

## Appendix D

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# FINAL REPORT

## **Raptor Nest Surveys for the Chokecherry and Sierra Madre Wind Resource Areas Carbon County, Wyoming**

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## INTRODUCTION AND BACKGROUND

The Power Company of Wyoming has proposed a wind-energy facility in Carbon County, Wyoming, capable of producing 2,000 megawatts (MW) of energy with 1,000 wind turbines. The wind-energy facility will be constructed in two project areas, referred to as the Chokecherry and Sierra Madre Wind Resource Areas (WRAs; Figure 1). Both WRAs are a mixture of Bureau of Land Management (BLM), State of Wyoming, and private lands.

In the preferred alternative of the Environmental Impact Statement (EIS) prepared for the new Resource Management Plan for the Rawlins District (BLM 2008), the “no surface occupancy” buffer for raptor nests is 1,200 feet (ft; 0.23 miles; 0.37 kilometers [km]) for ferruginous hawks (*Buteo regalis*) and 825 ft (0.16 miles; 0.25 km) for all other raptor species. In addition, no construction activities are allowed within one mile (1.61 km) of active golden eagle (*Aquila chrysaetos*) and ferruginous hawk nests or within 0.75 miles (1.20 km) of all other raptor species during the nesting season. Depending on species, the seasonal timing restrictions to protect nesting raptors covers the period February 1 to July 31. The objectives of this study were to locate and map raptor nests in and within one mile of the WRAs so that nest locations can be considered when siting wind energy facilities, planning construction activities, and characterizing use of the WRAs by nesting raptors.

## STUDY AREA

The proposed WRAs are located in Carbon County (Figure 1) approximately four miles (6.4 kilometers [km]) south of Rawlins, Wyoming, within T 16 N – T 18N, R 88 W – R 89W and T 19 N – T21N, R 85 W – R 88W. The Chokecherry WRA is dominated by sagebrush steppe and mixed grass prairie. Topography in the area is rolling hills throughout much of the WRA, with topography becoming more varied in the southern portion (Figure 1). A distinct rim with a steep cliff face dominates the southern boundary of the WRA. The general land practice is cattle grazing.

The Sierra Madre WRA is dominated by sagebrush steppe with pockets of quaking aspen (*Populus tremuloides*). Topography in the WRA ranges from gently rolling plains in the northern portion to rolling hills in the southern portion. The escarpment of Miller Hill dominates the northern boundary of the WRA. Drainages in the southern portion are dominated by willow (*Salix* spp.). The general land practice is also cattle grazing.

## METHODS

The goal of the nesting raptor survey was to gather information on nesting species visible from the air, locations of the nests, and timing of nesting by raptor species in the WRAs. The nest search area included each WRA and an approximate one-mile (1.6 km) buffer, which totaled approximately 183.2 square miles (mi<sup>2</sup>; 474.5 square kilometers [km<sup>2</sup>]) for the Chokecherry WRA and 86.2 mi<sup>2</sup> (223.3 km<sup>2</sup>) for the Sierra Madre WRA. The survey was conducted by helicopter from May 14 to May 30, 2008.

Raptor nests were surveyed for by flying in a helicopter and searching suitable habitat (stands of trees, rocky areas and cliffs) for nests. Surveys were conducted while flying at a maximum altitude of 250 ft (76.2 meters [m]) and an approximate airspeed of 30 miles per hour (mph; 48.3 kilometers per hour [kph]). If a nest was observed, the helicopter was moved to a position where it could be determined if the nest was occupied and what species was using the nest. Efforts were made to minimize disturbance to breeding raptors, including keeping the helicopter at a maximum distance from the nest in which the species could be determined. Locations of inactive nests were also recorded as they may become occupied during subsequent years. All nests, whether active or inactive, were given a unique identification number and the Universal Transverse Mercator (UTM) location was recorded with a global positioning system (GPS). In addition to the aerial surveys, raptor nests observed while conducting other study activities at the WRAs (e.g., burrowing owl [*Athene cunicularia*]) were recorded and mapped.

To supplement data collected during the 2008 nesting season, all raptor nest records for the Chokecherry and Sierra Madre WRAs maintained by the BLM were obtained. These records include nests located since 1980 (a 28-year period) and therefore do not reflect expected raptor nesting activity for any given year. Prior to 1996, the BLM mapped raptor nest locations opportunistically. Since 1996, specific surveys have been conducted to map raptor nests in the Rawlins Field Office. These records have been supplemented with raptor nests located as part of the permitting process for development activities such as pipelines and oil and gas developments (Heath Cline, Wildlife Biologist, BLM Rawlins Field Office, personal communication 10-22-08).

## RESULTS

Twenty-four active raptor nests, consisting of 11 nests of red-tailed hawk (*Buteo jamaicensis*), five of prairie falcon (*Falco mexicanus*), five of great horned owl (*Bubo virginianus*), and three of golden eagle were located during 2008 aerial surveys of the WRAs (Table 1). Two burrowing owls were also observed from the ground on the Chokecherry WRA, and it is assumed the burrowing owls were nesting in the area.

Twelve of the active raptor nests were found in or within one mile (1.6 km) of the Chokecherry WRA, and 12 were found in or within one mile of the Sierra Madre WRA (Figure 2). Fourteen (58%) of the active raptor nests were located in trees while the remaining 10 (42%) were located on cliffs (Table 1). Three of the four great horned owl and 10 of the 11 red-tailed hawk nests were in trees, whereas one great horned owl, one red-tailed hawk, and all golden eagle and prairie falcon nests were located on cliffs. Either eggs or chicks were observed in all active nests (Table 1).

A total of 110 inactive nests were also located, with 55 in or within one mile (1.6 km) of the Chokecherry WRA and 55 in or within one mile of the Sierra Madre WRA (Figure 3). Forty-eight percent of the inactive nests were on cliffs, 51% were in trees and 1% was on rock. All inactive nests were classified as being in good condition.

Most of the active and inactive raptor nests on the Chokecherry WRA were located along the extreme southern end of the WRA, although several also occurred along a ridgeline that runs east-west through the northern end of the project area (Figures 2 and 3). Very few active or inactive nests were located within the project boundary of the Sierra Madre WRA; the vast majority were located just outside the project boundary along steep, wooded slopes that lead away from the WRA (Figures 2 and 3).

In addition to raptors, seven active common raven (*Corvus corax*) nests and one active Canada goose (*Branta canadensis*) nest were located during aerial surveys (Table 2; Figure 2). Three of the common raven nests were in trees and four were on cliffs. The Canada goose nest was located in a tree along the North Platte River just east of the Chokecherry WRA.

Since 1980, the BLM has mapped 141 active raptor nests in or within one mile (1.6 km) of the WRAs, including 132 nests at the Chokecherry WRA, and nine at the Sierra Madre WRA (Figure 4). Over this 28-year period, golden eagle nests have been most common, with 42 active nests documented, followed by red-tailed hawk (31), ferruginous hawk (25), and prairie falcon (23). Other raptor nests located included three Cooper's hawks (*Accipiter cooperii*), three great horned owls, three American kestrels (*Falco americanus*), and one Swainson's hawk. The nest records also include two unidentified buteos and seven unidentified raptors. Most of the nests at the Chokecherry WRA occurred along the southern boundary of the WRA, although several nests were located throughout the WRA. Most of the nests found at the Sierra Madre WRA occur along the northern and eastern boundaries.

## DISCUSSION

Active raptor nest density was 0.07 nests/mi<sup>2</sup> within the Chokecherry WRA and the one-mile (1.6-km) buffer, and 0.14 nests/mi<sup>2</sup> within the Sierra Madre WRA and the one-mile buffer. This is low to moderate in comparison to 16 other WRAs evaluated in the western U.S., where active raptor nest density ranged from 0.03 to 0.43 nests/mi<sup>2</sup> and averaged 0.22 nests/mi<sup>2</sup> (Table 3). The low active raptor nest density of the Chokecherry and Sierra Madre WRAs will minimize the potential impact on nesting raptors. Since few raptor species targeted during nest surveys have been observed as fatalities at newer wind-energy facilities, correlations are very low between the number of collision fatalities and raptor nest density within one-mile of the wind-energy facility. Raptors nesting closest to turbines likely have higher probabilities of being impacted from collision with turbines, but data on nests very close to turbines (e.g., within a half-mile [0.8 km]) are currently inadequate to determine the level of these impacts. The existing wind-energy facility with the highest reported nest density is the Foote Creek Rim wind-energy facility in Wyoming, which lies approximately 60 miles (96.6 km) east of Rawlins. Most of the nests within two miles (3.2 km) of the wind-energy facility are of red-tailed hawk (Johnson et al. 2000b), but no red-tailed hawk fatalities have been documented at this site (Young et al. 2003d, 2003e).

In addition to possible direct effects on raptors within the WRAs through collision mortality, indirect effects caused by disturbance-type impacts, such as construction activity near an active nest, also have a potential impact on raptors. Birds displaced from wind-energy facilities might

move to areas with fewer disturbances, but with lower habitat quality, and therefore possibly reducing breeding success. Most studies on raptor displacement at wind-energy facilities, however, indicate effects to be negligible (Howell and Noone 1992; Johnson et al. 2000a, 2003; Madders and Whitfield 2006). At a wind-energy facility in eastern Washington, based on extensive monitoring using helicopter flights and ground observations, raptors still nested in the area at approximately the same levels after construction, and several nests were located within a half-mile (0.80 km) of turbines (Erickson et al. 2004). At the Foote Creek Rim wind-energy facility in southern Wyoming, one pair of red-tailed hawks nested within 0.3 miles (0.78 km) of the turbine strings, and seven red-tailed hawk nests, one great horned owl nest, and one golden eagle nest located within one mile (1.6 km) of the wind-energy facility successfully fledged young (Johnson et al. 2000b). The golden eagle pair successfully nested a half-mile from the wind-energy facility for three different years after it became operational. A Swainson's hawk also nested within a quarter-mile (0.4 km) of a turbine string at the Klondike I wind-energy facility in Oregon after the facility was operational (Johnson et al. 2003).

Notable exceptions to this include a study in Scotland that described territorial golden eagles avoiding the entire wind-energy facility area, except when intercepting non-territorial birds (Walker et al. 2005). The only published report of avoidance of wind turbines by nesting raptors occurred at Buffalo Ridge, Minnesota, where raptor nest density on 101 mi<sup>2</sup> (261.6 km<sup>2</sup>) of land surrounding a wind-energy facility was 5.94 nests/39 mi<sup>2</sup> (5.94 nests/101.0 km<sup>2</sup>), yet no nests were present in the 12 mi<sup>2</sup> (31.1 km<sup>2</sup>) wind-energy facility itself, even though habitat was similar (Usgaard et al. 1997). However, this analysis assumed that raptor nests are uniformly distributed across the landscape, an unlikely event, and even though no nests were found, only two nests would be expected for an area 12 mi<sup>2</sup> in size if the nests were distributed uniformly. A subsequent study at the Buffalo Ridge wind-energy facility in Minnesota found evidence of northern harriers (*Circus cyaneus*) avoiding turbines on both a small scale (< 328 ft [100 m] from turbines) and a larger scale (344-17,958 ft [105–5,364 m] from the nearest turbine) in the year following construction (Johnson et al. 2000a). Two years following construction, however, no large-scale displacement of northern harriers was detected. These observations suggest that there will be limited nesting displacement of raptors at the Chokecherry and Sierra Madre WRAs, although the creation of a buffer surrounding known nests when siting turbines will further reduce any potential impact.

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**Table 1. Composition and description of active raptor nests on the Chokecherry and Sierra Madre Wind Resource Areas in Carbon County, Wyoming, Spring 2008.**

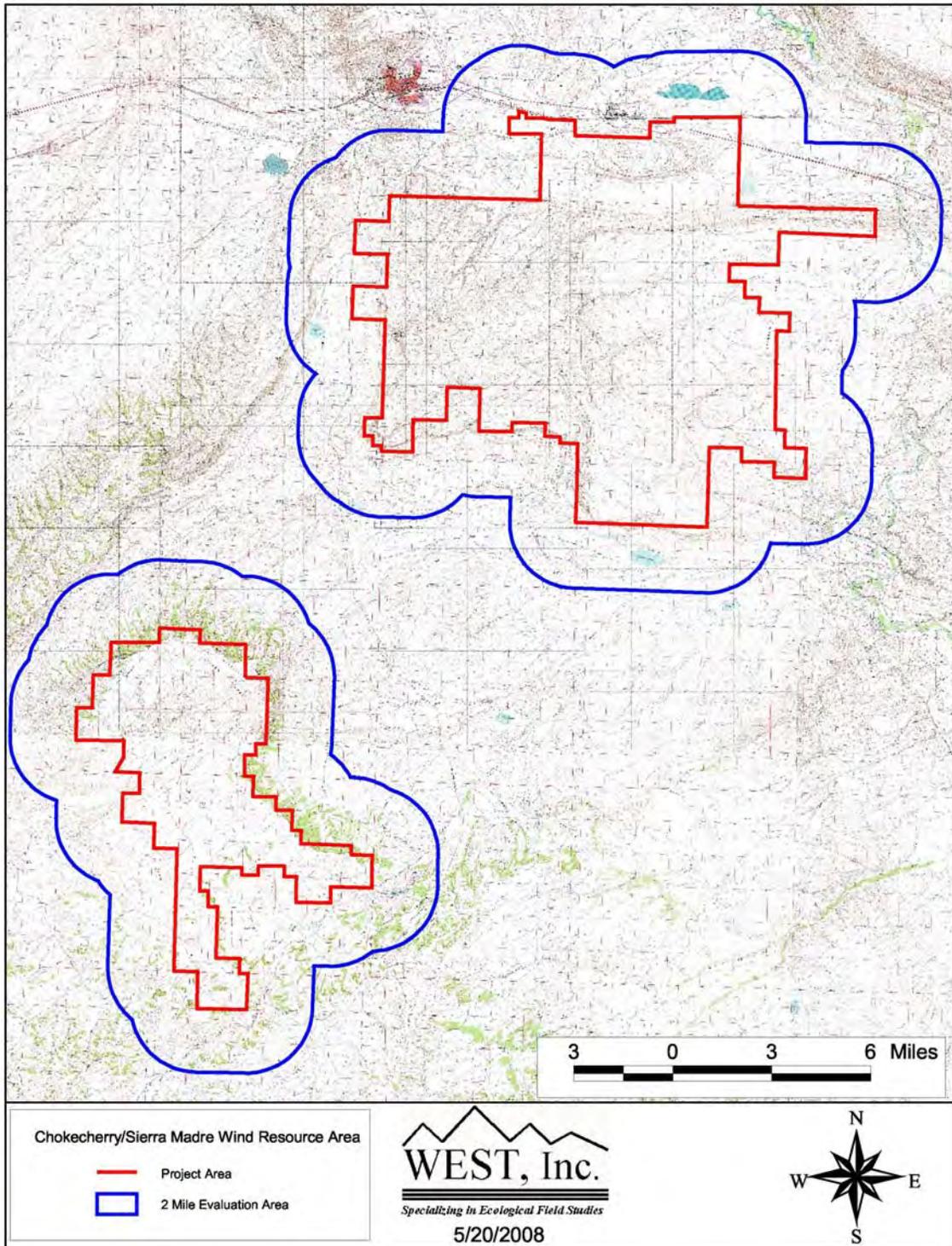
<b>Species</b>	<b>Nest Status</b>	<b>Nest Condition</b>	<b>Nest Substrate</b>
<b>Chokecherry WRA</b>			
great horned owl	Active-chicks	Good	Tree
great horned owl	Active-chicks	Good	Tree
great horned owl	Active-chicks	Good	Cliff
red-tailed hawk	Active-eggs	Good	Cliff
golden eagle	Active-chicks	Good	Cliff
golden eagle	Active-chicks	Good	Cliff
golden eagle	Active-chicks	Good	Cliff
prairie falcon	Active-eggs	Good	Cliff
prairie falcon	Active-eggs	Good	Cliff
prairie falcon	Active-eggs	Good	Cliff
prairie falcon	Active-eggs	Good	Cliff
prairie falcon	Active-eggs	Good	Cliff
Subtotal	12 nests		
<b>Sierra Madre WRA</b>			
great horned owl	Active-chicks	Good	Tree
great horned owl	Active-chicks	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
red-tailed hawk	Active-eggs	Good	Tree
Subtotal	12 nests		
<b>Total</b>	24 nests		

**Table 2. Composition and description of active non-raptor nests on the Chokecherry and Sierra Madre Wind Resource Areas in Carbon County, Wyoming, Spring 2008.**

<b>Species</b>	<b>Nest Status</b>	<b>Nest Condition</b>	<b>Nest Substrate</b>
<b>Chokecherry WRA</b>			
common raven	Active-chicks	Good	Cliff
common raven	Active-eggs	Good	Cliff
common raven	Active-chicks	Good	Cliff
common raven	Active-chicks	Good	Cliff
Canada goose	Active-eggs	Good	Tree
<b>Sierra Madre WRA</b>			
common raven	Active-chicks	Good	Tree
common raven	Active-eggs	Good	Tree
common raven	Active-chicks	Good	Tree
<b>Total</b>	<b>8 nests</b>		

**Table 3. Estimated raptor nest densities from other proposed and existing wind-energy facilities located primarily in the western U.S.**

<b>Wind Resource Area</b>	<b>Density (# nests/mi<sup>2</sup>)</b>		
Chokecherry, Wyoming	0.07		
Sierra Madre, Wyoming	0.14		
Biglow, Oregon	0.15		
Klondike III, Oregon	0.16		
Leaning Juniper, Oregon	0.41		
Stateline, Oregon-Washington	0.21		
Nine Canyon, Washington	0.03		
Zintel Canyon, Washington	0.08		
Buffalo Ridge, Minnesota	0.15		
Klickitat County, Washington	0.12		
Combine Hills, Oregon	0.24		
Columbia Hills, Washington	0.30		
Ponnequin, Colorado	0.06		
Hopkins Ridge, Washington	0.43		
Maiden, Washington	0.18		
Wild Horse, Washington	0.16		
Kittitas Valley, Washington	0.09		
Desert Claim, Washington	0.34		
<b>Average</b>	<b>0.19</b>		
Biglow, OR	WEST 2005	Combine Hills, OR	Young et al. 2003c
Klondike III, OR	Mabee et al. 2005	Columbia Hills, WA	BPA 1995
Leaning Juniper, OR	NWC and WEST 2005	Ponnequin, CO	Kerlinger et al. 2000
Stateline, OR/WA	URS and WEST 2001	Hopkins Ridge, WA	Young et al. 2003a
Nine Canyon, WA	Erickson et al. 2005	Maiden, WA	WEST and NWC 2002a
Zintel Canyon, WA	WEST and NWC 2002b	Wild Horse, WA	Erickson et al. 2003b
Buffalo Ridge, MN	Johnson et al. 2000	Kittitas Valley, WA	Erickson et al. 2003a
Klickitat County, WA	Erickson et al. 1999	Desert Claim, WA	Young et al. 2003b



