Attachment B

Phase I Bird and Bat Conservation Strategy

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VIA U.S. Postal Service and E-Mail

August 3, 2015

Clint Riley, Assistant Regional Director, Migratory Birds and State Programs
Mountain-Prairie Region
U.S. Fish and Wildlife Service
134 Union Blvd.
Lakewood, CO 80228

Re: Phase I Bird and Bat Conservation Strategy
for the Phase I Chokecherry and Sierra Madre Wind Energy Project

Dear Mr. Riley:

After more than five years of consulting and working with the U.S. Fish and Wildlife Service (USFWS), Power Company of Wyoming LLC (PCW) is pleased to submit the enclosed Phase I Bird and Bat Conservation Strategy (Phase I BBCS) for Phase I of the Chokecherry and Sierra Madre Wind Energy Project. Our Phase I BBCS is in addition to the separate Phase I Eagle Conservation Plan that PCW formally filed with the USFWS on June 15, 2015, in support of PCW's applications for a programmatic eagle take permit and a standard eagle take permit.

PCW's Phase I BBCS covers migratory birds managed under the Migratory Bird Treaty Act and bats managed by the state as non-game mammal species. The document outlines the comprehensive scientific data that was gathered and used to inform PCW's project design, and how the design, coupled with extensive conservation and mitigation measures, ensures that Phase I avoids and minimizes potential impacts to migratory birds and bats to the extent practicable.

The strategy also was developed in accordance with the USFWS's 2012 Wind Energy Guidelines, with the Wyoming Game and Fish Commission's 2010 Wildlife Protection Recommendations for Wind Energy Development in Wyoming, and with the requirements of the Bureau of Land Management's 2012 Record of Decision for the CCSM Project.

Once again, PCW has aimed to set the standard for developing renewable resources in an environmentally responsible manner via robust data collection, planning and conservation commitments. We appreciate receiving USFWS's extensive guidance throughout this process.

Sincerely,

Garry L. Miller
Vice President, Land and Environmental Affairs

Encl. as referenced

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Phase I Bird and Bat Conservation Strategy

Chokecherry and Sierra Madre Wind Energy Project

August 2015

Power Company of Wyoming LLC

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ACRONYMS AND ABBREVIATIONS

ACM	applicant-committed measure
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
BPP	Bat Protection Plan
CCSM Project	Chokecherry and Sierra Madre Wind Energy Project
C.F.R.	Code of Federal Regulations
CUP	Conditional Use Permit
EA	Environmental Assessment
ECP	Eagle Conservation Plan
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ETP	Eagle Take Permit
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
GPS	global positioning system
HSR	horizontal scanning radar
ISC	Industrial Siting Council
IM	Instruction Memorandum
MBTA	Migratory Bird Treaty Act

MCP	minimum convex polygon
MW	megawatt
NEPA	National Environmental Policy Act
NREL	National Renewable Energy Laboratory
NTP	notice to proceed
PCW	Power Company of Wyoming LLC
Phase I ECP	Phase I Eagle Conservation Plan
POD	plan of development
Ranch	The Overland Trail Ranch
RFO	Rawlins Field Office
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RSZ	rotor swept zone
SGCN	Species of Greatest Conservation Need
SWAP	State Wildlife Action Plan
TOTCO	The Overland Trail Cattle Company LLC
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USFWS Region 6	U.S. Fish and Wildlife Service Mountain-Prairie Region Office, Lakewood, Colorado
USFWS Region 6 Outline	U.S. Fish and Wildlife Service Region 6 Outline for a Bird and Bat Conservation Strategy: Wind Energy Projects
USFWS Wind Energy Guidelines	U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines
VSR	vertical scanning radar

WDA	wind development area
WGFC	Wyoming Game and Fish Commission
WGFC Wind Energy Recommendations	Wyoming Game and Fish Commission Wildlife Protection Recommendations for Wind Energy Development in Wyoming
WGFD	Wyoming Game and Fish Department
WHMA	wildlife habitat management area

1.0 Introduction and Purpose

This Bird and Bat Conservation Strategy (BBCS) applies to Phase I of Power Company of Wyoming LLC's (PCW) Chokecherry and Sierra Madre Wind Energy Project (CCSM Project). Phase I of the CCSM Project (Phase I) is located in the western portions of two Wind Development Areas referred to as "Chokecherry" and "Sierra Madre." *See Figure 1.1*. Phase I will consist of 500 wind turbines generating approximately 1,500 megawatts (MW) of renewable energy.

