasher	*Oreoscoptes montanus*	BCC	–	**Likely to occur.** The Project Area is within the known breeding range of the species and contains suitable breeding habitat. This species has been documented during site-specific surveys.
Sage sparrow	*Amphispiza belli*	BCC	–	**May occur.** The Project Area is at the northern edge of the species breeding range and contains suitable breeding habitat.
Sandhill crane	*Grus canadensis*	–	S3B, GB	**May occur. May wander**. The Project Area is within the known geographic and elevational range of the species. This species has been detected migrating through the Project Area.
Sharp-tailed grouse	*Tympanuchus phasianellus*	–	S1, GB	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented within the Project Area during site-specific surveys. Leks have also been documented in the Project Area.
Short-eared owl	*Asio flammeus*	–	S4, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented during site-specific surveys.
Snowy egret	*Egretta thula*	–	S2B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species.
Snowy plover	*Charadrius nivosus*	BCC	–	**Unlikely to occur.** The Project Area is outside the species' breeding range.

Table C1. Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Protection Status USFWS	**State Status IDFG	Potential for Occurrence in the Project Area
South hills crossbill[‡] (Red crossbill)	*Loxia sinesciuris*[‡] (*Loxia curvirostra*)	–	S1, PNS	**Unlikely to occur.** Although the Project Area is within the known geographic and elevational range of the species, no suitable breeding habitat is present within the Project Area. The species may migrate through the Project Area.
Swainson's hawk	*Buteo swainsoni*	–	S3B, PNS	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species. This species has been documented nesting in the Project Area.
Trumpeter swan	*Cygnus buccinator*	–	S1B, S2N, GB	**Unlikely to occur.** The Project Area is outside the species' breeding and wintering range, and there is no suitable habitat.
Tricolored blackbird	*Agelaius tricolor*	BCC	–	**Unlikely to occur.** The Project Area is outside the breeding range of the species.
Upland sandpiper[§]	*Bartramia longicauda*	–	S1B, PNS	**Unlikely to occur.** The Project Area is outside the breeding and wintering range of the species.
Virginia's warbler	*Oreothlypis virginiae*	BCC	S1B, PNS	**May occur.** The Project Area is within the known geographic and elevational range of the species.
Western grebe	*Aechmophorus occidentalis*	–	S2B, PNS	**May occur.** The Project Area is within known geographical and elevational range of this species. There is some suitable habitat around the Project Area.
White-headed woodpecker	*Picoides albolarvatus*	BCC	S2, PNS	**Unlikely to occur.** The Project Area is outside the breeding and wintering range of the species.
White-faced ibis	*Plegadis chihi*	–	S2B, PNS	**May occur.** Although the Project Area is within the breeding range of the species, the Project Area does not contain much suitable habitat. The species may migrate through the Project Area. This species has been documented during site-specific surveys.
White-winged crossbill	*Loxia leucoptera*	–	S1, PNS	**Unlikely to occur.** The Project Area does not contain conifer woodland, and the Project Area is on the edge of the range.
Williamson's sapsucker	*Sphyrapicus thyroideus*	BCC	S4B	**Unlikely to occur.** The Project Area does not contain conifer woodland, and the Project Area is on the edge of the range.
Willow flycatcher	*Empidonax traillii*	BCC	S5B	**Unlikely to occur.** The Project Area does not contain riparian woodland vegetation (cottonwood, willow, or saltcedar).
Wilson's phalarope	*Phalaropus tricolor*	–	S3B, PNS	**May occur.** The Project Area is within the range of this species; however, there is not much in terms of suitable habitat.
Yellow-billed cuckoo	*Coccyzus americanus*	PT BCC	S2B, PNS	**Unlikely to occur.** The Project Area does not contain riparian woodland vegetation (cottonwood, willow, or saltcedar).
Yellow rail	*Coturnicops noveboracensis*	BCC	–	**Unlikely to occur.** The Project Area is outside the breeding range of the species.
Bats[†]				
Californian myotis	*Myotis californicus*	–	S2	**Unlikely to occur.** The Project Area is outside the known geographic range, but there is suitable habitat in the Project Area
Fringed myotis	*Myotis thysanodes*	–	S2, PNS	**Unlikely to occur. May wander.** Although the Project Area is outside the known range of this species it has been found in the southwest portion of the state.