**Figure 1. Location of the Chokecherry and Sierra Madre Wind Resource Areas in Carbon County, Wyoming.**

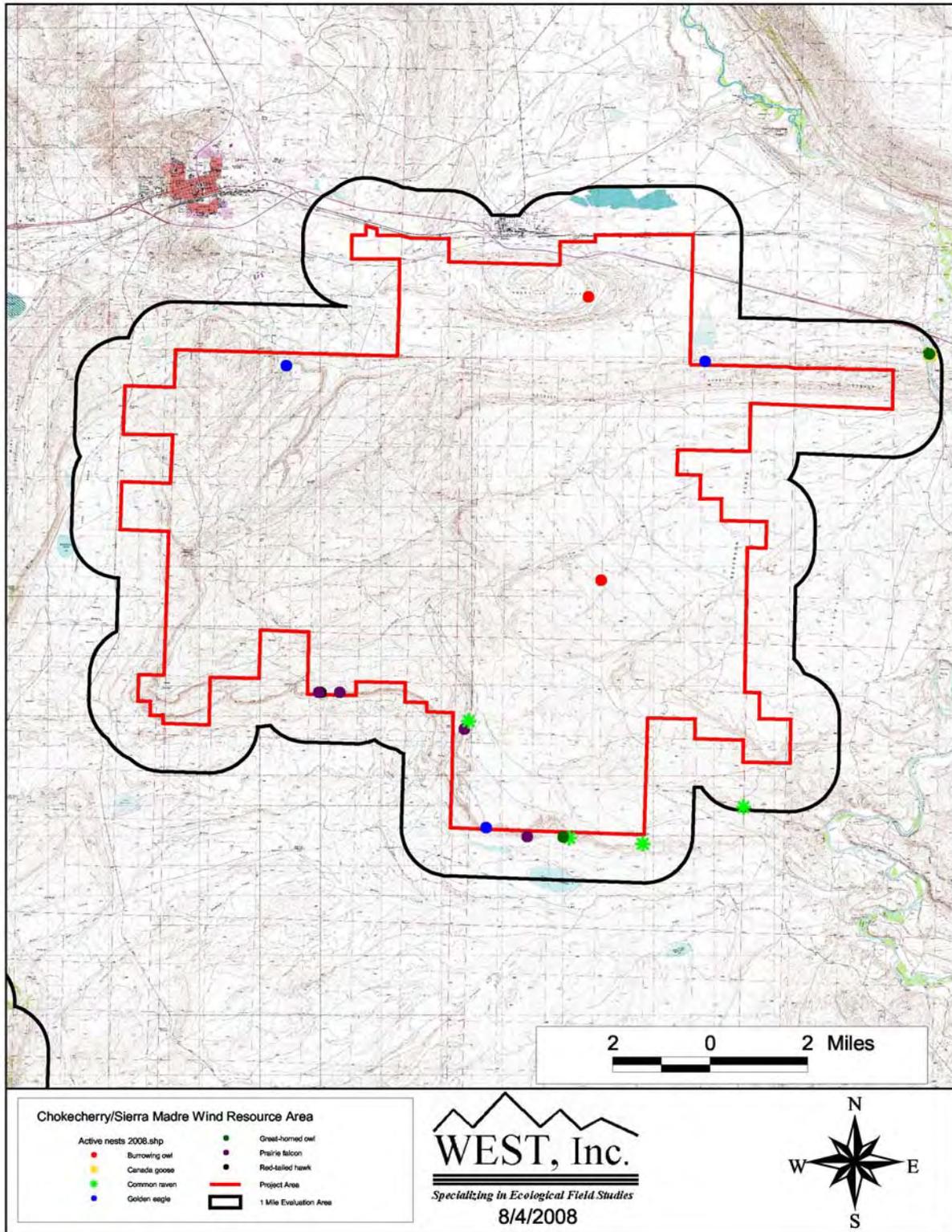
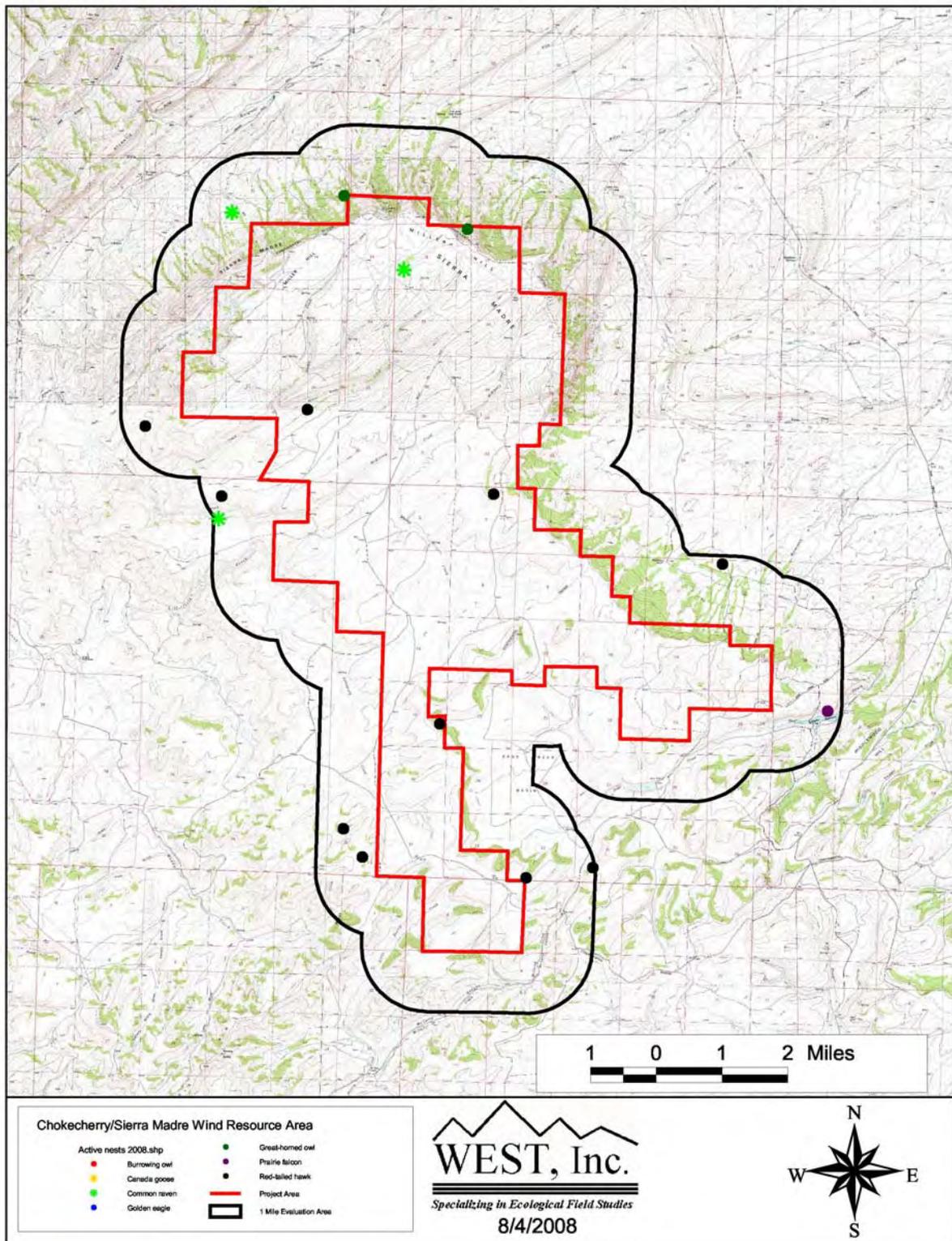
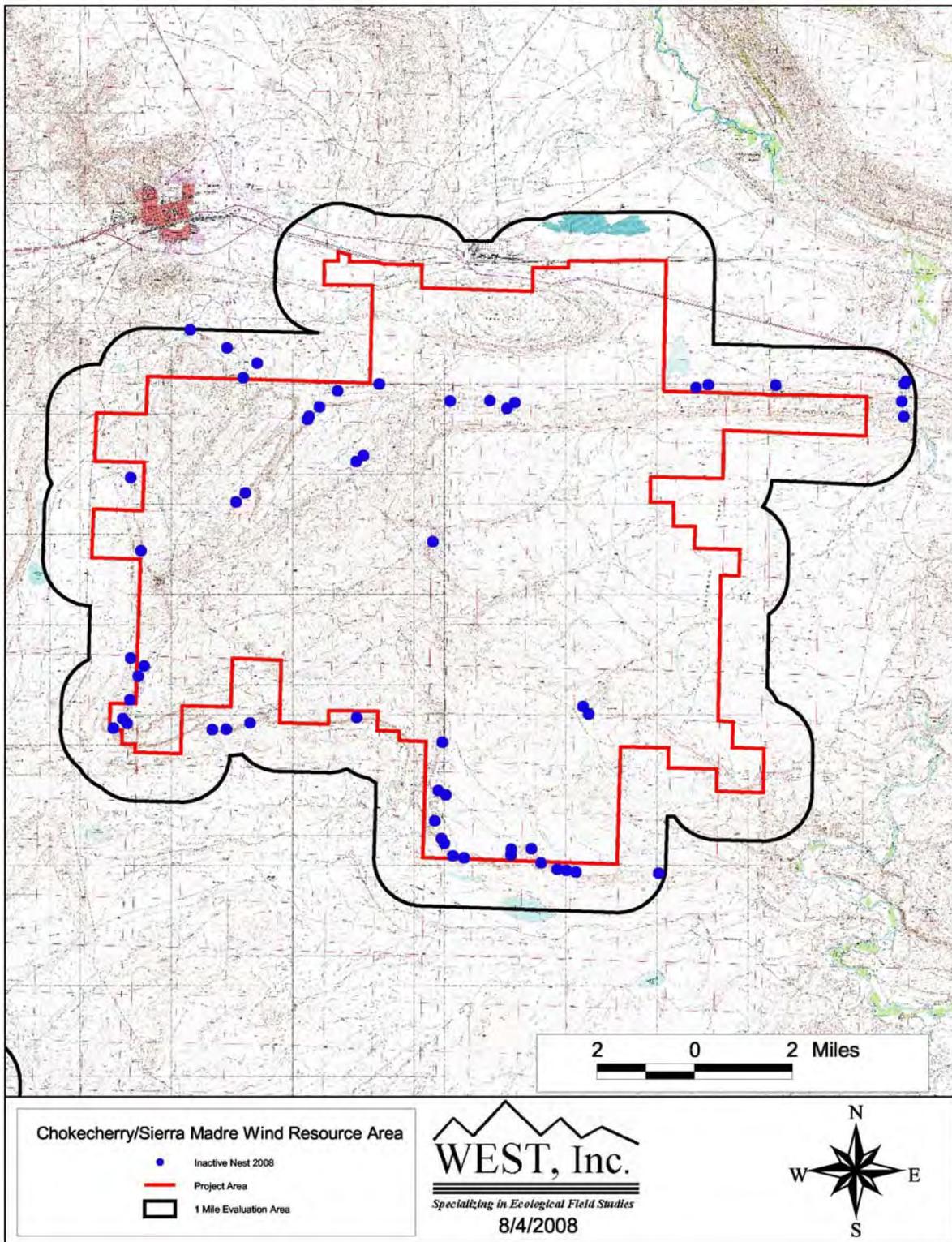


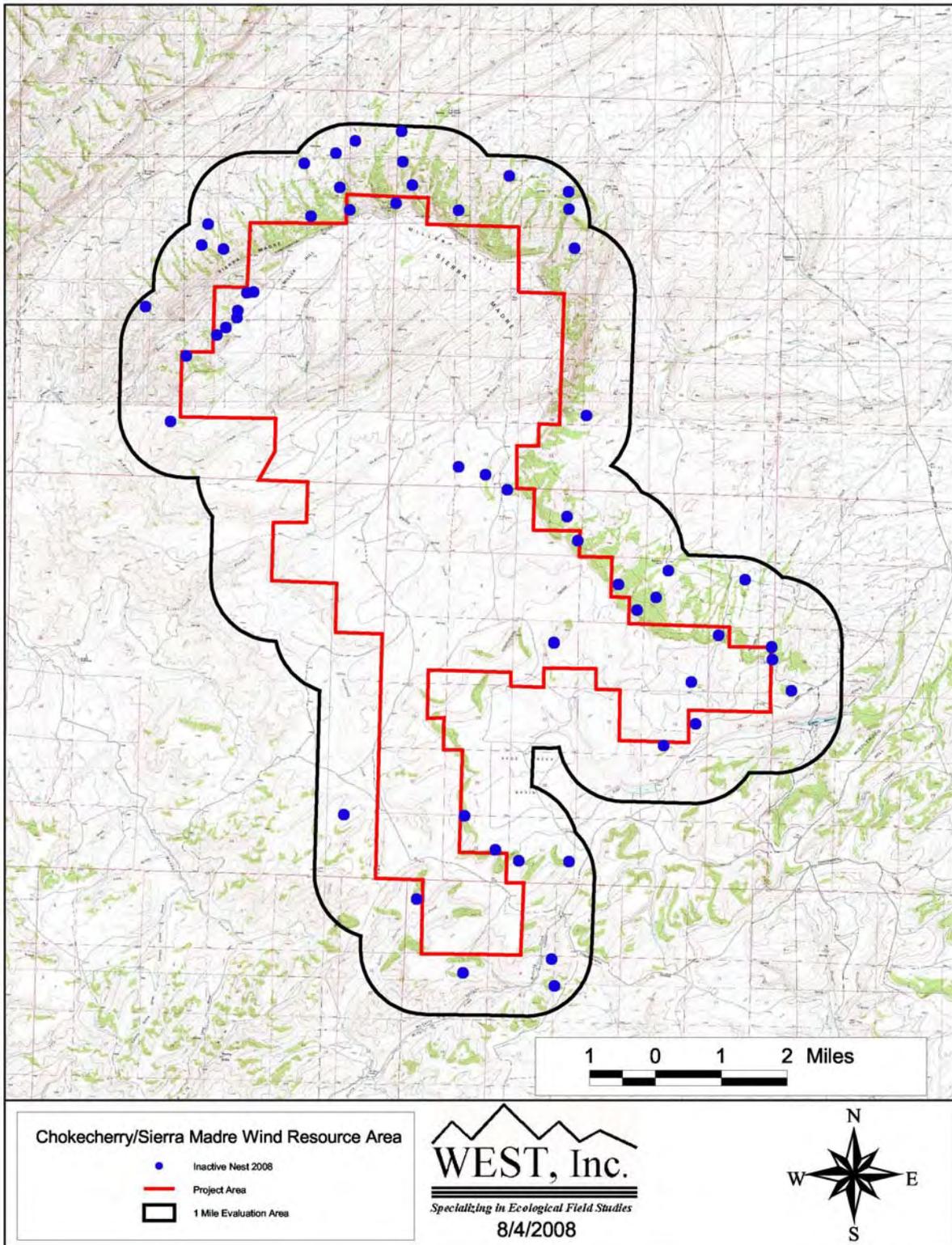
Figure 2a. Locations of active raptor nests at the Chokecherry WRA in Carbon County, Wyoming, April 2008.



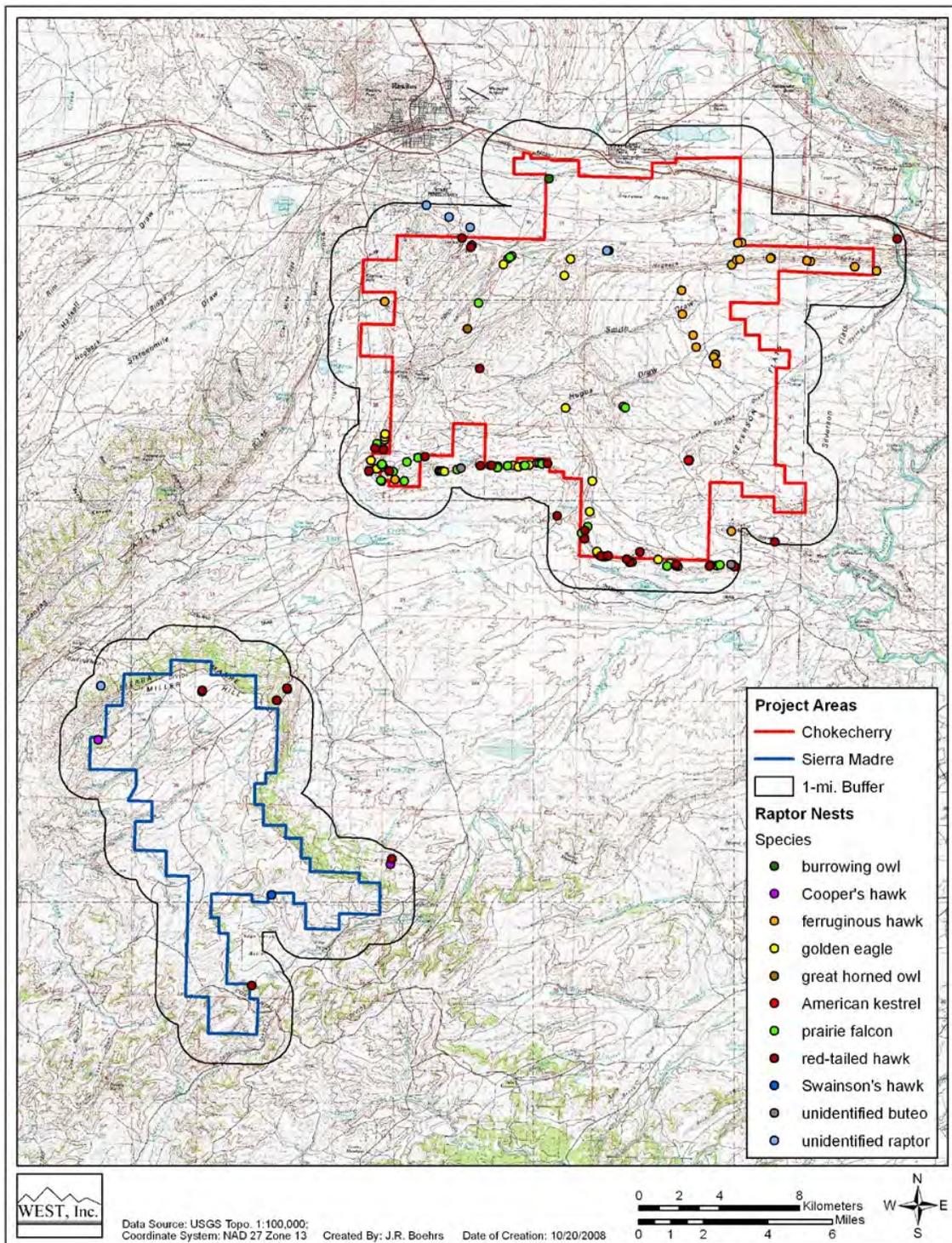
**Figure 2b. Locations of active raptor nests at the Sierra Madre WRA in Carbon County, Wyoming, April 2008.**



**Figure 3a. Locations of inactive raptor nests at the Chokecherry WRA in Carbon County, Wyoming, April 2008.**



**Figure 3b. Locations of inactive raptor nests at the Sierra Madre WRA in Carbon County, Wyoming, April 2008.**



**Figure 4. Locations of active raptor nests from BLM records at the Chokecherry and Sierra Madre Wind Resource Areas in Carbon County, Wyoming.**

**Summary Report for 2011 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project**

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**October 6, 2011**

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B	Photographs

## INTRODUCTION

In May and June 2011, SWCA Environmental Consultants (SWCA) conducted raptor nest surveys within the Chokecherry and Sierra Madre Wind Energy Project (Project) development footprint and in suitable nesting habitats within a 5-mile buffer (approximately 700 square miles) surrounding the Project. The selection of a 5-mile turbine buffer was made through consultation with the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM). This buffer was agreed upon since the existing BLM raptor nest database could be used as a basis for where to search for nests, and because terrain features that had high potential for nesting raptors were well known and established. A 5-mile turbine buffer was also deemed acceptable due to the robust avian monitoring efforts already underway within the Project area, which could also assist in identifying potential nesting raptors. Additionally, BLM regularly conducts raptor nest monitoring in areas that fall outside of the 5-mile turbine buffer. Data from those BLM monitoring efforts will be considered during development of the Avian Protection Plan and Eagle Conservation Plan.

Three types of survey methods were used to identify nests, determine nest condition and activity, and assess nesting success. Helicopter surveys were used to evaluate all known nests and all potential nesting habitats along cliff bands, on steep slopes, and along the North Platte River corridor. Ground surveys were used to identify nests not readily identified from helicopter surveys and to assess nests that were not identified or observable during the helicopter survey flight path. All ferruginous hawk (*Buteo regalis*) nests in the Project footprint were visited to assess current condition. Multiple nest monitoring visits were made to all active eagle nests and many of the active *Buteo* nests identified during helicopter and ground surveys. Nest monitoring visits were made until fledging was confirmed or until juveniles were no longer present on the nest. All nest survey and monitoring activities were conducted in accordance with the protocols submitted to and accepted by the USFWS.

## AERIAL SURVEYS

During aerial nest surveys, two biologists and a pilot flew in a Bell 206B3 helicopter on May 25 and June 10. Surveys on May 25 were completed primarily for the Chokecherry portion of the Project and the North Platte River corridor. Surveys on June 10 were completed for the Sierra Madre portion of the Project area as well as the Atlantic Rim. During the June 10 flight, several of the active nests identified during the May 25 surveys were revisited to assess nest activity and the development stage of the chick(s) on the nest.

Nineteen hours were spent flying the Project area and associated buffer. SWCA biologists used historic nest locations provided by the BLM Rawlins Field Office (RFO) for guidance in surveying existing and undocumented nest locations. Aerial surveys focused on known and potential nesting habitat for golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), and ferruginous hawk, as well as previously documented nest locations for these species and other large *Buteos*, falcons, and accipiters. These habitat types included cliff bands, rock outcrops and promenades, steep slopes, riparian zones and river corridors, and forested areas with large trees capable of supporting large nest structures. While the focus of the nest flights was on the three previously mentioned species, any active raptor nest that was

encountered during the course of the flights was documented. Additionally, all inactive or historic nests in poor condition that were observed during aerial surveying efforts were recorded. Data collected at each nest site included documentation of the nest substrate and location, nest condition, nest status (e.g., active or inactive, number of nestlings, etc.), global positioning system (GPS) location, and photo documentation of the nest when feasible and safe.

## GROUND SURVEYS

Ground surveys were used to evaluate potential nesting habitat that could not be surveyed or readily observed during aerial flights. Ground surveys focused on treed habitats with known nesting structures that could not be observed during helicopter surveys as well as selected known *Buteo* and accipiter nests in the Project area. Ground surveys also identified a previously unknown bald eagle nest. Due to an abundance of late season snowpack, areas around the base of Miller Hill were inaccessible until late spring, at which time the groves of quaking aspen (*Populus tremuloides*) had fully leafed out. While locating nests in these groves proved mostly unsuccessful, any raptor activity occurring in these areas would be captured by the four raptor monitoring points located around Miller Hill. Ground surveys also included visits to all historic ferruginous hawk nests in the Project area to evaluate current nest condition and determine when the nest had last been active. All ferruginous hawk nests in the survey area were inactive in 2011 and many of the historic nests identified in the BLM datasets were no longer viable for nesting activities (Appendix A). All ground survey locations were accessed on foot or with trucks and all-terrain vehicles. Data collected during ground surveys were identical to the data recorded during aerial surveys.