PCW has developed this BBCS for Phase I of the CCSM Project to avoid and minimize impacts to migratory birds and bats in accordance with USFWS Wind Energy Guidelines, WGFC Wind Energy Recommendations, and BLM requirements:

- The U.S. Fish and Wildlife Service (USFWS) issued Land-Based Wind Energy Guidelines (USFWS Wind Energy Guidelines) in March 2012. They recommend that wind energy projects use an iterative tiered approach to characterize migratory bird and bat use of the project area and to evaluate the potential risks of the project to migratory bird and bat species. This information can then be used when making decisions regarding siting, construction, and operation to avoid and minimize impacts to migratory birds and bats. *See Section 2.4. See USFWS 2012a.*
- The Wyoming Game and Fish Commission (WGFC) issued Wildlife Protection Recommendations for Wind Energy Development in Wyoming (WGFC Wind Energy Recommendations). They suggest early and ongoing coordination with the Wyoming Game and Fish Department (WGFD) to develop appropriate site-specific monitoring and best management practices to avoid potential conflicts with wildlife, including migratory birds and bats. *See Section 2.5. See WGFC 2010.*
- The Bureau of Land Management (BLM) in its Record of Decision (ROD) for the CCSM Project requires PCW to develop an Avian Protection Plan (APP) and Bat Protection Plan (BPP) for Phase I of the CCSM Project prior to the BLM's issuance of a right-of way (ROW) grant or notice to proceed (NTP).[1] *See Section 1.3.2.*

PCW has worked with USFWS personnel from the Mountain-Prairie Region Office, Lakewood, Colorado (USFWS Region 6), and the Wyoming Ecological Services Office, Cheyenne, Wyoming, since 2010 regarding the potential for the CCSM Project to affect migratory birds and bats. USFWS, as documented in its April 2011 letter to BLM regarding the CCSM Project, determined that "developing an APP is an appropriate option to avoid and minimize the potential take of eagles (based on BLM's IM 2010-156) and migratory birds and bats…" provided that PCW incorporate appropriate conservation measures into

[1] The terms Avian Protection Plan (APP), Bat Protection Plan (BPP), and Avian and Bat Protection Plan are used in the BLM ROD and BLM IM-2010-156. *See BLM 2010; BLM 2012a.* USFWS, however, in its Wind Energy Guidelines and other related documents has indicated it prefers the term Bird and Bat Conservation Strategy (BBCS) in the context of wind energy facilities.

the CCSM Project. *See Appendix A.* PCW has prepared this Phase I BBCS, as well as its Phase I Eagle Conservation Plan (Phase I ECP), in compliance with USFWS's determination.[1] *See PCW 2015a.*

PCW has worked cooperatively with WGFD since 2009 to avoid and minimize impacts to wildlife, including migratory birds and bats. As recommended by the WGFC Wind Energy Recommendations, PCW has incorporated site-specific best management practices into Phase I of the CCSM Project. PCW has also entered into a Landowner Agreement with The Overland Trail Cattle Company LLC (TOTCO) that sets forth management goals and actions to implement the WGFD recommendations. WGFD reviewed and approved the Landowner Agreement, acknowledging that the Landowner Agreement satisfies the applicable requirements of the WGFC Wind Energy Recommendations. This BBCS further describes PCW's commitments for Phase I and addresses the WGFC monitoring and best management practice recommendations specific to migratory birds and bats.

PCW has worked in close coordination with BLM, WGFD and USFWS using the extensive CCSM Project and Phase I data to avoid and minimize impacts to migratory birds and bats. This Phase I BBCS documents PCW's: (a) extensive site characterization efforts; (b) scientifically rigorous field studies to document the presence or absence of migratory birds and bats and their habitat; and (c) the comprehensive best management practices and conservation measures that have been and will be implemented to avoid and minimize potential adverse impacts to migratory birds and bats. As documented in this Phase I BBCS, development of Phase I is appropriate and is consistent with the USFWS Wind Energy Guidelines, the WGFC Wind Energy Recommendations, and the requirements of BLM's ROD.