Table C1. Special-status Non-eagle Avian and Bat Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Protection Status USFWS	**State Status IDFG	Potential for Occurrence in the Project Area
Long-eared myotis	*Myotis evotis*	–	S3	**Likely to occur.** The Project Area is within the known geographic and elevational range of the species, and it has been acoustically detected on-site in relatively low amounts.
Long-legged myotis	*Myotis volans*	–	S3	**Likely to occur.** The Project Area is within the known geographic range of the species and has suitable habitat, but it has not been acoustically detected on-site.
Spotted bat	*Euderma maculatum*	–	S3, PNS	**Unlikely to occur. May wander.** Although the Project Area is outside the known range of this species, it has been found in the southwest portion of the state.
Townsend's big-eared bat	*Corynorhinus townsendii*	–	S3, PNS	**Likely to occur.** The Project Area is within the known geographic range of the species, and it has been acoustically detected on-site in relatively low amounts.
Western pipistrelle	*Pipistrellus hesperus*	–	S3	**Unlikely to occur.** The Project Area is outside the known geographic range of the species although there is some suitable habitat in the Project Area.
Western red bat	*Lasiurus blossevillii*	–	S1B	**Unlikely to occur.** Although the Project Area is outside the known geographic range of the species, it was recorded acoustically at low activity levels in the Project Area.
Western small-footed myotis	*Myotis ciliolabrum*	–	S4	**Likely to occur.** The Project Area is within the known geographic range of the species, and it has been acoustically detected on-site in relatively low amounts
Yuma myotis	*Myotis yumanensis*	–	S3	**Likely to occur.** The Project Area is within the known geographic range of the species, and it has been acoustically detected on-site in relatively low amounts.

Notes:

BCC = USFWS Bird of Conservation Concern for Bird Conservation Region 9 (USFWS 2008)

BGEPA = Bald and Golden Eagle Protection Act

C = Candidate

DM = Delisted, being monitored

SC = Species of Concern

PT = Proposed threatened

T = Threatened

* American Ornithologists' Union (2013)–recognized common names.

† NatureServe (2013)–recognized common names.

‡ Proposed scientific name; species, endemic to southern Idaho, not recognized by American Ornithologists' Union (2013).

§ Species lacking essential information pertaining to status in Idaho.

S1 = Critically imperiled: at high risk because of extreme rarity (often five or fewer occurrences), rapidly declining numbers, or other factors that make it particularly vulnerable to rangewide extinction or extirpation.

S2 = Imperiled: at risk because of restricted range, few populations (often 20 or fewer), rapidly declining numbers, or other factors that make it vulnerable to rangewide extinction or extirpation.

S3 = Vulnerable: at moderate risk because of restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors that make it vulnerable to rangewide extinction or 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.

**Idaho Species of Greatest Conservation Need and Idaho Special Protection Status B = Breeding: conservation status refers to the breeding population of the species.

N = Nonbreeding: conservation status refers to the nonbreeding population of the species.

PNS = Nongame Protected species.

GB = Gamebird.

Appendix D

Passerine Bird Use Surveys Species List

Table D1. Horse Butte Wind Facility Passerine Bird Use Survey Species List

Common Name	Scientific Name	Fall 2009	Spring 2010	Spring 2011	Fall 2011
American goldfinch	*Spinus tristis*	X	X		
American robin	*Turdus migratorius*	X	X	X	X
Bank swallow	*Riparia riparia*			X	
Black-capped chickadee	*Poecile atricapillus*	X	X	X	X
Brewer's blackbird	*Euphagus cyanocephalus*		X	X	X
Brewer's sparrow	*Spizella breweri*	X	X	X	X
Cassin's finch	*Carpodacus cassinii*				X
Chipping sparrow	*Spizella passerina*	X		X	X
Cliff swallow	*Petrochelidon pyrrhonota*			X	
Dark-eyed junco	*Junco hyemalis*	X		X	X
Downy woodpecker	*Picoides pubescens*			X	X
European starling	*Sturnus vulgaris*			X	X
Green-tailed towhee	*Pipilo chlorurus*				X
Hairy woodpecker	*Picoides villosus*				X
Horned lark	*Eremophila alpestris*	X	X	X	X
Lark sparrow	*Chondestes grammacus*			X	X
Lesser goldfinch	*Spinus psaltria*	X			
Loggerhead shrike	*Lanius ludovicianus*				X
Mountain bluebird	*Sialia currucoides*	X	X	X	X
Mountain chickadee	*Poecile gambeli*				X
Mourning dove	*Zenaida macroura*		X	X	
Northern flicker	*Colaptes auratus*	X	X	X	X
Ruby-crowned kinglet	*Regulus calendula*	X			X
Rock pigeon	*Columba livia*				X
Rock wren	*Salpinctes obsoletus*		X	X	X
Sage thrasher	*Oreoscoptes montanus*		X		X
Savannah sparrow	*Passerculus sandwichensis*			X	X
Spotted towhee	*Piplio maculatus*				X
Townsend's solitaire	*Myadestes townsendi*				X
Townsend's warbler	*Setophaga townsendi*				X
Tree swallow	*Tachycineta bicolor*				X
Vesper sparrow	*Pooecetes gramineus*	X	X	X	X
Western meadowlark	*Sturnella neglecta*	X	X	X	X
Western wood-pewee	*Contopus sordidulus*				X
Western tanager	*Piranga ludoviciana*	X			
White-crowned sparrow	*Zonotrichia leucophrys*	X	X		X
Wilson's warbler	*Cardellina pusilla*				X
Yellow-rumped warbler	*Setophaga coronata*	X	X		