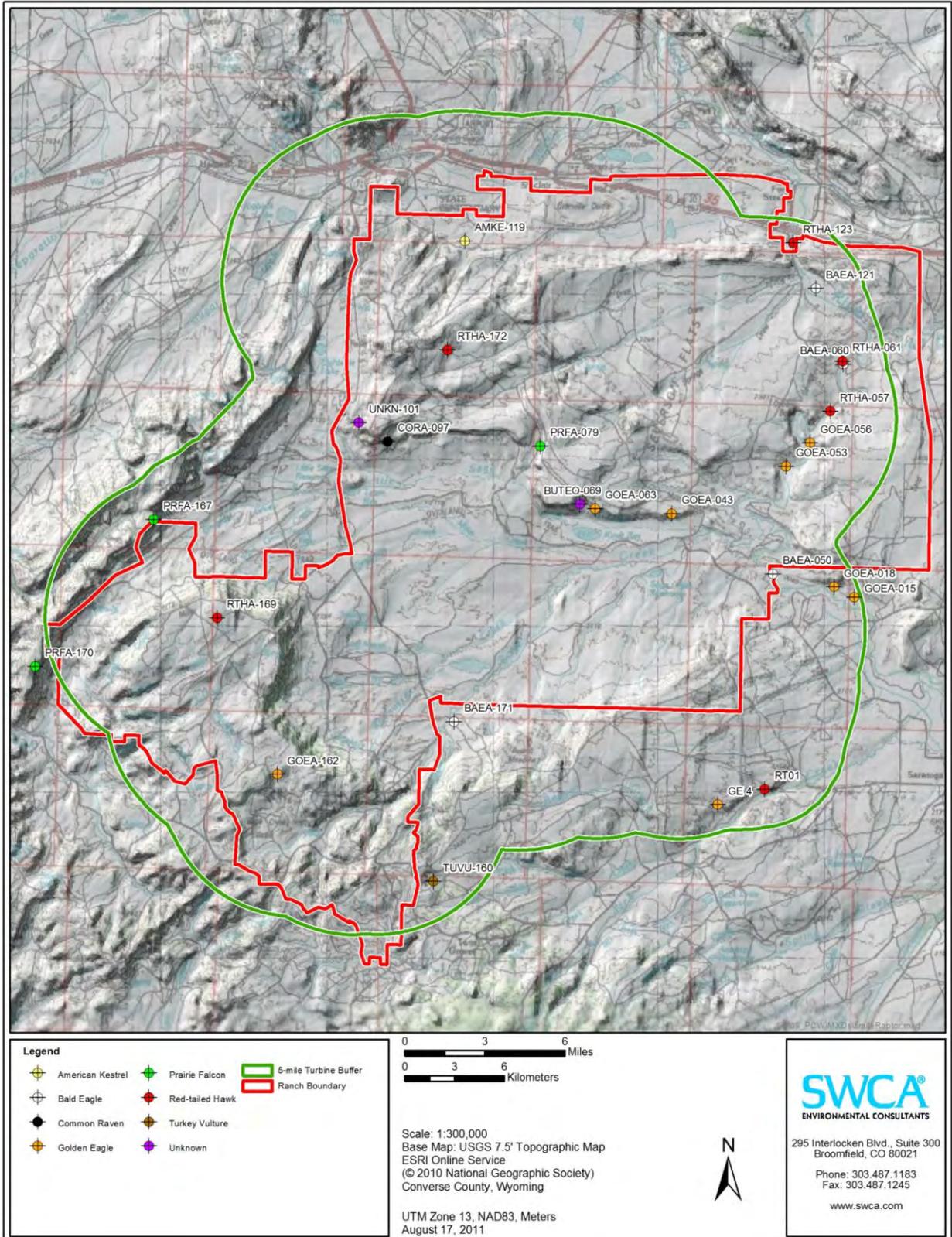
In total, 23 active raptor nests were located within the Project area and associated 5-mile buffer (Figure 1). The species composition of the active raptor nests were as follows: eight golden eagle, four bald eagle, six red-tailed hawk (*Buteo jamaicensis*), three prairie falcon (*Falco mexicanus*), one unknown *Buteo* (likely red-tailed hawk), and one American kestrel (*Falco sparverius*). An additional three active non-raptor nests were located during the flights and included one turkey vulture (*Cathartes aura*), one common raven (*Corvus corax*), and one unknown large species. The unknown large species nest was a medium-sized stick nest in a crevice of a cliff band, and was likely either a *Buteo* species or a common raven. All active golden eagle and bald eagle nests were located outside of the wind development footprint although three of the eagle nests (two golden eagle and one bald eagle) were located within 1 mile of potential turbine locations. Most active eagle nests were located east and southeast of the Chokecherry portion of the Project along cliff bands on the Bolten Rim and the North Platte River. One active eagle nest was located on the Sierra Madre portion of the Project. The remaining active eagle nests were located south of Middlewood Hill along Jack Creek and in the south Sage Creek Basin. All of the active golden eagle and bald eagle nests were observed to have one to two nestlings present, while the majority of the other active raptor nests appeared to be in the incubation or brooding stages. Appendix B contains representative photographs of the types of active and inactive nests that were observed during surveys.

## NEST MONITORING

Follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests and many other raptor nests in the Project area between July 5 and August 2. By July 20, four golden eagle and two bald eagle nests were confirmed as fledged or inactive. Additionally, three other *Buteo* and falcon nests were confirmed as fledged or inactive. As of August 2, the final four golden eagle and two bald eagle nests were confirmed as fledged or inactive. Of the remaining active *Buteo* and falcon nests, four were confirmed as fledged or inactive. Two red-tailed hawk nests remained active as of August 2, and two falcon nests were unable to be relocated during ground surveys due to the nests being built into cavities and tight crevasses along cliff bands.

## SUMMARY

In addition to the 23 active raptor nests, 158 inactive nests were also located and documented during the nest flights and other nest searching activities. These nests were located across the Project area and associated buffer; however, the vast majority were located along the Bolten Rim and around the perimeter of the Chokecherry plateau. While all nests observed during the nest flights were documented, it is possible that nests of certain species (e.g., American kestrel, prairie falcon, common raven, etc.) were not able to be located due to the nature of aerial surveys, and because of the way their nests are structured (i.e., oftentimes built in cavities or tight crevasses along cliff bands). All of the inactive nests marked were large in size and were considered potential raptor nests; however, as these nests were inactive, it is not possible to know exactly what species built and/or used the nest.



**Figure 1. Project area boundary, 5-mile turbine buffer, and all active nests located within the 5-mile turbine buffer in 2011.**

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**APPENDIX A**  
**BLM Ferruginous Hawk Dataset**

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## BLM FERRUGINOUS HAWK DATASET

In May and June 2011, SWCA Environmental Consultants (SWCA) conducted raptor nest surveys within the Chokecherry and Sierra Madre Wind Energy Project (Project) development footprint and in suitable nesting habitats within a 5-mile buffer (approximately 700 square miles) surrounding the Project. As part of SWCA's nest survey and monitoring effort, ground surveys were conducted to determine the status and condition of all ferruginous hawk (*Buteo regalis*) nests documented by the Bureau of Land Management (BLM) within the Project footprint. Forty ferruginous hawk nest sites were identified in the Project area from data shared by the BLM, and each of these nest sites was visited during 2011 ground surveys (Figure A-1). Data collected included presence/absence of a nest at each site; a description of the state of the nest (if a nest was detected); a description of the habitat surrounding the site; photographs of the nest and surrounding habitat (photographs are provided in Appendix B); and the presence of other features that could suggest recent ferruginous hawk activity (e.g., feathers, whitewash, fresh nesting materials, etc.). Of the 40 nest sites identified from the BLM data, 15 nest structures in various stages of condition and quality were located, some with almost no structure remaining. Additionally, seven historic sites were observed that may have once supported a nest; however, now only a few deteriorated sticks remain. Few of these nest structures were located at the BLM sites; however, SWCA surveyed at minimum 100 meters (m) around each of the BLM sites for nest structures as they were likely marked during aerial surveys, which can lead to some degree of inaccuracy in each location. Results for each BLM ferruginous hawk nest site are listed below.

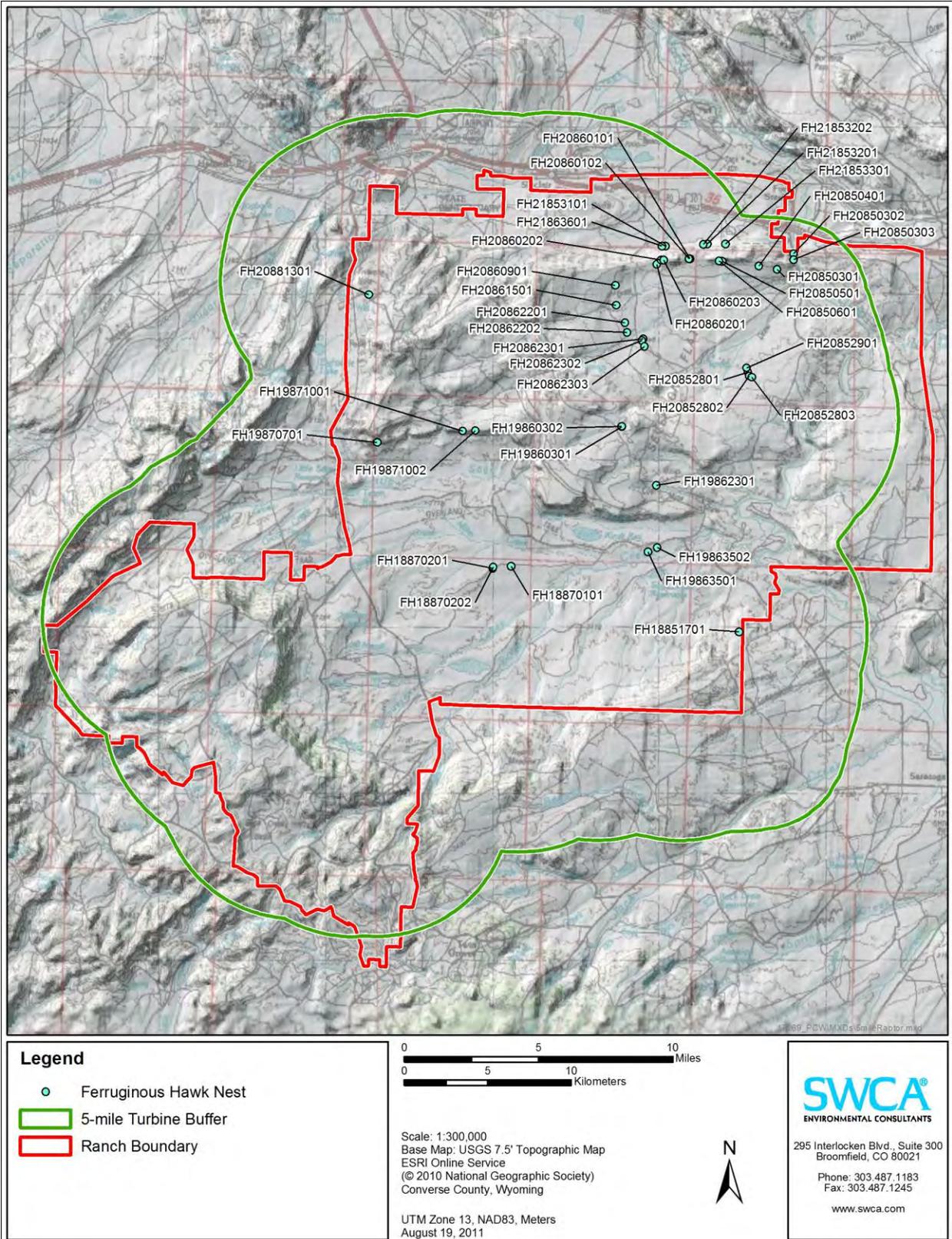
FH18851701: No nest was detected at this site, which is located on a rocky hilltop (Appendix B, Photo 14). An historic nest site is located approximately 22 m northwest of the BLM site (Universal Transverse Mercator [UTM] 13T 0334724, 4599927). The nest is in extremely poor condition with only a few sticks on a small rock outcrop (Appendix B, Photo 15). There were no signs of recent ferruginous hawk activity.

FH18870101: This site contains the remnants of an historic nest, mainly consisting of a few deteriorated sticks and a small amount of old whitewash, but no remaining nest structure (Appendix B, Photo 16). No signs of recent ferruginous hawk activity were observed.

FH18870201: This site is located in a drainage with no evidence of active or historic nests within 100 m of the site (Appendix B, Photo 17). No signs of recent ferruginous hawk activity were observed.

FH18870202: No nest was detected at this site. The site is located on a hillslope, and no signs of recent ferruginous hawk activity were present (Appendix B, Photo 18). A nest is located approximately 64 m north of the BLM site (UTM 13T 0320037, 4603851). This nest is located on a hillslope and is in fair condition; however, there were no other signs of recent ferruginous hawk activity (Appendix B, Photo 19).

FH19860301: A nest is located approximately 15 m east of this site (UTM 13T 0327708, 4612200). The nest is in good condition, likely used in the recent past (Appendix B, Photo 20), with a small amount of whitewash observed around the nest. This nest was also recorded during SWCA's flights across the Project area (nest FEHA-153).



**Figure A-1. Project area boundary, 5-mile turbine buffer, and all BLM ferruginous hawk nest sites within the Project area.**

FH19860302: No nest was detected at this site. The site is on a rocky hilltop (Appendix B, Photo 21) and is located approximately 35 m north of FH1986031. The area surrounding both of these sites was searched, but no additional nests were detected. No signs of recent ferruginous hawk activity were observed.

FH19862301: No nest was detected at this site. This site is located in sagebrush and bare ground on a hillslope below a cliff band (Appendix B, Photo 22). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH19863501: A nest was detected approximately 20 m north of the BLM site (UTM 13T 0329290, 4604725). The nest is located on a hilltop and is in fair condition, likely having been used in recent years (Appendix B, Photo 23). No other signs of recent ferruginous hawk activity were observed. This nest was also recorded during SWCA's flights across the Project area (nest FEHA-154).

FH19863502: This site contains the remnants of an historic nest, mainly consisting of a few deteriorated sticks, but no remaining nest structure (Appendix B, Photo 24). No signs of recent ferruginous hawk activity were observed.

FH19870701: No nest was detected at this site, which is located partway down a cliff band (Appendix B, Photo 25). There were no signs of active or historic nests within 100 m of the site; however, some signs of recent whitewash were observed along the cliff wall.

FH19871001: No nest was detected at this site, which is located at the base of a cliff band above a rock outcrop (Appendix B, Photo 26). There were no signs of active or historic nests within 100 m of the site; however, some signs of recent whitewash were observed along the cliff wall.

FH19871002: No nest was detected at this site. The site is located at the base of a cliff band (Appendix B, Photo 27) with signs of recent whitewash along the cliff band. A nest is located approximately 84 m northwest of the BLM site (UTM 13T 0318857, 4612023). The nest is located at the base of the cliff band on a rock outcrop and is in poor condition (Appendix B, Photo 28). No other signs of recent ferruginous hawk activity were observed.

FH20850301: No nest was detected at this site. The site is located in sagebrush and a bare ground drainage at the base of a small hillslope (Appendix B, Photo 29). There were no signs of active or historic nests within 100 m of the site; however, some signs of recent whitewash were observed on a perch 70 m to the north.

FH20850302: This site contains a large nest on a rock outcrop near the North Platte River (Appendix B, Photo 30). The nest is in good condition with relatively fresh grass woven into the inner bowl of the nest; the nest was likely used in the recent past. No feathers, whitewash, or other signs of recent ferruginous hawk activity were observed.

FH20850303: A nest was detected approximately 25 m south of the BLM site. The nest is located on a rock outcrop near the North Platte River. The nest is in poor condition and

appeared to be falling off the rock shelf on which it was originally built, which led to the structure being compromised (Appendix B, Photo 31). No signs of recent ferruginous hawk activity were observed.

FH20850401: No nest was detected at this site. The nest site is located on bare ground at the base of a hillslope (Appendix B, Photo 32). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20850501: No nest was detected at this site. The nest site is located in sagebrush and bare ground on a hillslope (Appendix B, Photo 33). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20850601: No nest was detected at this site. The nest site is located in sagebrush and bare ground on a hillslope (Appendix B, Photo 34). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20852801: The remnants of an historic nest are located approximately 16 m west of the BLM nest site at the base of a rock outcrop. The site mainly consists of a few deteriorated sticks, but there is no remaining nest structure (Appendix B, Photo 35). A small amount of old whitewash was observed on the rock outcrop, but there were no signs of recent ferruginous hawk activity.

FH20852802: A nest is located approximately 18 m north of the BLM site (UTM 13T 0335323, 4615247) on a rock outcrop. The nest is in fair to good condition with good structure, but is slightly collapsed (Appendix B, Photo 36). There were no signs of recent ferruginous hawk activity.

FH20852803: No nest was detected at this site, which is located on bare ground in a basin (Appendix B, Photo 37). The remnants of an historic nest are located approximately 95 m east of the BLM site (UTM 13T 0335585, 4615203) on a rock outcrop. The nest is in very poor condition and is mainly a pile of deteriorated sticks (Appendix B, Photo 38). No signs of recent ferruginous hawk activity were observed.

FH20852901: No nest was detected at this site. The site is located on bare ground near saltbush and next to a creek bed (Appendix B, Photo 39). A nest is located approximately 200 m north of the BLM site (UTM 13T 0335189, 4615940) on a rock outcrop. The nest is in fair condition and has potential for reuse in the future (Appendix B, Photo 40). Old whitewash is present at the site, but no other signs of recent ferruginous hawk activity.

FH20860101: No nest was detected at this site, which is located on rocky ground on a hilltop (Appendix B, Photo 41). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20860102: No nest was detected at this site, which is located on rocky ground on a hillslope (Appendix B, Photo 42). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20860201: No nest was detected at this site, which is located on a rocky hillslope (Appendix B, Photo 43). A nest is located approximately 80 m northeast of the BLM site (UTM 13T 0329868, 4622032) on a small rock outcrop. The nest is in fair to good condition and has potential for reuse in the future (Appendix B, Photo 44). There were no signs of recent ferruginous hawk activity.

FH20860202: No nest was detected at this site, which is located on rocky ground on a hillslope (Appendix B, Photo 45). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20860203: No nest was detected at this site, which is located on a rock outcrop on a hilltop (Appendix B, Photo 46). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20860901: No nest was detected at this site, which is located in a sagebrush basin (Appendix B, Photo 47). There are signs of an historic nest on a rock outcrop located approximately 45 m northeast of the BLM site; however, the site mainly consists of a few deteriorated sticks. This site was also recorded during SWCA's flights across the Project area (nest FEHA-151). There were no signs of other nests or recent ferruginous hawk activity within 100 m of the site.

FH20861501: No nest was detected at this site, which is located in a sagebrush basin (Appendix B, Photo 48). There are signs of an historic nest on a rock outcrop located approximately 110 m south of the BLM site; however, the site mainly consists of a few deteriorated sticks. This site was also recorded during SWCA's flights across the Project area (nest FEHA-150). There were no signs of other nests or recent ferruginous hawk activity within 100 m of the site.

FH20862201: No nest was detected at this site, which is located in a sagebrush basin (Appendix B, Photo 49). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20862202: No nest was detected at this site, which is located in sagebrush at the bottom of a small hillslope (no photo available). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20862301: No nest was detected at this site, which is located in sagebrush at the base of a small rock outcrop. There are signs of an historic nest on a rock outcrop located approximately 78 m northwest of the BLM site. The nest is in very poor condition and consists a pile of sticks with no cohesive structure (Appendix B, Photo 50). This site was also recorded during SWCA's flights across the Project area (nest FEHA-149). There were no signs of other nests or recent ferruginous hawk activity within 100 m of the site.

FH20862302: This site contains a large nest beside a rock outcrop. The nest is in good condition with a discernable inner bowl, and was likely used in the recent past (Appendix B, Photo 51). Newer whitewash was observed on the outcrop near the nest, but no other signs of

recent ferruginous hawk activity were observed. This nest was also recorded during SWCA's flights across the project area (nest FEHA-148).

FH20862303: No nest was detected at this site, which is located at the bottom of a small hillslope/rock outcrop (no photo available). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH20881301: No nest was detected at this site, which is located in sagebrush at the bottom of a hillslope (Appendix B, Photo 52). A nest is located approximately 75 m southeast of the BLM site (UTM 13T 0312604, 4620081). The nest is in good condition and built on a small rock outcrop on a hillslope and has potential for reuse in the future (Appendix B, Photo 53). Old whitewash was observed around the nest; however, no other signs of recent ferruginous hawk activity were observed.

FH21853101: No nest was detected at this site, which is located on a rock outcrop on a hilltop (Appendix B, Photo 54). A nest is located approximately 329 m east of the BLM site (UTM 13T 0330639, 4623027). The nest is in good condition and built along the side of a rock outcrop, and likely has been used in the recent past (Appendix B, Photo 55). Some old whitewash was observed along the rock outcrop; however, no other signs of recent ferruginous hawk activity were observed.

FH21853201: No nest was detected at this site, which is located on the side of a hillslope/rock outcrop. A nest is located approximately 115 m east of the BLM site (UTM 13T 0332949, 4623131). The nest is in fair condition and built along a rock outcrop and has potential for reuse in the future (Appendix B, Photo 56). This site was likely recorded during SWCA's flights across the Project area (nest GOEA-125). Some old whitewash was observed along the rock outcrop; however, no other signs of recent ferruginous hawk activity were observed.

FH21853202: No nest was detected at this site, which is located along the side of a rock outcrop (no photo available). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

FH21853301: No nest was detected at this site, which is located on the side of a hillslope. A nest is located approximately 100 m southwest of the BLM site (UTM 13T 0333852, 4623124). The nest is in poor condition, mostly deteriorated, and built on the top of a rock outcrop (Appendix B, Photo 57). Some old whitewash was observed along the rock outcrop; however, no other signs of recent ferruginous hawk activity were observed.