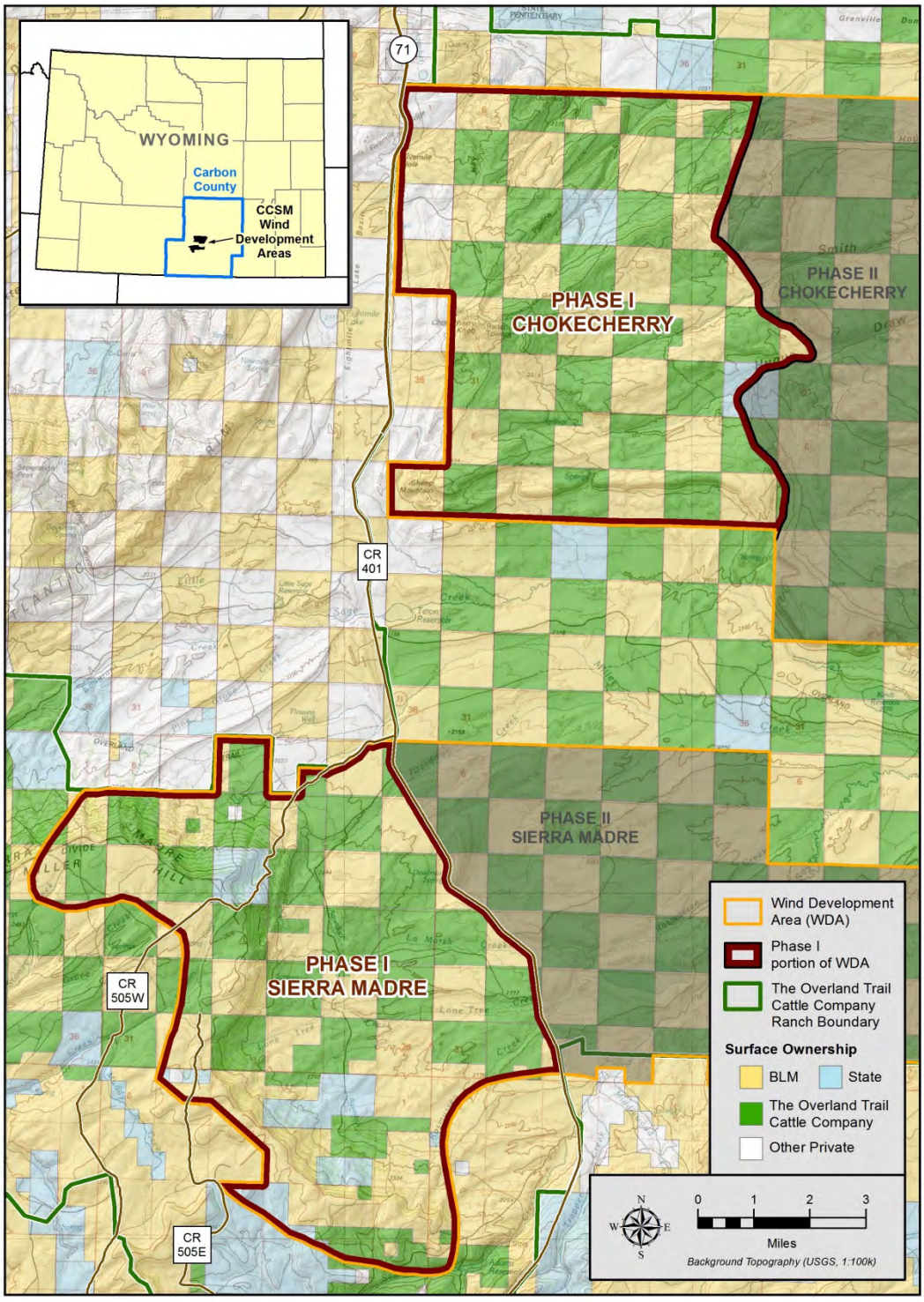


Figure 1.1. Phase I of the Chokecherry and Sierra Madre Wind Energy Project.

1.1 Purpose of the Phase I Bird and Bat Conservation Strategy

This Phase I BBCS documents PCW's strategies and commitments to avoid and minimize impacts to migratory birds and bats during construction, operation, maintenance, and decommissioning of Phase I of the CCSM Project. This Phase I BBCS also details PCW's identification of potential risks to migratory birds and bats and its reduction of those risks through implementation of avoidance and minimization measures, best management practices, and conservation measures. In addition, this Phase I BBCS describes the alternate sites, configurations, construction methods, and operational practices evaluated by PCW during the project design and avoidance and minimization process.

PCW prepared this Phase I BBCS in accordance with the USFWS Wind Energy Guidelines, WGFC Wind Energy Recommendations, USFWS Region 6 *Outline for a Bird and Bat Conservation Strategy: Wind Energy Projects* (USFWS Region 6 Outline), and the requirements included in BLM's ROD. Consistent with these guidelines and recommendations, PCW initiated discussions with USFWS and WGFD regarding potential impacts to migratory bird and bat species early in the development of the CCSM Project and maintained communication with USFWS, WGFD, BLM, and other stakeholders throughout the development process. As a result, PCW substantially redesigned the CCSM Project, removing wind turbines from hundreds of acres of the original proposed site and relocating, removing, and agreeing to curtail certain wind turbines within the areas of the site that remain slated for wind development. Collectively, the measures identified in this Phase I BBCS will avoid and minimize risks to migratory bird and bat species to the extent practicable. *See Chapter 4.0*.

1.2 Scope of the Phase I Bird and Bat Conservation Strategy

This Phase I BBCS addresses migratory birds managed under the Migratory Bird Treaty Act (MBTA) and bats managed as non-game mammal species by WGFD. However, this Phase I BBCS does not apply to greater sage-grouse (*Centrocercus urophasianus*) or bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively). Detailed information on PCW's commitments to avoid, minimize, and mitigate impacts to bald and golden eagles under the provisions of the Bald and Golden Eagle Protection Act (BGEPA) is included in the Phase I Eagle Conservation Plan (ECP) submitted to USFWS on June 15, 2015. *See PCW 2015a.* Information specific to PCW's commitments to avoid, minimize, and mitigate impacts to greater sage-grouse is included in the CCSM Project ROD and PCW's Sage-grouse Conservation Plan. *See BLM 2012b, App. B at App. N.*

In addition, this Phase I BBCS does not apply to any species listed under the Endangered Species Act (ESA). BLM determined that federally threatened or endangered migratory bird or bat species are unlikely to occur on the CCSM Project Site, including Phase I. *See BLM 2012b at pp.3.15-1:3.15-4.* However, if a threatened or endangered migratory bird or bat species is identified in Phase I, PCW will implement the applicable provisions of the ESA in addition to the measures included in this Phase I BBCS.

USFWS maintains a list of all species protected by the MBTA. *See 50 C.F.R. § 10.13*. This list includes over 1,000 species of migratory birds, including raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. The MBTA does not protect introduced species such as the house (English) sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), rock dove (pigeon) (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), and non-migratory upland game birds (Greater sage-grouse, dusky grouse [*Dendragapus obscurus*], etc.). USFWS also maintains a list of introduced species not protected by the MBTA. *See 70 Fed. Reg. 12,710 (2005)*.

PCW has identified 117 species of migratory birds within the CCSM Project Site, including Phase I. *See Appendix B.* Of these, 22 species are identified as USFWS Birds of Conservation Concern, BLM Sensitive Species, or WGFD Species of Greatest Conservation Need (SGCN). *See Table 1.1*. In addition, this Phase I BBCS addresses the multiple bat species that have been observed, acoustically detected, or documented in the vicinity of the CCSM Project. *See Orabona et al. 2012; BLM 2012b.* Table 1.2 lists the bat species that may be present on the CCSM Project Site, including Phase I.

Table 1.1. Phase I Special Status Migratory Bird Species.

Species Group	Common Name	Scientific Name	Conservation Status
Passerines	Brewer's Sparrow	*Spizella breweri*	USFWS-CC, BLM-S, WGFD-SGCN
	Lark Bunting	*Calamospiza melanocorys*	WGFD-SGCN
	Loggerhead Shrike	*Lanius ludovicianus*	USFWS-CC, BLM-S
	Sagebrush Sparrow	*Artemisiospiza nevadensis*	USFWS-CC, BLM-S, WGFD-SGCN
	Sage Thrasher	*Oreoscoptes montanus*	USFWS-CC, BLM-S, WGFD-SGCN
Raptors	Burrowing Owl	*Athene cunicularia*	USFWS-CC, BLM-S, WGFD-SGCN
	Ferruginous Hawk	*Buteo regalis*	USFWS-CC, BLM-S, WGFD-SGCN
	Merlin	*Falco columbarius*	WGFD-SGCN
	Northern Goshawk	*Accipiter gentilis*	BLM-S, WGFD-SGCN
	Peregrine Falcon	*Falco peregrinus*	USFWS-CC, BLM-S, WGFD-SGCN
	Prairie Falcon	*Falco mexicanus*	USFWS-CC
	Swainson's Hawk	*Buteo swainsoni*	USFWS-CC, WGFD-SGCN
Waterbirds/ Waterfowl	Black-crowned Night-heron	*Nycticorax nycticorax*	WGFD-SGCN
	Canvasback	*Aythya valisineria*	WGFD-SGCN
	Clark's Grebe	*Aechmophorus clarkii*	WGFD-SGCN
	Lesser Scaup	*Aythya affinis*	WGFD-SGCN
	Long-billed Curlew	*Numenius americanus*	USFWS-CC, BLM-S, WGFD-SGCN
	Mountain Plover	*Charadrius montanus*	USFWS-CC, BLM-S, WGFD-SGCN
	Northern Pintail	*Anas acuta*	WGFD-SGCN
	Redhead	*Aythya americana*	WGFD-SGCN
	Sandhill Crane	*Grus canadensis*	WGFD-SGCN
	White-faced Ibis	*Plegadis chihi*	BLM-S, WGFD-SGCN