FH21863601: No nest was detected at this site, which is located on rocky ground on a hilltop (Appendix B, Photo 58). There were no signs of active or historic nests within 100 m of the site, nor was there evidence of recent ferruginous hawk activity.

**APPENDIX B**  
**Photographs**

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**Photo 1.** Active golden eagle nest GOEA-018. Adult and downy nestling are present.



**Photo 2.** Active golden eagle nest GOEA-043. One downy nestling is present.



**Photo 3.** Active golden eagle nest GOEA-053. One downy nestling is present.



**Photo 4.** Active golden eagle nest GOEA-056. One downy nestling is present and a smaller dummy nest is located just right of the active nest.



**Photo 5.** Active golden eagle nest GOEA-063. Adult is brooding a downy nestling.



**Photo 6.** Active golden eagle nest GOEA-162. One downy nestling is present.



**Photo 7.** Active bald eagle nest BAEA-171. One fully feathered nestling is present.



**Photo 8.** Inactive stick nest, classified as fair condition.



**Photo 9.** Inactive stick nest, classified as poor condition.



**Photo 10.** Inactive stick nest, classified as good condition.



**Photo 11.** Inactive stick nests. The upper nest is classified as fair to poor condition, the lower nest is classified as good condition.



**Photo 12.** Inactive stick nest, classified as good condition.



**Photo 13.** Inactive stick nest, classified as good condition.



**Photo 14.** BLM nest site FH18851701. No nest is located at this site.



**Photo 15.** Remnants of a nest located 22 meters northwest of FH18851701.



**Photo 16.** BLM nest site FH18870101. Site consists of a small amount of deteriorated sticks, but no remaining nest structure.



**Photo 17.** BLM nest site FH18870201. No nest is located at or near this site.



**Photo 18.** BLM nest site FH18870202. No nest is located at this site.



**Photo 19.** Nest located 64 meters north of FH18870202.



**Photo 20.** A nest located 15 meters east of BLM nest site FH19860301.



**Photo 21.** BLM nest site FH19860302. No nest is located at this site.



**Photo 22.** BLM nest site FH19862301. No nest is located at or near this site.



**Photo 23.** A nest located 20 meters north of BLM nest site FH19863501.



**Photo 24.** BLM nest site FH19863502. Site consists of a small amount of deteriorated sticks, but no remaining nest structure.



**Photo 25.** BLM nest site FH19870701. No nest is located at or near this site.



**Photo 26.** BLM nest site FH19871001. No nest is located at or near this site.



**Photo 27.** BLM nest site FH19871002. No nest is located at this site.



**Photo 28.** Nest located 84 meters northwest of FH19871002.



**Photo 29.** BLM nest site FH20850301. No nest is located at or near this site.



**Photo 30.** Nest located at BLM site FH20850302. Nest is in good condition and was likely used in the recent past.



**Photo 31.** Remnants of a nest located at BLM site FH20850303. Nest is in poor condition and falling off of the rock shelf on which it was built.



**Photo 32.** BLM nest site FH20850401. No nest is located at or near this site.



**Photo 33.** BLM nest site FH20850501. No nest is located at or near this site.



**Photo 34.** BLM nest site FH20850601. No nest is located at or near this site.



**Photo 35.** Remnants of a nest located 16 meters west of BLM site FH20852801. Site consists of some deteriorated sticks, but no remaining nest structure.



**Photo 36.** Nest located 18 meters north of FH20852802.



**Photo 37.** BLM nest site FH20852803. No nest is located at this site.



**Photo 38.** Remnants of a nest located 95 meters east of FH20852803.



**Photo 39.** BLM nest site FH20852901. No nest is located at this site.



**Photo 40.** Nest located 200 meters north of FH20852901.



**Photo 41.** BLM nest site FH20860101. No nest is located at or near this site.



**Photo 42.** BLM nest site FH20860102. No nest is located at or near this site.



**Photo 43.** BLM nest site FH20860201. No nest was found at this site.



**Photo 44.** Nest located 80 meters northeast of FH20860201.



**Photo 45.** BLM nest site FH20860202. No nest is located at or near this site.



**Photo 46.** BLM nest site FH20860203. No nest is located at or near this site.



**Photo 47.** BLM nest site FH20860901. No nest is located at or near this site.



**Photo 48.** BLM nest site FH20861501. No nest is located at or near this site.



**Photo 49.** BLM nest site FH20862201. No nest is located at or near this site.



**Photo 50.** Remnants of a nest located 78 meters northwest of FH20862301. Photo taken during SWCA's nest flights.



**Photo 51.** Nest located at BLM site FH20862302.



**Photo 52.** BLM nest site FH20881301. No nest is located at this site.



**Photo 53.** Nest located 75 meters southeast of FH20881301.



**Photo 54.** BLM nest site FH21853101. No nest was found at this site.



**Photo 55.** Nest located 329 meters east of FH21853101.



**Photo 56.** Nest located 115 meters east of FH21853201.



**Photo 57.** Remnants of a nest located 100 meters southwest of FH21853301.



**Photo 58.** BLM nest site FH21863601. No nest is located at or near this site.

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**Summary Report for 2012 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project**

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**October 2012**

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## INTRODUCTION

In April and May 2012, SWCA Environmental Consultants (SWCA) conducted raptor nest surveys within the Chokecherry and Sierra Madre Wind Energy Project (Project) site and in suitable nesting habitats within a 5-mile buffer (approximately 700 square miles) surrounding the Project (Figure 1). The selection of a 5-mile turbine buffer was made through consultation with the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM). This buffer was agreed upon since the existing BLM raptor nest database could be used as a basis for where to search for nests, and because terrain features that had high potential for nesting raptors were well known and established. A 5-mile turbine buffer was also deemed acceptable due to the robust avian monitoring efforts already underway within the Project Site, which could also assist in identifying potential nesting raptors. Additionally, BLM regularly conducts raptor nest monitoring in areas that fall outside of the 5-mile turbine buffer.

Three types of survey methods were used to identify nests, determine nest condition and activity, and assess nesting success. Helicopter surveys were used to evaluate all known nests and all potential nesting habitats along cliff bands, on steep slopes, and along the North Platte River corridor. Ground surveys were used to identify nests not readily identified from helicopter surveys and to assess nests that were not identified or observable during the helicopter surveys. All viable ferruginous hawk (*Buteo regalis*) nests in the Project Site were visited to assess nesting status. Multiple nest monitoring visits were made to all active eagle nests and most other active raptor nests identified during helicopter and ground surveys. Nest monitoring visits were made until fledging was confirmed or until juveniles were no longer present on the nest. All nest survey and monitoring activities were conducted in accordance with the protocols submitted to and accepted by the USFWS.

## AERIAL SURVEYS

During aerial nest surveys, two biologists and a pilot flew in a Bell 206B3 helicopter on April 25 and 26, and May 8, 2012. Surveys on April 25 and 26 were completed for the area surrounding the Chokecherry Wind Development Area (WDA) and the North Platte River corridor. Surveys on May 8 were completed for the area surrounding the Sierra Madre WDA and the Atlantic Rim.

Approximately 20 hours were spent flying the Project Site and associated buffer. SWCA biologists used historic nest locations provided by the BLM Rawlins Field Office (RFO) and data collected during 2011 nest surveys for guidance in surveying existing and undocumented nest locations. Aerial surveys focused on known and potential nesting habitat for golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), and ferruginous hawk, as well as previously documented nest locations for these species and other large *Buteos*, falcons, and accipiters. These habitat types included cliff bands, rock outcrops and promenades, steep slopes, riparian zones and river corridors, and forested areas with large trees capable of supporting large nest structures. All inactive nests that were observed during aerial surveying efforts were recorded; however, historical nest sites with no remaining nest structure were not recorded due to the low likelihood those nests will be used again.

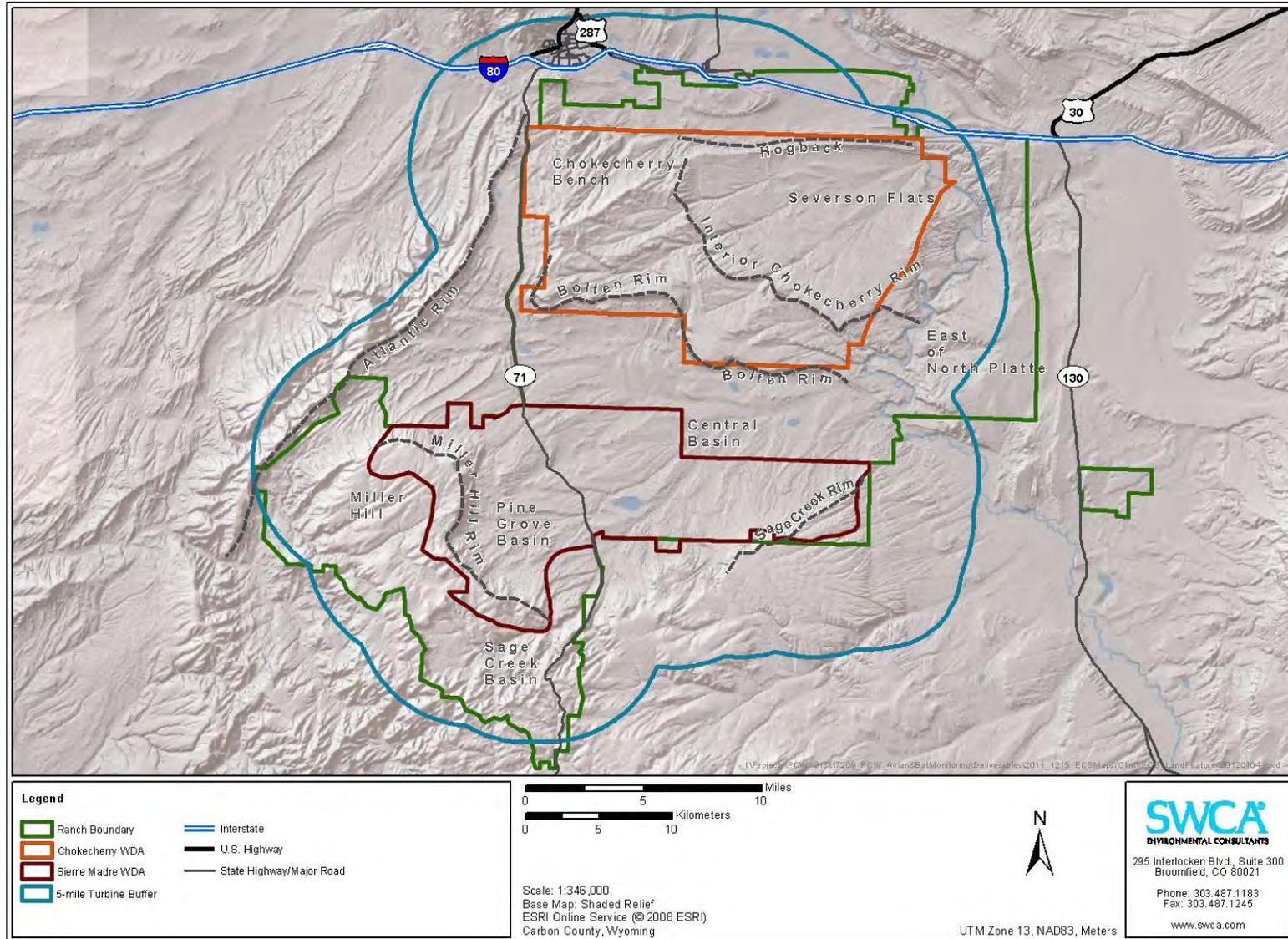


Figure 1. Project Site, 5-mile turbine buffer, and significant land features.

Data collected at each nest site included documentation of the nest substrate and location, nest condition, nest status (e.g., active or inactive, number of nestlings, etc.), global positioning system (GPS) location, and photo documentation of the nest when feasible and safe.

## GROUND SURVEYS

Ground surveys were used to evaluate potential nesting habitat that could not be surveyed or readily observed during aerial flights. Ground surveys focused on treed habitats with known nesting structures that could not be observed during helicopter surveys as well as selected known *Buteo* and accipiter nests in the Project Site. Ground surveys also included visits to 12 historical ferruginous hawk nest locations on the Project Site to evaluate current nest condition and activity (Table 1). In 2011, 40 historical ferruginous hawk nests contained in the BLM’s nest database and located on the Project Site were visited. During these surveys, the majority of the historical nest sites were either not located, or determined to be unviable as now only a few deteriorated sticks remain. All ground survey locations were accessed on foot or with trucks and all-terrain vehicles. Data collected during ground surveys were identical to the data recorded during aerial surveys.

**Table 1. Existing Historical Ferruginous Hawk Nests on the Project Site.**

<b>Nest ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Substrate</b>	<b>Condition</b>	<b>BLM Nest Association</b>
FH20850302	338031	4622605	Rock outcrop	Good	N/A
FH20852802	335323	4615247	Rock outcrop	Poor	N/A
FH20862302	328919	4617385	Rock outcrop	Good	N/A
FH-N1	329868	4622032	Rock outcrop	Fair	Near BLM Nest FH20860201
FH-N2	330639	4623027	Rock outcrop	Good	Near BLM Nest FH21853101
FH-N3	312604	4620081	Rock outcrop	Good	Near BLM Nest FH20881301
FH-N4	318857	4612023	Rock outcrop	Poor	Near BLM Nest FH19871002
FH-N18	335189	4615940	Rock outcrop	Fair	Near BLM Nest FH20852901
FH-N21	327708	4612200	Rock outcrop	Good	Near BLM Nest FH19860301
FH-N22	329290	4604725	Hilltop	Fair	Near BLM Nest FH19863501
FH-N23	320037	4603851	Hill slope	Fair	Near BLM Nest FH18870202
FH-N24	332949	4623131	Rock outcrop	Fair	Near BLM Nest FH21853201

## RESULTS

In total, 34 active raptor nests were located within the Project Site and associated 5-mile buffer (Figures 2 and 3). The species composition of the active raptor nests was as follows: 10 red-tailed hawk (*Buteo jamaicensis*), nine prairie falcon (*Falco mexicanus*), seven golden eagle, six bald eagle, and two American kestrel (*Falco sparverius*). An additional five active non-raptor nests were located during the flights and included two common raven (*Corvus corax*), one Canada goose (*Branta canadensis*), one great blue heron (*Ardea herodias*), and one great horned owl (*Bubo virginianus*). No ferruginous hawks were found nesting in any of the 12 potential nest locations surveyed in 2012; however, two of the active golden eagle nests (both along the Hogback) were at nest sites previously identified through the 2011 ferruginous hawk nest surveys.

Only the two active golden eagle nests along the Hogback (both likely used by the same pair of eagles after the first nest failed) were located near or within the Chokecherry WDA. These nests are located on the northern boundary of the WDA (one inside and one outside the WDA) and outside the area of likely turbine development. Four active golden eagle nests and four active bald eagle nests were located along the North Platte River corridor outside of the WDAs. One active bald eagle nest was located along the North Platte River within the Chokecherry WDA but within the 1-mile turbine exclusion setback from the North Platte River established for the Project to protect nesting raptors and other wildlife. The nest is well outside the area of likely turbine development and therefore risk from Project development is minimal. The higher observance of active bald eagle nests along the North Platte River may be due to conducting aerial surveys earlier in the year in 2012 as compared to 2011, before trees had fully leafed out.

With respect to the Sierra Madre WDA, no active eagle nests were located within the WDA. One active golden eagle nest was located approximately 1.5 miles south of the southern boundary of the WDA in the area of Sage Creek Rim; however, during a May 29 nest monitoring visit, it was discovered that this nest had been blown off of the cliff. One active bald eagle nest was located approximately 0.6 mile south of the WDA in a snag west of the base of Sage Creek Rim (the same location as observed in 2011).

Follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests and many other raptor nests in the Project Site between May 24 and July 27. By July 27, all seven golden eagle and six bald eagle nests were confirmed as fledged or inactive, and 15 other *Buteo* and falcon nests were confirmed as fledged or inactive (Table 2). The remaining nests were not included in the follow-up surveys due to being located on private land, or being located in cavities and tight crevasses along cliff bands where they could not be observed from the ground.

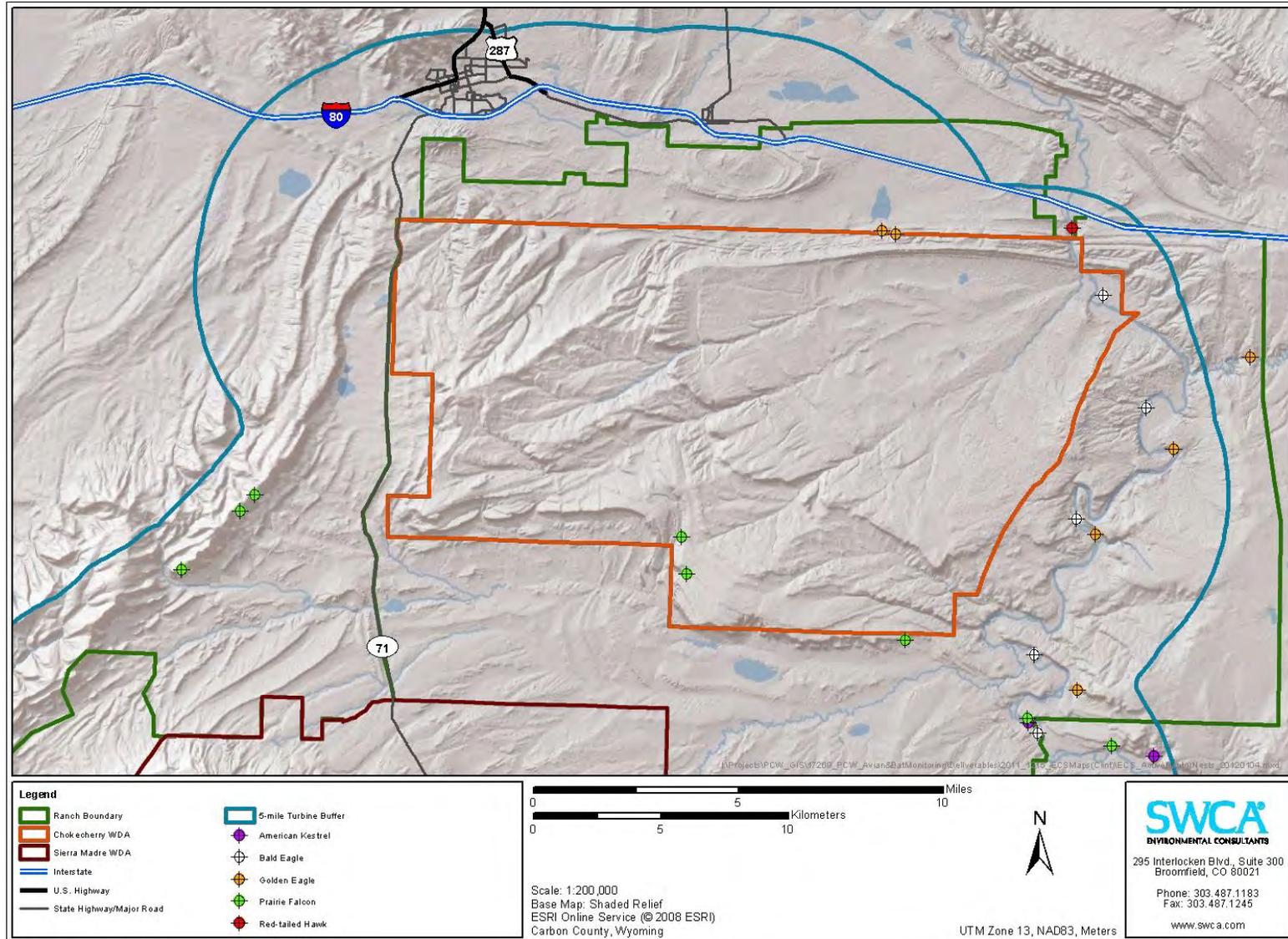
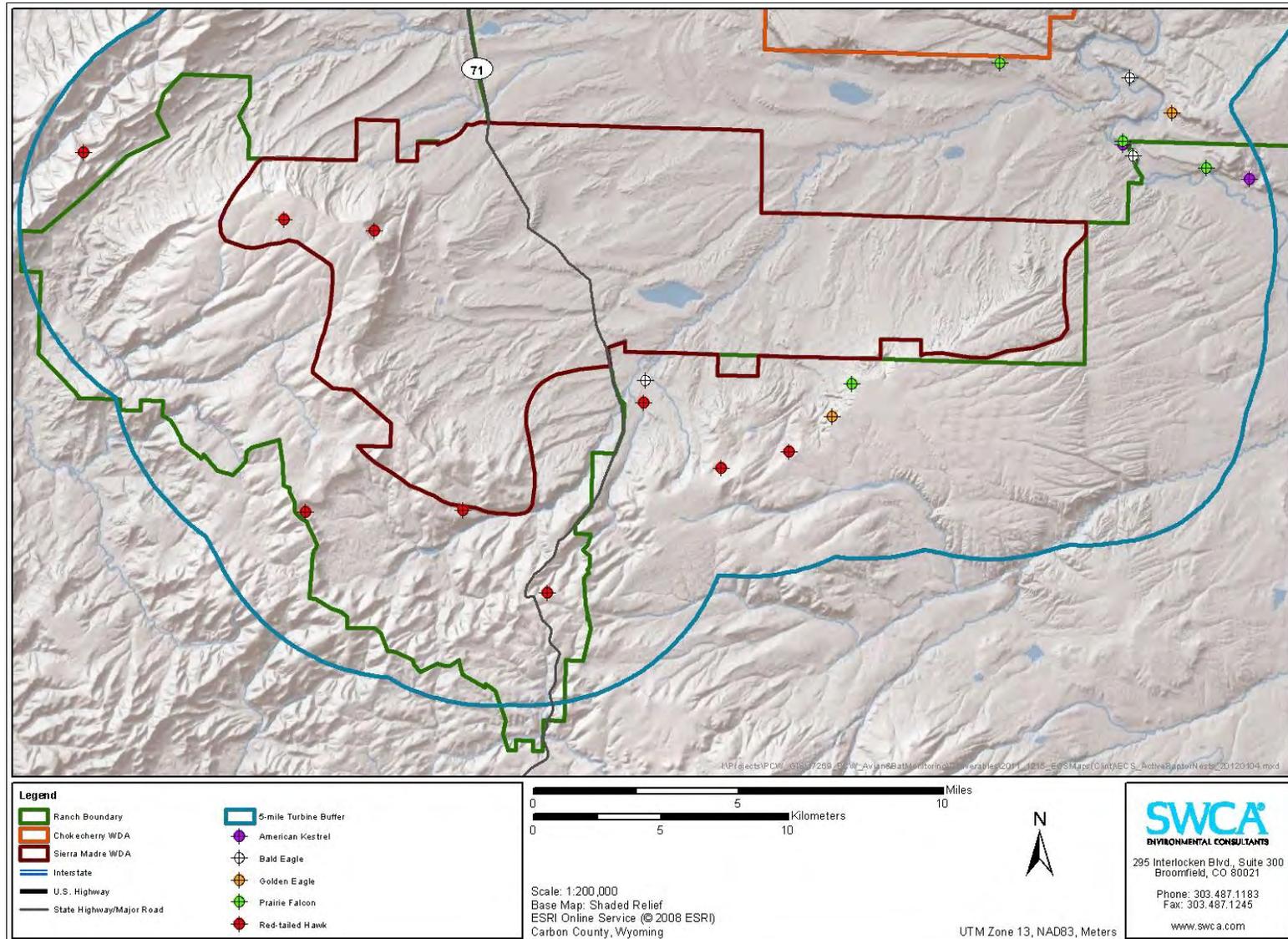


Figure 2. All active nests located in the vicinity of the Chokecherry WDA.