Notes:
USFWS-CC = USFWS Birds of Conservation Concern
BLM-S = BLM Rawlins Field Office Sensitive Species
WGFD-SGCN = WGFD SGCN listed species

Table 1.2. Phase I Bat Species.

Common Name	Scientific Name	Conservation Status
California Myotis	*Myotis californicus*	---
Fringed Myotis	*Myotis thysanodes*	BLM-S, WGFD-SGCN
Little Brown Myotis	*Myotis lucifugus*	WGFD-SGCN
Long-eared Myotis	*Myotis evotis*	BLM-S, WGFD-SGCN
Long-legged Myotis	*Myotis volans*	WGFD-SGCN
Western Small-footed Myotis	*Myotis ciliolabrum*	WGFD-SGCN
Yuma Myotis	*Myotis yumanensis*	---
Big Brown Bat	*Eptesicus fuscus*	WGFD-SGCN
Eastern Red Bat	*Lasiurus borealis*	WGFD-SGCN
Hoary Bat	*Lasiurus cinereus*	---
Pallid Bat	*Antrozous pallidus*	WGFD-SGCN
Silver-haired Bat	*Lasionycteris noctivagans*	---
Townsend's Big-eared Bat	*Corynorhinus townsendii*	BLM-S, WGFD-SGCN

Notes:
USFWS-CC = USFWS Birds of Conservation Concern
BLM-S = BLM Rawlins Field Office Sensitive Species
WGFD-SGCN = WGFD SGCN listed species

1.3 Relationship with Other Documents and Processes

PCW's commitments set out in this Phase I BBCS, in combination with the various applicant-committed conservation measures and conservation plans included within the Phase I site-specific plans of development (site-specific PODs), along with the requirements outlined in BLM's ROD, promote the conservation of migratory birds and bats as well as many other wildlife and fish species within or near Phase I. *See PCW 2015b; BLM 2012a; BLM 2012b.* The following sections describe the other documents and permitting processes that relate to this Phase I BBCS.

1.3.1 CCSM Project Background [2]

This BBCS is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate BBCS; however, this section describes the CCSM Project as a whole to provide context for the discussion that follows on permitting.

The CCSM Project is located in Carbon County, Wyoming, south of the City of Rawlins and Town of Sinclair. The project is sited on the Overland Trail Ranch (Ranch), which is owned and operated by PCW's affiliate TOTCO. The Ranch is a 320,000-acre agricultural operation, consisting primarily of cattle ranching and hay production. The Ranch is located in "checkerboard" country, in which land section ownership alternates between private land, mostly owned by TOTCO, and federal land managed by BLM along with a small portion of Wyoming State Land Board and WGFD-managed land. This pattern of land ownership dates back to the land grants made to the railroad under the Union Pacific Railway Act of 1862. The Ranch has some of the nation's best onshore wind energy resources, Class 6 and 7, with annual average winds above 8.8 meters per second (20 miles per hour) as mapped by AWS Truepower for the U.S. Department of Energy's National Renewable Energy Laboratory (NREL).

The CCSM Project will consist of 1,000 wind turbines capable of generating up to 3,000 MW of clean, renewable wind energy. Phase I includes 500 wind turbines and associated infrastructure including the Road Rock Quarry, West Sinclair Rail Facility and Phase I Haul Road and Facilities. The CCSM Project is partially located on federal land administered by BLM's Rawlins Field Office. This federal nexus triggered environmental reviews under the National Environmental Policy Act (NEPA). BLM prepared a Final Environmental Impact Statement (FEIS) and issued a ROD on the CCSM Project. BLM is also preparing two Environmental Assessments (EA) for Phase I. The EA for the Phase I Infrastructure Components is complete; on December 23, 2014, BLM issued a Decision Record approving the Phase I Infrastructure Components. *See BLM 2014a; BLM 2014b.* The EA for the remainder of Phase I, the Phase I Wind Turbine Development, is currently underway, and a Decision Record is anticipated in the fall of 2015. BLM's process to comply with NEPA and the status of its environmental review of the CCSM Project are described in more detail below.

[2] A more detailed description of the CCSM Project is included in chapter 3.0; however, some background is necessary to provide context for the discussion of the related documents and permitting processes.

1.3.2 Federal Environmental Review

BLM's Compliance with NEPA

Development of the CCSM Project began in November 2006 when applications for two right-of-way (ROW) grants for wind energy site testing and monitoring (Type-II Wind Energy Project Area Grants) were filed with BLM. The applications covered two areas of the Ranch, identified as Chokecherry and Sierra Madre. BLM granted the Chokecherry Wind Energy Project Area Grant on June 11, 2007, and the Sierra Madre Wind Energy Project Area Grant on June 15, 2007. By the end of June 2007, the first two meteorological towers were collecting data from the Chokecherry Project Area. Since the Type-II Wind Energy Project Area Grants were issued, PCW has erected over 30 meteorological towers, some located on private land and some located on federal land, collecting wind speed and weather data from diverse areas within Chokecherry and Sierra Madre. PCW has an easement from TOTCO for wind development on the privately owned sections, but a ROW grant for development of a wind energy project (Type-III Wind Energy Development Grant) from BLM is needed in order to use the adjoining federal land for the CCSM Project. Therefore, in January 2008, PCW submitted an application and plan of development (POD) for a Type-III Wind Energy Development Grant to BLM, which would authorize PCW to construct, operate, maintain and decommission the CCSM Project on BLM-administered land. Subsequently, BLM, in compliance with NEPA and in coordination with other state and local governmental agencies, commenced the preparation of an Environmental Impact Statement (EIS), the most comprehensive form of environmental analysis.

BLM's Environmental Impact Statement

BLM published a Notice of Intent to prepare an EIS and conducted public scoping in August 2008. *See 73 Fed. Reg. 43,469 (July 25, 2008).* The agency action evaluated in the BLM's EIS was "to decide whether the area identified in PCW's proposal would be acceptable for development of a wind farm and identify the appropriate development strategy." *See BLM 2012b at p. ES-1.* On July 22, 2011, BLM segregated approximately 107,175 acres of federal land within the proposed project area and released the Draft EIS for public comment. On July 3, 2012, BLM published the Notice of Availability for the FEIS on the CCSM Project and the segregation of an additional 2,560 acres of federal land in the Federal Register. The BLM FEIS summarized the components of the CCSM Project as follows:

- A 2,000- to 3,000-megawatt (MW) wind farm consisting of approximately 1,000 wind turbine generators (WTGs) with a nameplate capacity ranging from 1.5- to 3-MW;
- Development of step-up transformers, underground and overhead electric collection and communication lines, electric substations, rail distribution facility (RDF), operation and maintenance facilities, and laydown areas;
- Haul road and transmission connection between the two sites;
- Construct new roads and upgrade existing roads; and
- Power from the wind farms would be transmitted via overhead electric transmission lines that would connect to a new substation.

See BLM 2012b at p. ES-1. In addition, PCW applied to BLM for a new road to allow PCW to reopen an on-site quarry that will supply aggregate for CCSM Project roads.