**Figure 3. All active nests located in the vicinity of the Sierra Madre WDA.**

**Table 2. Nest Checks for All Active Bald and Golden Eagle Nests and Most Other Raptor Nests within the Project Site and Associated Buffer.**

Species	Substrate	Easting	Northing	1st Check	2nd Check	3rd Check	4th Check
American Kestrel	Cliff cavity	341388	4602365	6/1: adult flushed from eyrie	6/22: likely fledged	N/A	N/A
American Kestrel	Cottonwood cavity	336444	4603689	5/24: incubating	6/26: 1 fledgling	N/A	N/A
Bald Eagle	Cottonwood	336820	4603277	4/25: 1 nestling	5/31: active; unknown number of nestlings	6/26: active; unknown number of nestlings	7/27: unknown
Bald Eagle	Cottonwood	336682	4606344	4/25: incubating	5/25: active; adult flushed from nest tree	6/22: active; 2 adults observed	7/23: fledged
Bald Eagle	Cottonwood	338325	4611699	4/25: 2 adults perched on nest	5/30: failed	N/A	N/A
Bald Eagle	Cottonwood	341067	4616070	4/25: incubating	6/1: active; unknown number of nestlings	6/30: failed	N/A
Bald Eagle	Cottonwood	339381	4620512	4/25: incubating	6/19: failed	N/A	N/A
Bald Eagle	Snag	317657	4594433	4/25: 2 adults perched on nest	5/30: 1 nestling	6/18: 1 nestling	7/23: fledged
Golden Eagle	Cliff	338361	4604961	4/25: incubating	5/25: unknown	6/22: unknown; likely inactive	7/23: failed
Golden Eagle	Cliff	339071	4611096	4/25: incubating	5/30: unknown	6/21: 1 nestling	7/23: fledged
Golden Eagle	Cliff	342167	4614447	4/25: incubating	5/30: failed	N/A	N/A
Golden Eagle	Rock outcrop	330685	4623050	4/25: incubating	6/19: failed	N/A	N/A
Golden Eagle	Cliff	345176	4618079	4/26: incubating	6/1: 2 nestlings	6/19: 2 nestlings	7/23: likely fledged
Golden Eagle	Cliff	324997	4593017	5/9: incubating	5/29: failed; nest blown off cliff	N/A	N/A

*Summary Report for 2012 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project*

<b>Species</b>	<b>Substrate</b>	<b>Easting</b>	<b>Northing</b>	<b>1st Check</b>	<b>2nd Check</b>	<b>3rd Check</b>	<b>4th Check</b>
Golden Eagle	Rock outcrop	331228	4622914	6/27: failed	N/A	N/A	N/A
Prairie Falcon	Cliff cavity	322793	4611002	4/26: adult flushed from eyrie	5/31: unknown	6/30: 1 fledgling	N/A
Prairie Falcon	Cliff	323018	4609521	4/26: incubating	5/31: unknown	6:30: unknown; likely inactive	N/A
Prairie Falcon	Cliff	325753	4594280	5/8: 2 adults flushed from nest	5/29: active; adult perched near nest	6/20: active; 2 adults flushed	7/25: likely fledged
Prairie Falcon	Cliff	336428	4603842	5/25: adult flushed from nest	6/26: unknown; likely fledged	N/A	N/A
Red-tailed Hawk	Aspen	313788	4586085	5/8: incubating	5/31: active; adult observed	6/23: 2 nestlings	7/25: fledged
Red-tailed Hawk	Snag	304269	4589261	5/8: incubating	5/31: 1 nestling	6/23: 2 nestlings	7/24: fledged
Red-tailed Hawk	Aspen	320629	4590980	5/8: 2 adults flushed from area	5/29: unknown; 2 adults observed	6/20: unknown	7/25: unknown; 2 adults observed
Red-tailed Hawk	Aspen	323291	4591635	5/8: adult perched on nest	5/29: 2 nestlings	6/20: 3 nestlings	7/25: fledged
Red-tailed Hawk	Snag	306965	4600335	5/22: adult perched on nest	6/18: unknown; likely inactive	N/A	N/A
Red-tailed Hawk	Cottonwood	338160	4623133	6/1: incubating	6/19: 2 nestlings	7/23: likely fledged	N/A
Red-tailed Hawk	Snag	303433	4600759	6/29: 1 nestling	7/27: fledged	N/A	N/A
Red-tailed Hawk	Aspen	310451	4589317	6/23: 1 nestling	7/26: fledged	N/A	N/A
Red-tailed Hawk	Cottonwood	317580	4593539	5/8: adult perched in nest tree	5/30: unknown	6/18: 1 nestling	7/23: 1 nestling

## **SUMMARY**

In addition to the 34 active raptor nests, 158 inactive nests were also located and documented during the nest flights and other nest searching activities. These nests were located across the Project Site and associated buffer; however, the vast majority were located around the perimeter of the Chokecherry WDA, the North Platte River corridor, and along the Atlantic Rim. While all nests observed during the nest flights were documented, it is possible that nests of certain species (e.g., American kestrel, prairie falcon, common raven, etc.) were not located due to the nature of aerial surveys, and because of the way their nests are structured (i.e., oftentimes built in cavities or tight crevasses along cliff bands). All of the inactive nests marked were large in size and were considered potential raptor nests; however, as these nests were inactive, it is not possible to know exactly what species built and/or used the nest.

The 2012 Year Three survey showed two active golden eagle nests located on the boundaries of the Chokecherry WDA (likely the same pair), but well outside the area of likely turbine development, and none were located within the Sierra Madre WDA. Five active golden eagle nests were located outside the Project Site but within the 5-mile buffer. There was one active bald eagle nest within the Chokecherry WDA but well outside the likely turbine development area. No other active bald eagle nests were within the Project Site. Five active bald eagle nests were outside the boundaries of the Project Site within the 5-mile buffer. Two active red-tailed hawk nests were located within the Sierra Madre WDA near the western boundary, while most others were located south of the Sierra Madre WDA and along the Atlantic Rim. Two prairie falcon nests were located along the Bolten Rim within the Chokecherry WDA, while most others were located along the North Platte River, the Sage Creek Rim, and Atlantic Rim. Multiple follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests and many other raptor nests within the Project site between May 24 and July 27, 2012, and the results of those surveys are summarized in Table 2.

**Summary Report for 2013 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project**

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**August 2013**

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## INTRODUCTION

In April 2013, SWCA Environmental Consultants (SWCA) conducted raptor nest surveys within the Chokecherry and Sierra Madre Wind Energy Project (Project) site and in suitable nesting habitats within a 5-mile buffer (approximately 700 square miles) surrounding the Project (Figure 1). The selection of a 5-mile turbine buffer was made through consultation with the U.S. Fish and Wildlife Service and the Bureau of Land Management (BLM). This buffer was agreed upon since the existing BLM raptor nest database could be used as a basis for where to search for nests, and because terrain features that had high potential for nesting raptors were well known and established. A 5-mile turbine buffer was also deemed acceptable due to the robust avian monitoring efforts already underway within the Project site, which could also assist in identifying potential nesting raptors. Additionally, the BLM regularly conducts raptor nest monitoring in areas that fall outside of the 5-mile turbine buffer.

Two types of survey methods were used to identify nests, determine nest condition and activity, and assess nesting success. Helicopter surveys were used to evaluate all known nests and all potential nesting habitats along cliff bands, on steep slopes, and along the North Platte River corridor. Ground surveys were used to identify nests not readily identified from helicopter surveys and to assess nests that were not identified or observable during the helicopter surveys. All viable ferruginous hawk (*Buteo regalis*) nests in the Project site were visited to assess nesting status. Multiple nest monitoring visits were made to all active eagle nests and most other active raptor nests identified during helicopter and ground surveys. Nest monitoring visits were made until fledging was confirmed or until juveniles were no longer present on the nest. All nest survey and monitoring activities were conducted in accordance with the protocols submitted to and accepted by the U.S. Fish and Wildlife Service.

## AERIAL SURVEYS

During aerial nest surveys, two biologists and a pilot flew in a Bell 206B3 helicopter on April 24 and 25, 2013. Surveys on April 24 were completed for the area surrounding the North Platte River corridor and the Sierra Madre Wind Development Area (WDA). Surveys on April 25 were completed for the Chokecherry WDA and the area surrounding the Atlantic Rim.

Approximately 20 hours were spent flying the Project site and associated buffer. SWCA biologists used historic nest locations provided by the BLM Rawlins Field Office and data collected during 2011 and 2012 nest surveys for guidance in surveying existing and undocumented nest locations. Aerial surveys focused on known and potential nesting habitat for golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), and ferruginous hawk, as well as previously documented nest locations for these species and other large *Buteos*, falcons, and accipiters. These habitat types included cliff bands, rock outcrops and promenades, steep slopes, riparian zones and river corridors, and forested areas with large trees capable of supporting large nest structures. All inactive nests that were observed during aerial surveying efforts were recorded; however, historical nest sites with no remaining nest structure were not recorded due to the low likelihood those nests will be used again.

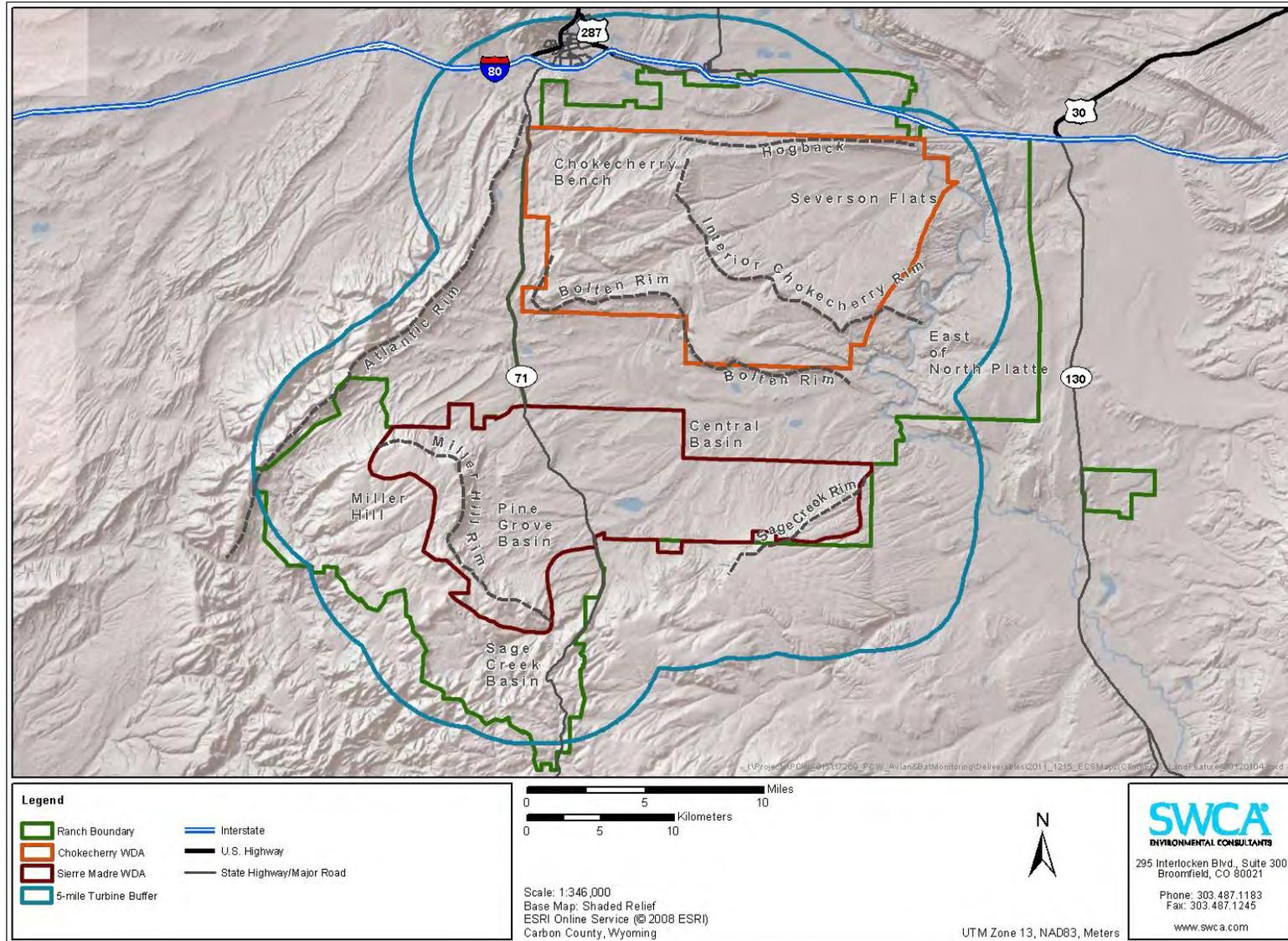


Figure 1. Project site, 5-mile turbine buffer, and significant land features.

Data collected at each nest site included documentation of the nest substrate and location, nest condition, nest status (e.g., active or inactive, number of nestlings, etc.), global positioning system (GPS) location, and photo documentation of the nest when feasible and safe.

## GROUND SURVEYS

Ground surveys were used to evaluate potential nesting habitat that could not be surveyed or readily observed during aerial flights. Ground surveys focused on treed habitats with known nesting structures that could not be observed during helicopter surveys as well as selected known *Buteo* and accipiter nests in the Project site. Ground surveys also included visits to 12 historical ferruginous hawk nest locations on the Project site to evaluate current nest condition and activity (Table 1). In 2011, 40 historical ferruginous hawk nests contained in the BLM's nest database and located on the Project site were visited. During the 2013 surveys, the majority of the historical nest sites were either not located, or determined to be unviable as only a few deteriorated sticks remain. All ground survey locations were accessed on foot or with trucks and all-terrain vehicles. Data collected during ground surveys were identical to the data recorded during aerial surveys.

**Table 1. Existing Historical Ferruginous Hawk Nests on the Project Site.**

<b>Nest ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Substrate</b>	<b>Condition</b>	<b>BLM Nest Association</b>
59	332949	4623131	Rock outcrop	Fair	Near BLM Nest FH21853201
211	338031	4622605	Rock outcrop	Fair	FH20850302
212	335323	4615247	Rock outcrop	Fair	FH20852802
234	328919	4617385	Rock outcrop	Fair	FH20862302
238	327708	4612200	Rock outcrop	Good	Near BLM Nest FH19860301
239	329290	4604725	Hilltop	Fair	Near BLM Nest FH19863501
241	309124	4608503	Hill slope	Fair	FH19882201
257	329868	4622032	Rock outcrop	Fair	Near BLM Nest FH20860201
258	312604	4620081	Rock outcrop	Good	Near BLM Nest FH20881301
259	318857	4612023	Rock outcrop	Poor	Near BLM Nest FH19871002
260	335189	4615940	Rock outcrop	Fair	Near BLM Nest FH20852901
263	320037	4603851	Hill slope	Fair	Near BLM Nest FH18870202

## RESULTS

In total, 25 active raptor nests were located within the Project site and associated 5-mile buffer (Figures 2 and 3). The species composition of the active raptor nests was as follows: 7 bald eagle, 7 golden eagle, 6 red-tailed hawk (*Buteo jamaicensis*), 4 prairie falcon (*Falco mexicanus*), and 1 American kestrel (*Falco sparverius*). One additional occupied golden eagle nesting territory was identified in the Central Basin during other Project survey efforts, but no nest initiation was detected during multiple visits to the site. Seven active non-raptor nests were also located during the flights and included 4 common raven (*Corvus corax*) and 3 great horned owl (*Bubo virginianus*). No evidence of ferruginous hawk nesting or nest maintenance was found at any of the 12 nest locations surveyed in 2013 (Table 1).

Only 1 active golden eagle nest located on Kindt Point was identified within the Chokecherry WDA. This nest was located just within the southern boundary of the WDA and falls within the Turbine No-Build area that encompasses the entirety of the Bolten Rim and Interior Chokecherry Rim. This nest also falls more than 5 miles outside the boundaries of the Phase I development area for the Chokecherry WDA. Four active golden eagle nests and 5 active bald eagle nests were located along the North Platte River corridor outside of the WDAs. These nests are all 10 to 15 miles outside the boundaries of the Phase I development area for the Chokecherry WDA. One active bald eagle nest was located along the North Platte River within the Chokecherry WDA but within the 1-mile turbine exclusion setback from the North Platte River established for the Project to protect nesting raptors and other wildlife. The nest is well outside the area of likely turbine development and therefore risk from Project development is minimal.

With respect to the Sierra Madre WDA, no active eagle nests were located within the WDA. One active golden eagle nest was located approximately 0.50 mile south of the southern boundary of the WDA in the area of Sage Creek Rim, and another was located approximately 5.75 miles south of the southern boundary of the WDA, just inside the boundary of the survey buffer. These nests are both more than 5 miles outside the boundaries of the Phase I development area for the Sierra Madre WDA. One active bald eagle nest was located approximately 0.6 mile south of the WDA in a snag at the base of Sage Creek Rim (the same location as observed in 2011 and 2012). This nest is approximately 1.5 miles outside the boundaries of the Phase I development area for the Sierra Madre WDA, and is located immediately south of a Turbine No-Build Area surrounding Rasmussen Reservoir that was created to protect foraging and use areas associated with this nest.

One additional occupied golden eagle nesting territory was identified in the Central Basin between the Chokecherry and Sierra Madre WDAs, approximately 0.75 mile west of Sage Creek Reservoir. This nest location is approximately 9 miles southeast of the Phase I development area for the Chokecherry WDA and 9 miles east of the Phase I development area for the Sierra Madre WDS. Individuals were observed perching and copulating on this nest; however, no signs of nest initiation were detected during multiple visits to the site. This nest falls within the Turbine No-Build area that encompasses much of the Central Basin between the Chokecherry and Sierra Madre WDAs.

Follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests and many other raptor nests in the Project site between May 21 and July 26. Of the 7 golden active eagle nests documented during 2013 nest surveys, 5 were determined to have failed by the end of June, and only one was determined to have fledged by the end of July. One was unable to be visited due to private land access issues. With regards to the 7 active bald eagle nests, 2 were confirmed as failed by the end of June, 2 were determined to have fledged and an additional 2 were about to fledge by the end of July. The status of one bald eagle nest was unable to be determined due to dense foliage surrounding the nest. Of the 6 active red-tailed hawk nests, 2 were confirmed to have fledged and 1 was confirmed to have failed by the end of June, and 2 were unable to be determined whether they had fledged or failed due to the timing of nest visits (Table 2). One red-tailed hawk nest was unable to be visited due to private land access issues. The remaining nests were not included in the follow-up surveys due to being located on private land, or being located in cavities and tight crevasses along cliff bands where they could not be observed from the ground.

In addition to the 25 active raptor nests, 196 inactive and historic nests were surveyed and assessed during the nest flights and other nest searching activities. These nests were located across the Project site and associated buffer; however, the vast majority were located around the perimeter of the Chokecherry WDA, the North Platte River corridor, and along the Atlantic Rim. While all nests observed during the nest flights were documented, it is possible that nests of certain species (e.g., American kestrel, prairie falcon, common raven, etc.) were not located due to the nature of aerial surveys, and because of the way their nests are structured (i.e., oftentimes built in cavities or tight crevasses along cliff bands). All of the inactive nests marked were large in size and were considered potential raptor nests; however, as these nests were inactive, it is not possible to know exactly what species built and/or used the nest.

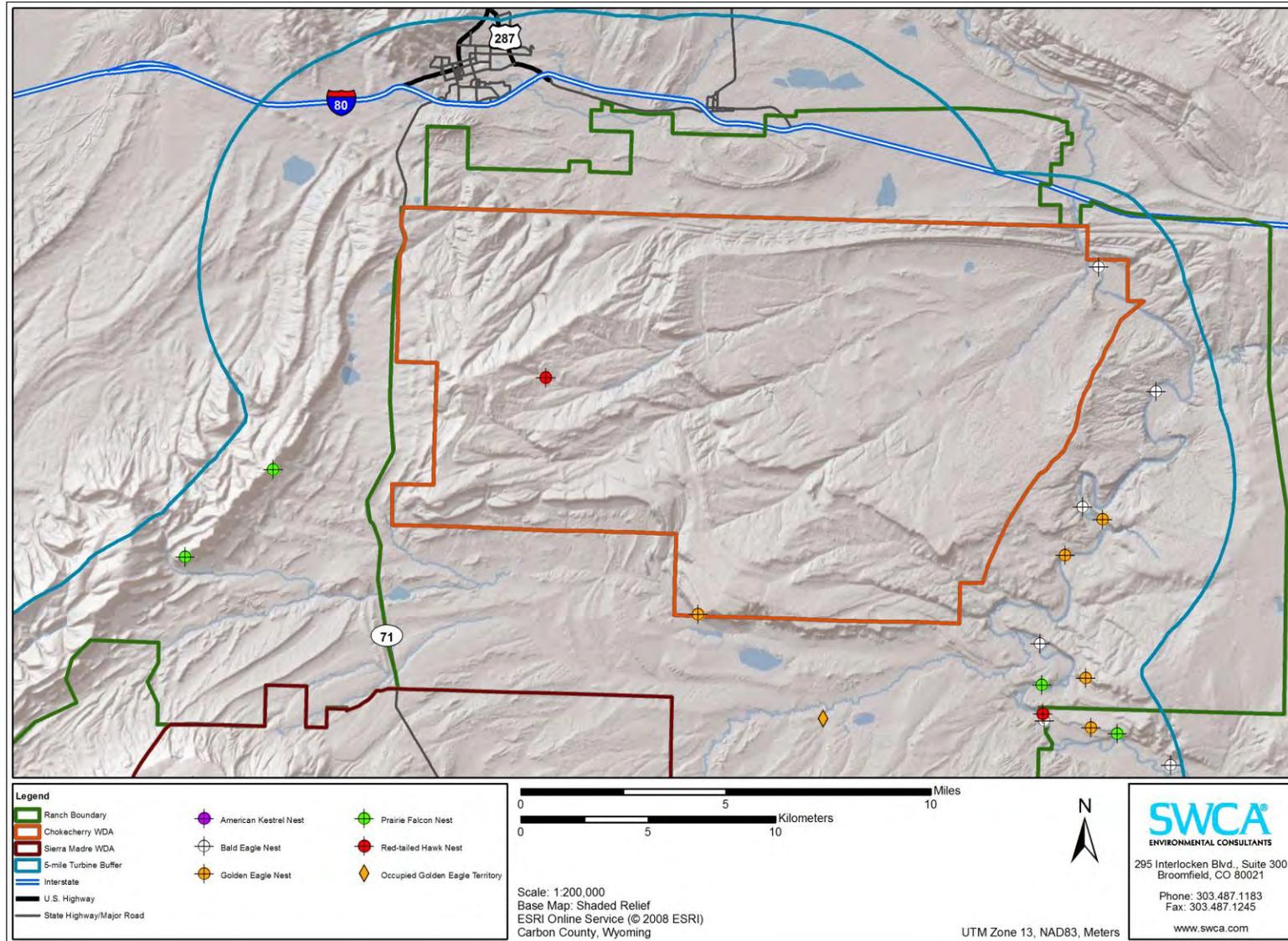
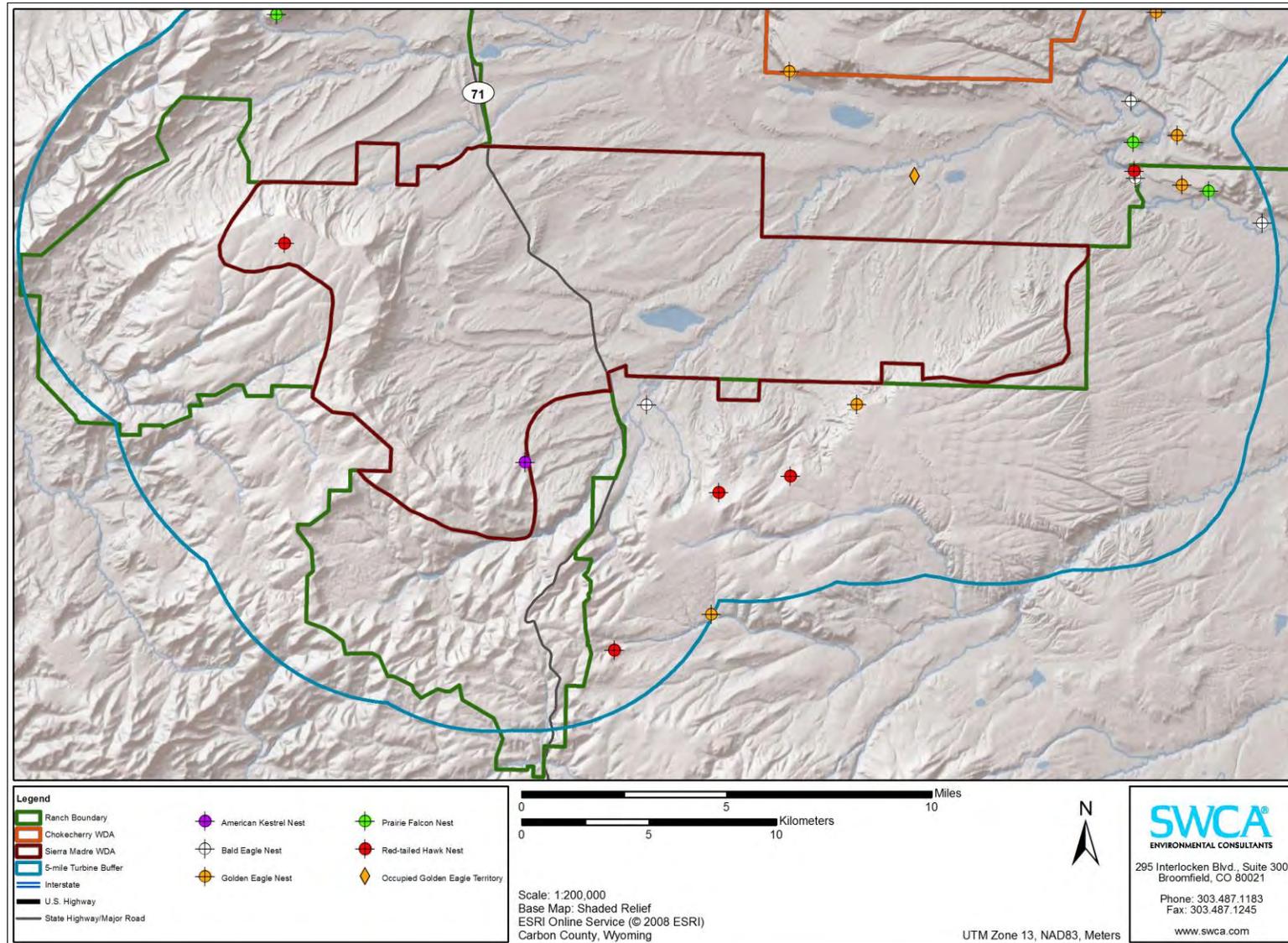


Figure 2. All active nests located in the vicinity of the Chokecherry WDA.



**Figure 3. All active nests located in the vicinity of the Sierra Madre WDA.**

**Table 2. Nest Checks for All Active Bald and Golden Eagle Nests and Most Other Raptor Nests within the Project Site and Associated Buffer.**

Species	Substrate	Easting	Northing	1st Check	2nd Check	3rd Check	4th Check
Bald eagle	Cottonwood	341820	4601564	4/24: 2 adults perched on nest	5/30: unable to check due to cattle in area (private land)	7/10: failed	N/A
Bald eagle	Cottonwood	336852	4603315	4/24: incubating	5/30: active; unknown number of nestlings	6/28: 1 nestling	7/24: fledged
Bald eagle	Cottonwood	336682	4606344	4/24: incubating	5/30: active; unknown number of nestlings	6/28: failed	N/A
Bald eagle	Cottonwood	338352	4611712	4/24: incubating	5/22: 1 nestling	6/27: 1 nestling	7/25: about to fledge
Bald eagle	Cottonwood	341240	4616259	4/24: 2 adults perched on nest	5/23: active; unknown number of nestlings	6/27: 1 nestling	7/25: fledged
Bald eagle	Cottonwood	338988	4621149	4/24: 2 adults perched on nest	5/23: active; unknown number of nestlings	6/26: active; unknown number of nestlings	7/23: unknown
Bald eagle	Snag	317657	4594433	4/24: incubating	6/4: active; unknown number of nestlings	7/1: 1 nestling	7/23: about to fledge
Golden eagle	Cliff	338676	4603051	4/25: incubating	5/30: unknown; likely inactive	6/28: failed	N/A
Golden eagle	Cliff	338483	4605000	4/25: incubating	5/30: unknown; likely inactive	6/29: failed	N/A
Golden eagle	Cliff	337660	4609823	4/25: incubating	5/21: active; unknown number of nestlings	6/27: failed	N/A
Golden eagle	Cliff	339131	4611220	4/25: incubating	5/22: unknown	6/27: failed	N/A

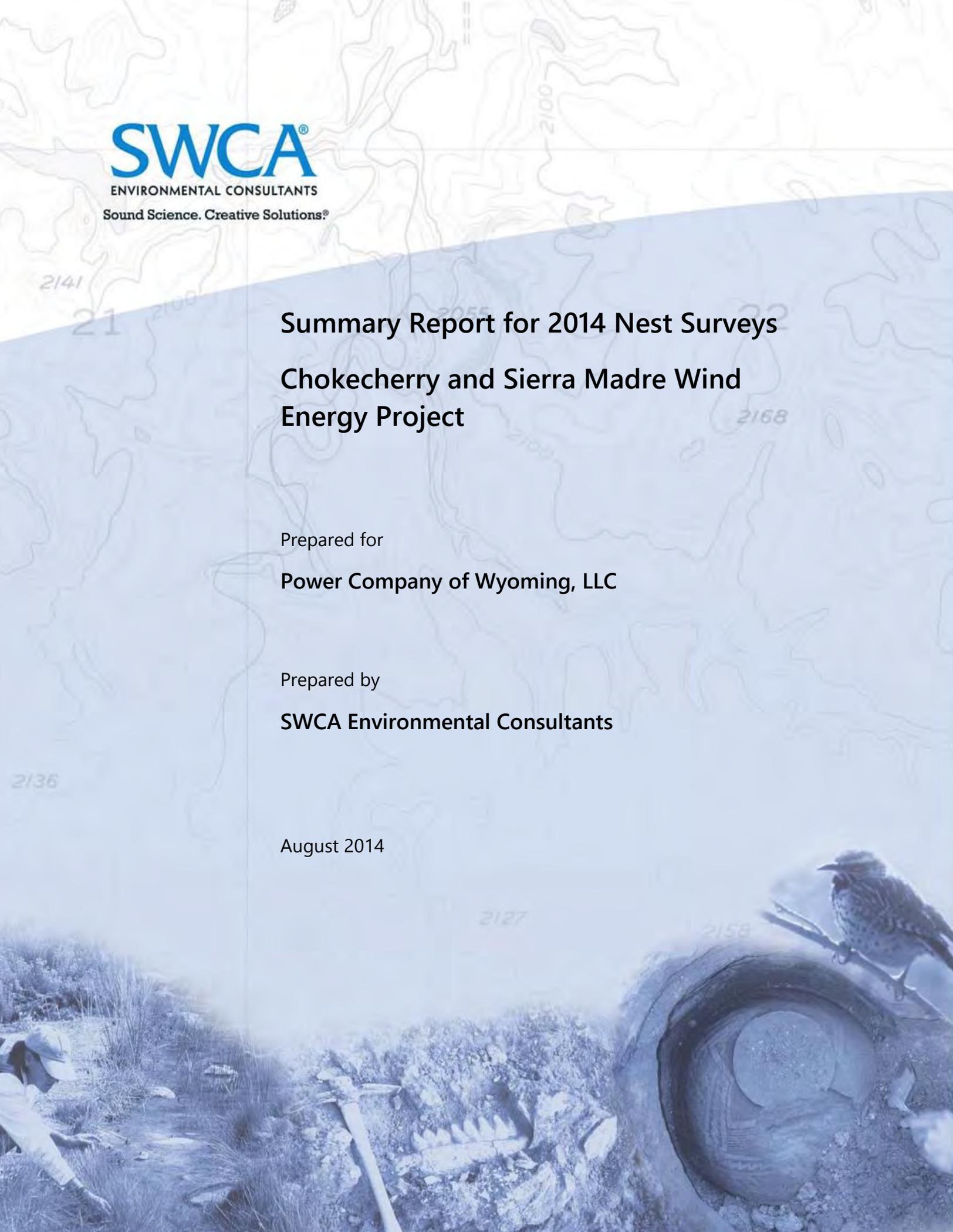
*Summary Report for 2013 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project*

<b>Species</b>	<b>Substrate</b>	<b>Easting</b>	<b>Northing</b>	<b>1st Check</b>	<b>2nd Check</b>	<b>3rd Check</b>	<b>4th Check</b>
Golden eagle	Cliff	323263	4607504	4/25: incubating	5/29: active; unknown number of nestlings	6/29: 1 nestling	7/24: fledged
Golden eagle	Cliff	325909	4594456	4/24: incubating	5/29: unknown	7/2: failed	N/A
Golden eagle	Conifer	320199	4586224	4/24: incubating	N/A: private land, unable to check status	N/A	N/A
Golden eagle	Cliff	328174	4603404	3/15: adults observed copulating on nest	5/2: no activity	5/16: no activity	N/A
Red-tailed hawk	Cottonwood	336791	4603594	4/24: incubating	5/30: active; unknown number of nestlings	N/A	N/A
Red-tailed hawk	Cottonwood snag	317278	4616802	5/15: incubating	5/31: incubating	7/3: failed	N/A
Red-tailed hawk	Aspen	323291	4591635	4/24: incubating	5/29: likely active	6/26: unknown	N/A
Red-tailed hawk	Conifer snag	303433	4600759	4/24: incubating	5/28: active; unknown number of nestlings	6/27: likely fledged	N/A
Red-tailed hawk	Aspen	320485	4590999	4/24: incubating	5/29: active; unknown number of nestlings	6/26: likely fledged	N/A

## **SUMMARY**

The 2013 nest surveys showed one active golden eagle nest located on the southern boundary of the Chokecherry WDA within a Turbine No-Build area, and none were located within the Sierra Madre WDA. Six active golden eagle nests were located outside the Project site but within the 5-mile buffer. One occupied golden eagle nesting territory was identified in the Central Basin in a Turbine No-Build area, but nest initiation was never detected. There was one active bald eagle nest within the Chokecherry WDA but well outside the likely turbine development area. No other active bald eagle nests were within the Project site. Six active bald eagle nests were outside the boundaries of the Project site within the 5-mile buffer. One active red-tailed hawk nest was located in the western area of the Chokecherry WDA, and one was located on top of Miller Hill in the Sierra Madre WDA. Most other red-tailed hawk nests were located south of the Sierra Madre WDA and one was located along the North Platte River. Two prairie falcon nests were located along the North Platte River, and two were located along the Atlantic Rim. Multiple follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests and many other raptor nests within the Project site between May 21 and July 26, 2013, and the results of those surveys are summarized in Table 2.

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# Summary Report for 2014 Nest Surveys Chokecherry and Sierra Madre Wind Energy Project

Prepared for

**Power Company of Wyoming, LLC**

Prepared by

**SWCA Environmental Consultants**

August 2014



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**Summary Report for 2014 Nest Surveys  
Chokecherry and Sierra Madre Wind Energy Project**

Prepared for:

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**August 2014**

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### Appendix

A – Results of Flight Path Monitoring Surrounding Select Active Golden Eagle Nests

## INTRODUCTION

This report documents SWCA Environmental Consultants (SWCA) raptor nest survey results for 2014 within the Chokecherry and Sierra Madre Wind Energy Project (CCSM Project) Site and in suitable nesting habitats within a 5-mile buffer (approximately 700 square miles) surrounding the CCSM Project (Figure 1). The selection of a 5-mile turbine buffer was made through consultation with the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM). The USFWS and BLM concurred that the 5-mile buffer was appropriate because the existing raptor nest database could be used as a basis for where to search for nests, and because terrain features that had high potential for nesting raptors were well known and established. A 5-mile turbine buffer was also deemed acceptable due to the robust avian monitoring efforts that have been underway within the CCSM Project Site since 2010, which also assists in identifying potential nesting raptors. Additionally, BLM regularly conducts raptor nest monitoring in areas that fall outside of the 5-mile turbine buffer.

Two types of survey methods were used to identify nests, determine nest condition and activity, and assess nesting success. Helicopter surveys were used to evaluate all known nests and all potential nesting habitats along cliff bands, on steep slopes, and along the North Platte River corridor. Ground surveys were used to identify nests not readily identified from helicopter surveys and to assess nests that were not identified or observable during the helicopter surveys. All known viable ferruginous hawk (*Buteo regalis*) nests in and immediately adjacent to the CCSM Project Site were visited to assess nesting status. SWCA biologists made multiple nest monitoring visits to all active eagle nests identified during helicopter and ground surveys. Nest monitoring visits are made until fledging is confirmed or until juveniles are no longer present on the nest. All nest survey and monitoring activities were conducted in accordance with the protocols submitted to and accepted by USFWS.

## AERIAL SURVEYS

During aerial nest surveys, two biologists and a pilot flew in an Aerospatiale AS355 helicopter on May 1, 13, and 14, 2014. Surveys on May 1 and 13 were completed for the area surrounding the North Platte River corridor, Chokecherry Wind Development Area (WDA), and the Atlantic Rim. Surveys on May 14 were completed for areas in and adjacent to the Sierra Madre WDA. Data collected at each nest site included documentation of substrate and location, nest condition, nest status (e.g., active or inactive, number of adults, eggs, nestlings, etc.), activity, and global positioning system (GPS) location.

Approximately 18 hours were spent flying the CCSM Project Site and 5-mile turbine buffer. Historic nest locations provided by BLM Rawlins Field Office and data collected during 2011, 2012, and 2013 nest surveys were used for guidance in surveying existing and undocumented nest locations. Surveys focused on known and potential nesting habitat for golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*), as well as previously documented nest locations for other large *Buteos*, falcons, and accipiters. Habitat types included cliff bands, rock outcrops and promenades, steep slopes, riparian zones and river corridors, and forested areas with large trees capable of supporting nest structures. All inactive nests observed during aerial surveys were recorded.

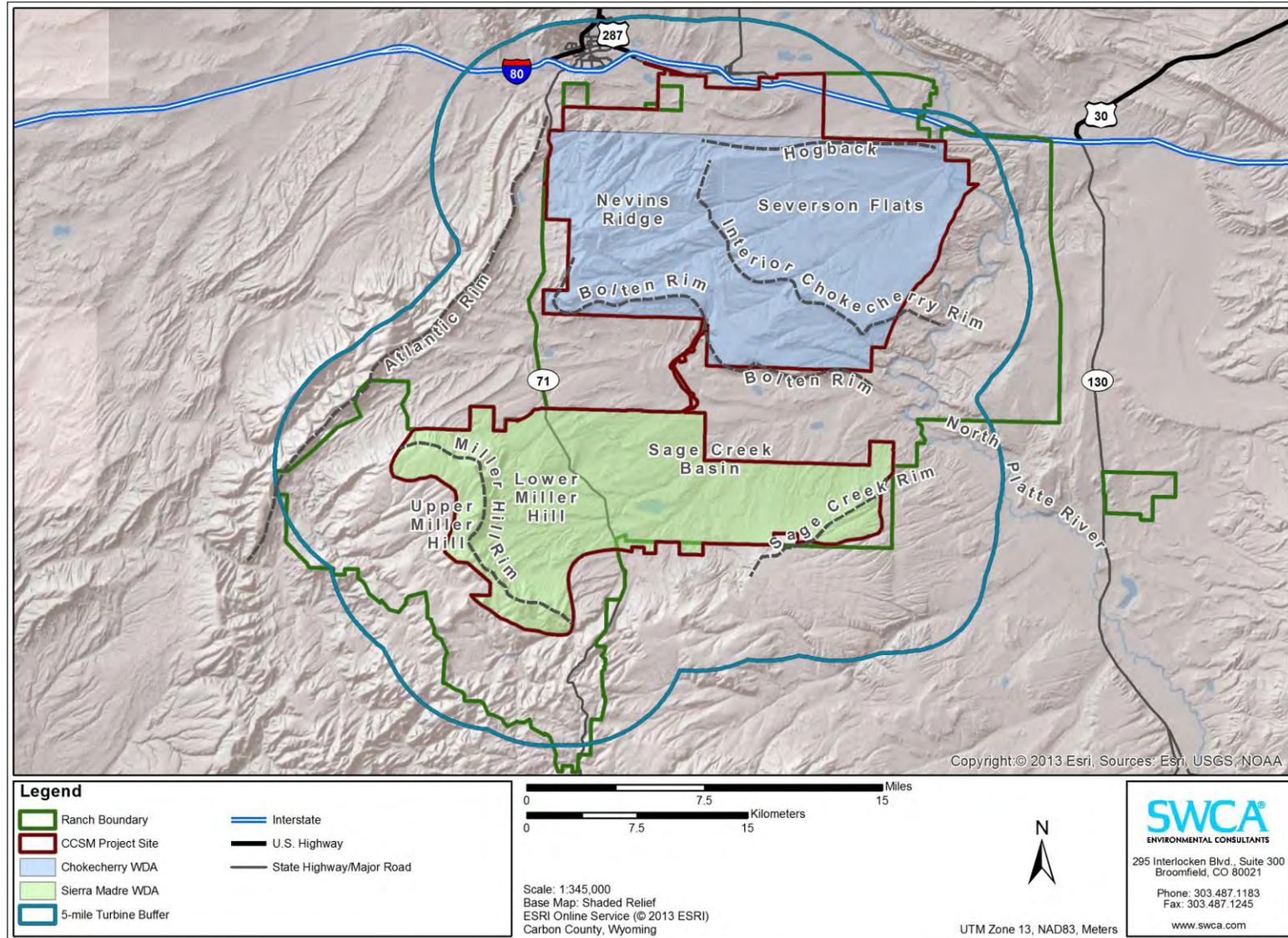


Figure 1. CCSM Project Site, Wind Development Areas, 5-mile turbine buffer, and notable land features.

## GROUND SURVEYS

Ground surveys were used to evaluate potential nesting habitat that could not be surveyed or readily observed during aerial flights. Ground surveys focused on treed habitats with known nesting structures that could not be observed during helicopter surveys as well as selected known *Buteo* and accipiter nests in the CCSM Project Site. Ground surveys also included visits to 12 historical ferruginous hawk nest locations on and adjacent to the CCSM Project Site to evaluate current nest condition and activity (Table 1). In 2011, 40 historical ferruginous hawk nests contained in the BLM’s nest database and located on or adjacent to the CCSM Project Site were visited. During the 2011 surveys, 28 of the historical nest sites were either not located or determined to be unviable as only a few deteriorated sticks remained. The 12 remaining historical ferruginous hawk nests have been accessed on foot or with trucks and all-terrain vehicles each subsequent year to survey for activity. Data collected during the 2014 ground surveys were identical to the data recorded during previous aerial and ground surveys.

**Table 1. Existing Historical Ferruginous Hawk Nests on the CCSM Project Site.**

<b>Nest ID</b>	<b>Easting</b>	<b>Northing</b>	<b>Substrate</b>	<b>Condition</b>	<b>BLM Nest Association</b>
59	332949	4623131	Rock outcrop	Fair	Near BLM Nest FH21853201
211	338031	4622605	Rock outcrop	Fair	FH20850302
212	335323	4615247	Rock outcrop	Fair	FH20852802
234	328919	4617385	Rock outcrop	Fair	FH20862302
238	327708	4612200	Rock outcrop	Good	Near BLM Nest FH19860301
239	329290	4604725	Hilltop	Fair	Near BLM Nest FH19863501
241	309124	4608503	Hill slope	Fair	FH19882201
257	329868	4622032	Rock outcrop	Fair	Near BLM Nest FH20860201
258	312604	4620081	Rock outcrop	Good	Near BLM Nest FH20881301
259	318857	4612023	Rock outcrop	Poor	Near BLM Nest FH19871002
260	335189	4615940	Rock outcrop	Fair	Near BLM Nest FH20852901
263	320037	4603851	Hill slope	Fair	Near BLM Nest FH18870202

## RESULTS

During 2014 survey efforts, 43 active raptor nests were located within the CCSM Project Site and associated 5-mile buffer (Figures 2 and 3). The species composition of the active raptor nests was as follows: 17 golden eagle, 12 red-tailed hawk (*Buteo jamaicensis*), 7 bald eagle, 4 prairie falcon (*Falco mexicanus*), 2 Swainson's hawk (*Buteo swainsoni*), and 1 unidentified *Buteo* nest that was likely a red-tailed hawk. Eighteen active non-raptor nests were also located during the flights and included 12 common raven (*Corvus corax*), 5 great horned owl (*Bubo virginianus*), and 1 Canada goose (*Branta canadensis*). No evidence of ferruginous hawk nesting or nest maintenance was found at any of the 12 nest locations surveyed in 2014 (Table 1).

Nesting patterns in 2014 were consistent with results from 2011, 2012, and 2013 surveys. As observed during previous raptor nest surveys, the highest density of nesting raptors in the 5-mile buffer surrounding the CCSM Project Site was along the North Platte River. Of the 43 active raptor nests identified during 2014 surveys, 16 (37%) were located along the North Platte River corridor. The 16 nests were comprised of 6 bald eagle nests (86% of all active bald eagle nests in the survey area), 6 golden eagle nests (35% of all active golden eagle nests in the survey area), 3 red-tailed hawk nests, and 1 prairie falcon nest. The nests along the North Platte River fall within an identified turbine no-build area and are more than 17 kilometers (11 miles) from the nearest Phase I turbine location.

Six of the 43 raptor nests identified during 2014 surveys were located on the Bolten Rim, which roughly corresponds to the southern boundary of the Chokecherry WDA, and one was located on a rock outcrop just north of the Bolten Rim. All 7 nests were located within identified turbine no-build areas or other associated setbacks from the Bolten Rim that were established in redesigning the CCSM Project to avoid and minimize risks to eagles and other avian species. Six of the 7 nests along the Bolten Rim were occupied by golden eagles with the remaining nest occupied by a prairie falcon. Of the 6 active golden eagle nests, 2 are on the eastern half of the Bolten Rim and are 8.5 and 12.9 kilometers (5.3 and 8.7 miles) from the nearest Phase I turbine location. The remaining 4 golden eagle nests are on the western half of the Bolten Rim and were specifically addressed in redesigning the Phase I Wind Turbine Development to avoid and minimize risks to eagles and other avian species (Figures 2 and 3). Of these 4 nests, the 2 westernmost golden eagle nests are located more than 3.4 kilometers (2 miles) from the nearest Phase I turbine location. The other two golden eagle nests are located between 2 and 3 kilometers (1.2 and 1.8 miles) from the nearest Phase I turbine location.

One active golden eagle nest was located on a small cliff in the Sage Creek Basin between the Chokecherry and Sierra Madre WDAs, approximately 1.2 kilometers (0.8 mile) west of Sage Creek Reservoir. This nest is located in a Turbine No-Build Area established in the Sage Creek Basin and is 14.7 kilometers (9.1 miles) from the nearest Phase I turbine location. This nest was occupied by golden eagles in 2013 and 2014, but failed early into the nesting season both years. This year the majority of the nest collapsed off the cliff and is no longer viable in its current form. This nest location falls within the Turbine No-Build Area that encompasses much of the Sage Creek Basin between the Chokecherry and Sierra Madre WDAs

Two active golden eagle nests were located along the Atlantic Rim west of the Chokecherry and Sierra Madre WDAs. The northernmost nest on Atlantic Rim is approximately 8.7 kilometers (5.41 miles) north of the nearest Phase I turbine location in the Sierra Madre WDA, and is located completely outside of the CCSM Project Site. The southernmost nest on Atlantic Rim is 6.8 kilometers (4.2 miles) west of the nearest Phase I turbine location in the Sierra Madre WDA, and is located completely outside of the CCSM Project Site.

With respect to the Sierra Madre WDA, no active eagle nests were located within the WDA. One active golden eagle nest was located approximately 0.8 kilometer (0.5 mile) south of the southern boundary of the WDA in the area of Sage Creek Rim and is 11.4 kilometers (7.1 miles) from the nearest Phase I turbine location. One additional active golden eagle nest was located 8.4 kilometers (5.2 miles) south of the southern boundary of the WDA, just inside the boundary of the survey buffer and 7.9 kilometers (4.9 miles) southeast of the nearest Phase I turbine location. One active bald eagle nest was located approximately 0.6 kilometers (0.4 miles) south of the WDA in a snag at the base of Sage Creek Rim (the same location as observed in 2011, 2012 and 2013). This nest is approximately 3.9 kilometers (2.4 miles) from the nearest Phase I turbine location, and is located immediately south of a Turbine No-Build Area surrounding Rasmussen Reservoir that was created to protect foraging and use areas associated with this nest.

Follow-up ground surveys were completed to document nest activity and fledging success for all eagle nests in the CCSM Project Site and associated 5-mile buffer between May 22 and July 21 (Table 2). During this time, flight path mapping surveys were also initiated at 7 golden eagle nests located along the Bolten Rim, Interior Chokecherry Rim, and Sage Creek Rim in order to determine how eagles from those nests were using the surrounding habitat, and whether they were utilizing the Phase I Wind Turbine Development Site for their activities. These specific nests were selected due to their proximity to the Chokecherry and Sierra Madre WDAs, and results and analysis from these surveys may be found in Appendix A. Flight path mapping documented that patterns of use surrounding these 7 nests was consistent with observations made in previous years. The majority of use occurred south of the Bolten Rim over the Sage Creek Basin in a designated Turbine No-Build Area. The limited time spent north of the Bolten Rim occurred in designated Turbine No-Build Areas and associated setback and did not occur within the Phase I Wind Turbine Development Site.

Of the 17 active golden eagle nests documented during 2014 nest surveys, 7 were determined to have failed and 6 were determined to have fledged by the end of July. The statuses of the remaining nests were unable to be determined because of private land access issues or lack of evidence of fledging or failure. With regards to the 7 active bald eagle nests, 1 was confirmed to have failed, and 6 were determined to have fledged by the end of July 2014.

In addition to the 43 active raptor nests, 241 inactive and historic nests were surveyed and assessed during the helicopter nest flights and other nest searching activities. These nests were located across the CCSM Project Site and associated buffer; however, the highest concentrations were located along the Bolten Rim, the North Platte River corridor, and along the Atlantic Rim. While all nests observed during the helicopter nest flights were documented, it is possible that nests of certain species (e.g., American kestrel, prairie falcon, common raven, etc.) were not located due to the nature of aerial surveys, and because of the way their

nests are structured (i.e., oftentimes built in cavities or tight crevasses along cliff bands). All of the inactive nests observed were large in size and were considered potential raptor nests; however, as these nests were inactive, it is not possible to know exactly which species built and/or used the nest in the past.

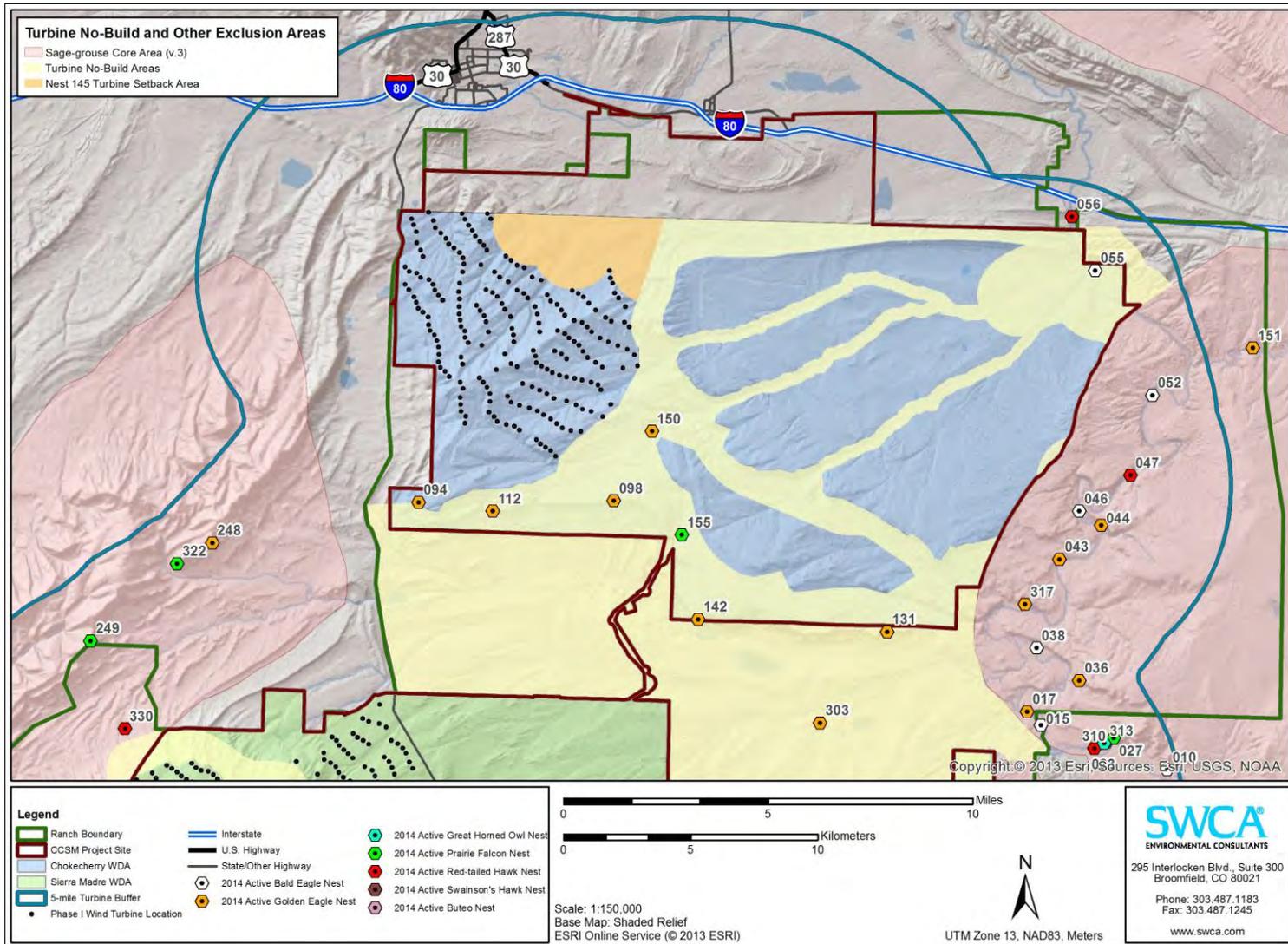
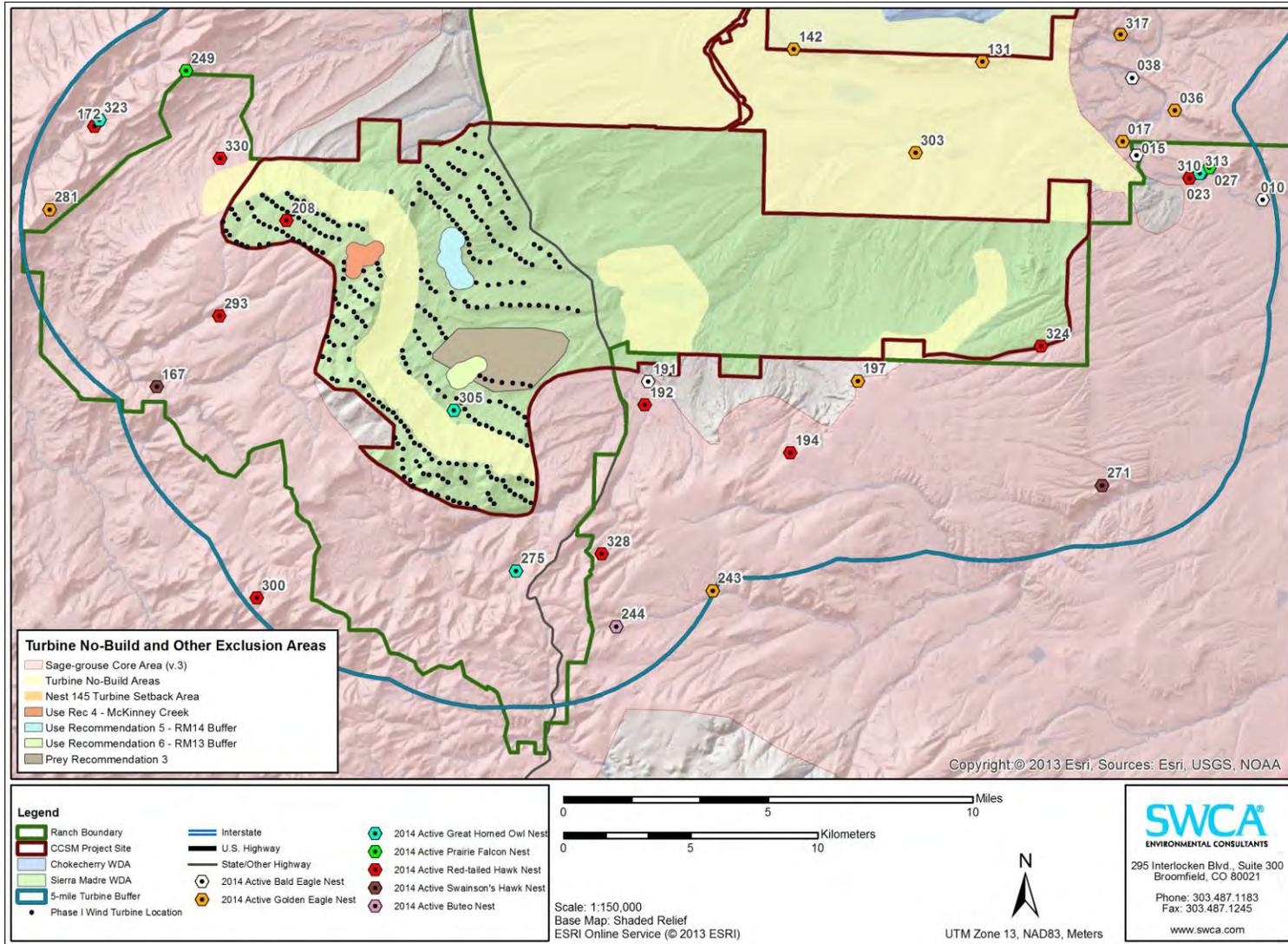


Figure 2. All active nests, Turbine No-Build Areas, and other avoidance and minimization areas located in the vicinity of the Chokecherry WDA.



**Figure 3. All active nests, Turbine No-Build Areas, and other avoidance and minimization areas located in the vicinity of the Sierra Madre WDA.**

**Table 2. Nest Status Assessments for All Active Bald and Golden Eagle Nests within the CCSM Project Site and Associated Buffer.**

Species	Nest ID	Substrate	Easting	Northin g	Status at Flight	1st Check	2nd Check	3rd Check
Bald eagle	010	Cottonwood	341820	4601564	5/1: incubating	not checked	7/2: 1 adult perched on nest	7/20: fledged
Bald eagle	015	Cottonwood	336852	4603315	5/1: incubating	6/12: brooding	7/1: 2 adults perched on nest	7/24: 1 nestling fledged
Bald eagle	038	Cottonwood	336682	4606344	5/1: incubating	6/13: no activity detected	7/1: 1 nestling	7/20: 1 nestling fledged
Bald eagle	046	Cottonwood	338352	4611712	5/13: incubating	6/10: 1 nestling	6/30: 1 nestling	7/18: 1 nestling fledged
Bald eagle	052	Cottonwood	341240	4616259	5/13: 2 adults perched on nest	6/10: 1 adult perched on nest	6/30: 2 nestlings	7/18: 1 nestling fledged
Bald eagle	055	Cottonwood	338988	4621149	5/13: eggs in nest, adult perched nearby	6/10: no activity detected	6/30: no activity detected	7/23: failed
Bald eagle	191	Snag	317657	4594433	5/14: incubating	6/26: 1 nestling	7/3: 1 nestling	7/21: 1 nestling fledged
Golden eagle	017	Cliff	336319	4603846	5/13: incubating	6/12: no activity detected	7/1: no activity detected	7/20: failed
Golden eagle	036	Cliff	338361	4605066	5/13: 2 nestlings	6/13: no activity detected	7/2: 1 adult perched on nest	7/18: 1 nestling fledged
Golden eagle	043	Cliff	337586	4609820	5/13: 1-2 nestlings	6/10: 1 adult perched on nest	6/30: 2 eagles of perched on nest, unknown age	7/18: status unknown
Golden eagle	044	Cliff	339223	4611152	5/13: 1 nestling	6/10: no activity detected	6/30: 1 nestling	7/18: 1 nestling fledged
Golden eagle	094	Cliff	312378	4612056	5/1: incubating	6/11: 1 adult flying nearby	6/23: no activity detected	7/17: failed
Golden eagle	098	Cliff	320060	4612115	5/1: incubating	6/5: 1 adult flying nearby	7/15: no activity detected	7/17: failed
Golden eagle	112	Cliff	315305	4611707	5/1: incubating	6/4: 1 adult flying nearby	6/23: 1 adult flying nearby	7/16: fledged

<b>Species</b>	<b>Nest ID</b>	<b>Substrate</b>	<b>Easting</b>	<b>Northin g</b>	<b>Status at Flight</b>	<b>1st Check</b>	<b>2nd Check</b>	<b>3rd Check</b>
Golden eagle	131	Cliff	330801	4606975	5/1: incubating	6/20: 1 adult sitting on nest	7/1: 1 nestling	7/15: 1 nestling fledged
Golden Eagle	142	Cliff	323377	4607473	5/1: incubating	6/3: 1 adult flying nearby	6/25: 1 adult flying nearby	7/15: unknown fledging status
Golden Eagle	150	Cliff	321562	4614839	5/1: incubating	5/28: no activity detected	6/11: failed	N/A
Golden Eagle	151	Rock Outcrop	345183	4618108	5/13: incubating	not checked	7/2: 1 nestling	7/18: 1 nestling fledged
Golden Eagle	197	Cliff	325910	4594457	5/14: incubating	6/2: no activity detected	6/24: 1 adult flying nearby	7/14: failed
Golden Eagle	303	Cliff	328174	4603405	4/18: incubating	4/30: failed, nest collapsed from cliff	N/A	N/A
Golden Eagle	317	Cliff	336235	4608056	5/13: 1-2 nestlings	not checked	6/30: 1 nestling	7/18: 1 nestling fledged
Golden Eagle	248	Cliff	304266	4610464	5/13: incubating	6/26: 1 nestling	7/3: 1 nestling	7/21: 1 nestling fledged
Golden Eagle	281	Cliff	294128	4601180	5/14: incubating	6/25: 1 adult perched on nest	7/3: failed	N/A
Golden Eagle	243	Conifer	294128	4601180	5/14: incubating	NA – Private land	NA – Private land	NA – Private land

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Appendix A: Results of Flight Path Monitoring Surrounding Select  
Active Golden Eagle Nests

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## **INTRODUCTION**

During May, June and July of 2013 and 2014, SWCA Environmental Consultants (SWCA) conducted flight path mapping surveys for the Chokecherry and Sierra Madre Wind Energy Project (CCSM Project) Site at select active golden eagle nest locations. The active nests surveyed were located along the Bolten Rim and Sage Creek Rim, which generally follow the southern boundaries of the Chokecherry and Sierra Madre Wind Development Areas (WDAs), respectively. In 2013, 2 active golden eagle nests (nests 143 and 197) were located along these rims, and in 2014, 7 nests (nests 094, 098, 112, 131, 142, 150, and 197) were located along these rims. All of the active golden eagle nests surveyed were between 2 and 14 kilometers (1.2 and 8.7 miles) of Phase I turbine locations.

## **FLIGHT PATH SURVEYS**

For flight path surveys, biologists selected survey locations on top of the Bolten and Sage Creek rims with views of the nests and surrounding landscape. Survey locations were sites at least 400 meters from nest locations to reduce the likelihood of disturbing nesting activities. Surveys were generally conducted once per week for 2 to 4 hours at each nest, and survey start times were rotated each week to provide coverage of all daylight hours at each nest location. During surveys, biologists would scan the landscape around them with the assistance of binoculars to detect any golden eagles utilizing the airspace around the active nest locations. Once an eagle was detected, biologists would track the eagle and record its flight path to capture its use of the surrounding topographic features and habitat. Golden eagle flight paths were mapped out to approximately 4,000 meters from the observer, and data collected during these surveys focused primarily on accurate recording of golden eagle flight paths and identification of the active nest the flight path was associated with. Flight paths were georeferenced and digitized for analysis purposes.

In 2013, approximately 30 hours were spent mapping flight paths at the 2 active golden eagle nests located on the Bolten and Sage Creek Rims and in 2014, approximately 160 hours were spent mapping flight paths at the 7 active golden eagle nests located on the Bolten and Sage Creek Rims. Survey effort varied between the two years primarily due to changes in the number of active golden eagle nests.

## **RESULTS**

Flight path patterns observed in 2013 and 2014 were consistent with observations made during raptor surveys conducted for the CCSM Project from 2011 through 2013. As was observed during past raptor surveys, the majority of all eagle flight paths mapped during 2013 and 2014 occurred along and south of the Bolten Rim and north of the Sage Creek Rim in the Sage Creek Basin located between these two topographic features (Figure A.1). Almost no flight paths were recorded north of the Bolten Rim and south of the Sage Creek Rim. The few flight paths that occurred north of the Bolten Rim were located within Turbine No-Build Areas and other areas specifically addressed in redesigning the Phase I Wind Turbine Development to avoid and minimize risks to eagles and other avian species. Several nests (nest numbers 094, 098, 150, and 197) failed early in the flight path survey effort; therefore, few or no flight paths were recorded for these nests.

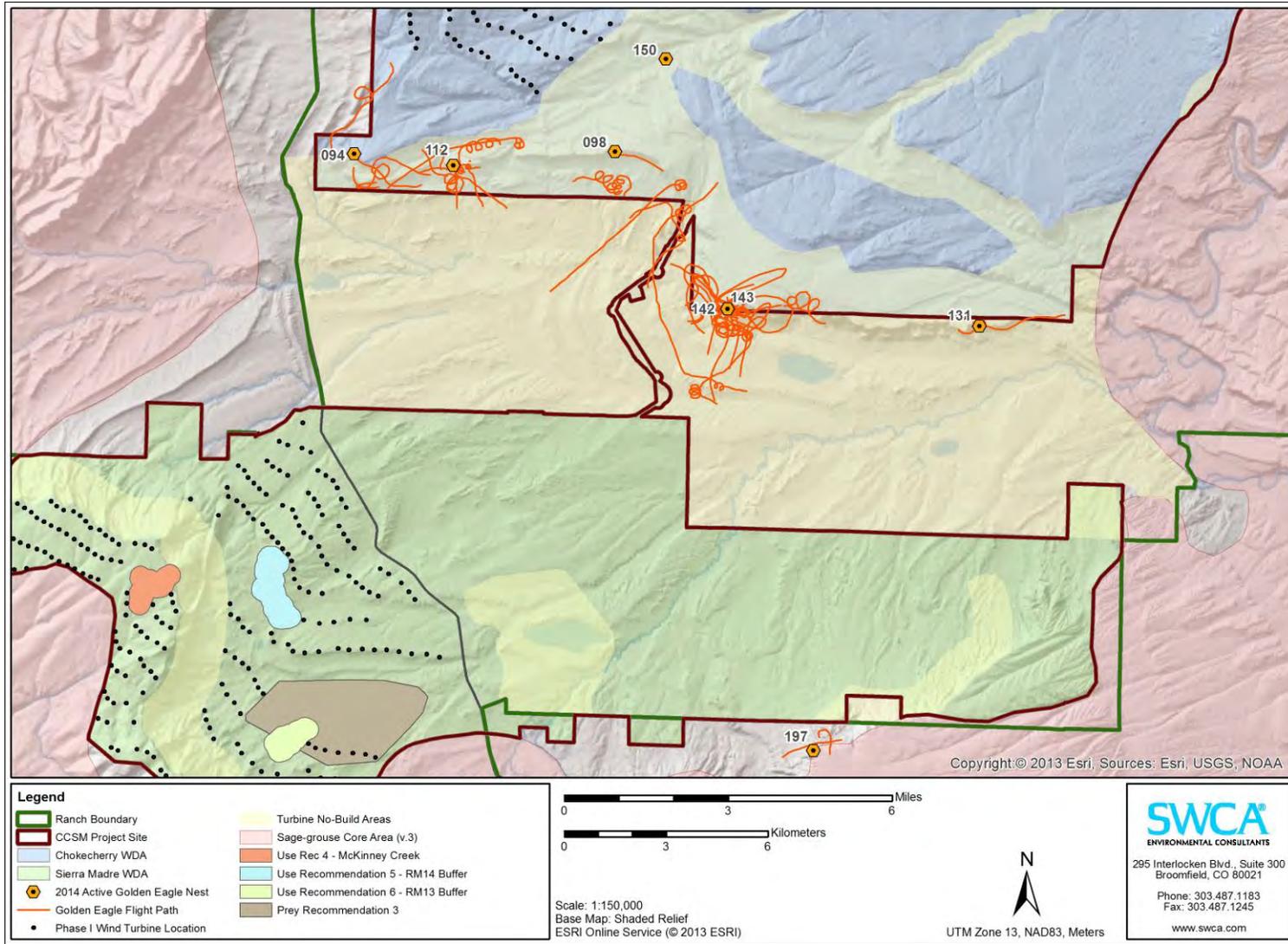


Figure A.1. Golden eagle nests and flight paths, Turbine No-Build Areas, and other avoidance and minimization areas located in the CCSM Project Site

## Appendix E

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**Summary Report for 2013 Eagle Roost Surveys  
Chokecherry and Sierra Madre Wind Energy Project**

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## INTRODUCTION

In February 2013, SWCA Environmental Consultants (SWCA) conducted aerial eagle roost surveys within suitable habitats on the Chokecherry and Sierra Madre Wind Energy Project (Project) site and surrounding area (Figure 1). These surveys were specifically conducted to locate roosting locations for bald eagles (*Haliaeetus leucocephalus*), which are known to roost overnight in communal groups (U.S. Fish and Wildlife Service [Service] 1983). Golden eagles (*Aquila chrysaetos*) are not typically known to roost in communal groups; however, any observation of either species of eagle detected during the roost flights was documented. Surveys followed established protocols for locating bald eagle roosts as described in the Service's Northern States Bald Eagle Recovery Plan (Service 1983).

Prior to surveys, potential bald eagle roost areas were assessed and delineated through a desktop habitat analysis of the Project site and surrounding area. High-resolution aerial imagery, vegetation, and other supplementary spatial layers were reviewed in ArcGIS software to delineate riparian zones, cottonwood (*Populus* sp.) galleries, mixed-conifer groves, and other large stands of quaking aspen (*Populus tremuloides*) or other tree species that could have potential to serve as communal roost sites for bald eagles. These targeted areas with the highest potential for roosting activity were surveyed exclusively rather than flying transects over the Project site, most of which is dominated by sagebrush steppe or salt desert scrub vegetation types with very little forested area to support communal roosts (Figure 2). The key areas delineated in the desktop analysis for eagle roost surveys include the North Platte River corridor and associated cottonwood galleries along the eastern boundary of the Project site and the Chokecherry Wind Development Area (WDA); sections of Pass Creek, Jack Creek, and associated tributaries with forested cover east and south of the Project site; stands of mixed conifers and quaking aspen south of the Project site; and stands of mixed conifers and quaking aspen along the eastern and north faces of Miller Hill in the Sierra Madre WDA (Figure 3).

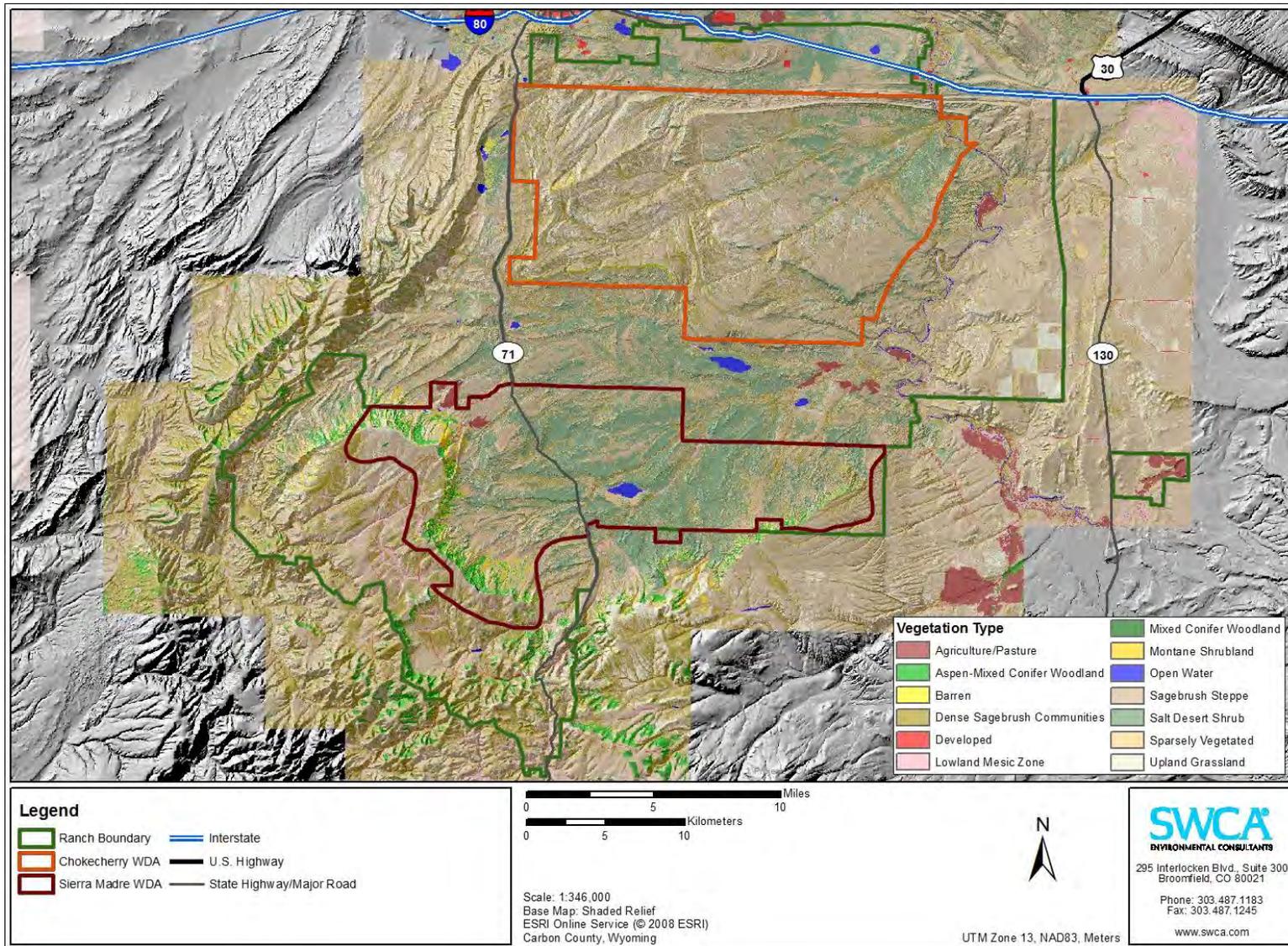
## AERIAL SURVEYS

During the aerial roost surveys, two biologists and a pilot experienced in aerial wildlife surveys flew in a Cessna 182 fixed-wing aircraft during the evening hours of February 27 and the morning hours of February 28, 2013. Surveys on both dates were conducted during the accepted timeframe provided in the Northern States Bald Eagle Recovery Plan (Service 1983), and all of the delineated areas discussed above and displayed in Figure 3 were surveyed on both flights. The fixed-wing aircraft was flown at a low to moderate speed at an average altitude of 30 meters above ground level. Biologists surveyed from both sides of the aircraft to achieve full coverage of the delineated survey areas, and any eagles observed during the flights were documented.

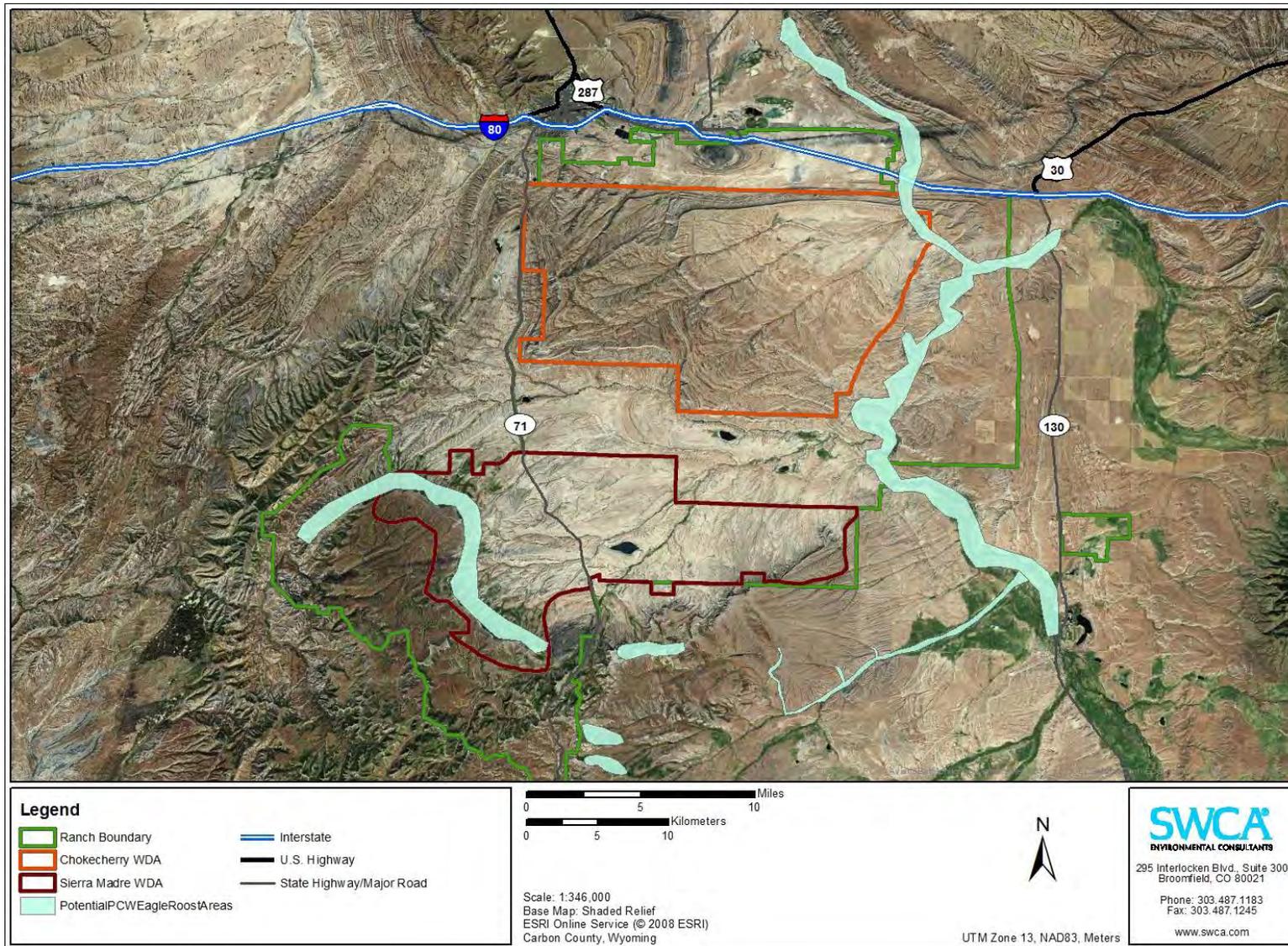
## RESULTS

No communal bald or golden eagle roosts were located during either of the aerial roost surveys. On February 27, the aerial roost survey began at 4:30 p.m. and continued until 6:15 p.m. The fixed-wing aircraft left the Saratoga, WY airport and flew north along the North





**Figure 2. Vegetation types within the Project site and surrounding areas.**



**Figure 3. Potential communal eagle roost habitat within the Project site and surrounding areas.**

Platte River corridor. One bald eagle was observed in flight near the North Platte, and two golden eagles were observed perched on a cliff wall along the North Platte near a documented nesting area. The flight continued north of Interstate 80 to the Fort Steele area before heading back south along the North Platte River. In addition to the North Platte River, the Pass Creek and Jack Creek tributaries were also flown in areas that supported large cottonwood trees. Once the North Platte River corridor and associated tributaries were covered, the mixed conifer and quaking aspen stands located due south of the Project site were surveyed, as well as the mixed conifer and quaking aspen stands along the east and north faces of Miller Hill. No other eagles were observed during this flight.

On February 28, the aerial roost survey began at 6:20 a.m. and continued until 8:10 a.m. This flight followed the same flight path taken on the previous day's survey. One golden eagle was observed flying near the cliff band where the two individuals were perched the previous evening, likely one of the same individuals. One individual bald eagle was observed perched in a cottonwood tree at the northern extent of the survey area along the North Platte River. Two bald eagles were observed perched in a cottonwood tree along Jack Creek, likely establishing their breeding season territory. One additional golden eagle was also observed flying low over Jack Creek; however, no additional eagle activity was observed.

## **SUMMARY**

In the course of two aerial eagle roost surveys conducted during both morning and evening hours within the Project site and surrounding area, no communal eagle roosts were documented. Only a few incidental observations of individual eagles or territorial pairs were documented during the aerial roost surveys. These results are consistent with the habitat available on the Project site given there are very few forested areas or areas with trees large enough to support a communal eagle roost (Figure 2). The North Platte River corridor is the only portion of the Project site that could have any potential to support a communal roost as it does have large galleries of cottonwood trees, the cliffs around the river provide some protection from inclement weather conditions, and the river may provide a potential prey source if it is not frozen over. However, only two individual bald eagles were observed along the river during both flights. None of the other delineated areas that were surveyed have any potential to support a communal eagle roost as the available trees are too small and spread out, there is little protection from inclement weather, and there are few consistent prey sources to support a large number of eagles.

## **REFERENCES**

U.S. Fish and Wildlife Service (Service). 1983. Northern States Bald Eagle Recovery Plan. Northern States Bald Eagle Recovery Team. U.S. Fish and Wildlife Service, Department of the Interior, Washington D.C. Available online at [http://www.fws.gov/midwest/eagle/recovery/be\\_n\\_recplan.pdf](http://www.fws.gov/midwest/eagle/recovery/be_n_recplan.pdf). Accessed in March 2013.