BLM prepared a project-wide EIS based on a conceptual POD prepared by PCW. *See BLM 2012b, App. B.* BLM used the conceptual wind turbine and facility sites and conceptual construction schedule in preparing its overall impacts analysis which assumed the "greatest potential for [surface] disturbance" so that impacts identified at the time of micrositing the various project components would most likely not exceed those impacts described in the FEIS. *See BLM 2012a at p. 3-1.* The BLM FEIS recognizes that because BLM's estimates of project-wide impacts are based on conceptual siting and analysis of "the largest possible area of [surface] disturbance," additional NEPA analysis may be necessary for site-specific PODs to examine any impacts that may exceed those analyzed in the project-wide level FEIS. *See BLM 2012b, App. B at pp. 1& 2.* It therefore provides for further NEPA analysis of site-specific PODs to be tiered to the BLM FEIS. *See BLM 2012b, App. B at p. 1.*

The potential impacts to migratory birds and bats at the CCSM Project were analyzed in the BLM FEIS. The BLM FEIS identifies the potential impacts including direct impacts consisting of fatalities and loss of habitat, as well as indirect impacts associated with habitat loss, modification, and displacement. *See BLM 2012b at pp.4.14-15 & 4.14-18.* BLM recognizes that "[t]he magnitude of these impacts depends upon the number of wind turbines and other infrastructure constructed for each alternative and the amount of direct and indirect habitat lost due to construction and operation of the project." *See BLM 2012b at p. 4.14-18.*

The BLM FEIS evaluates the impacts of granting the requested ROWs based on available data as of June 2012, for a 1,000 wind turbine, 3,000 MW project without the benefit of the avoidance, minimization, and conservation measures included in this Phase I BBCS. Without these measures in place, BLM recognizes that significant impacts to certain migratory bird and bat species may occur. *See BLM 2012b at p. 4.14-26 & 4.14-51.* The BLM FEIS requires development of an APP and BPP to avoid and minimize impacts to migratory birds and bats. Further, the BLM FEIS states that "Any project constraints and mitigation measures identified through the development of the [BBCS] will be approved prior to issuance of any Notice to Proceed for the project and, in turn, associated stipulations would be incorporated into the ROW grants."[3] *See BLM 2012b at p. 4.14-16 & 4.14-22.*

BLM's Record of Decision

On October 9, 2012, the U.S. Secretary of the Interior Ken Salazar signed the ROD approving wind energy development in the Chokecherry and Sierra Madre Wind Development Areas. In the ROD BLM determined that portions of the areas for which PCW seeks ROWs "are suitable for wind energy development and associated facilities . . . as described under the Preferred Alternative in the CCSM project Final EIS." *See BLM 2012a at p. ES-1.* BLM's Selected Alternative provides for "development of a

[3] The procedure for issuing ROW grants and NTP was detailed further in the Decision Record for EA1. *See "BLM's Supplemental Tiered NEPA Analysis."*

2,000- to 3,000- megawatt (MW) project consisting of up to 1,000 wind turbines and ancillary facilities in the two sites, the 109,086-acre Chokecherry site and 110,161-acre Sierra Madre site, and off-site access on 460 acres." *See BLM 2012a at p. ES-1.* The Sierra Madre Wind Development Area consists of two distinct areas located both east and west of Highway 71 - with the majority of the wind development acreage located west of Highway 71. *See BLM 2012a at Figure 3-1.* The portion of Sierra Madre located west of Highway 71 is referred to as Miller Hill, and the portion of Sierra Madre located east of Highway 71 is referred to as Sage Creek Basin. *See BLM 2012a, App. B at pp. 4-25 & 4-26. See Figure 4-10.* The Chokecherry Wind Development Area is located east of Highway 71, and is divided into Western and Eastern Chokecherry based on topography. *See BLM 2012a, App. B at p. 4-26, Figure 4-10.*

The BLM FEIS and ROD outline a detailed procedure under which PCW will submit site-specific PODs to BLM for subsequent NEPA analysis tiered "to the analysis and site-specific terms and conditions described in the ROD associated with the project-wide EIS." *See BLM 2012a at p. C-1.* The BLM ROD provides that "BLM will closely evaluate the site-specific [PODs] to determine whether the impacts exceed the [surface] disturbance estimates from the conceptual layouts that served as the basis for determining significance of impacts in the project-wide level EIS." *See BLM 2012a at p. 3-1.* The BLM ROD therefore provides that future site-specific development plans "will be screened against the analysis conducted in this EIS, and then the appropriate level of subsequent, tiered NEPA analysis will be conducted prior to BLM issuing a decision on ROW applications." *See BLM 2012a at p.3-3; BLM 2012a, App. C.* Thus, the ROD anticipated additional environmental review would be conducted by BLM.

The BLM ROD also recognizes that USFWS has jurisdiction with respect to migratory birds; therefore, the BLM ROD requires action by USFWS before BLM will issue a NTP for construction of the CCSM Project. *See BLM 2012a at pp. 3-1 & 3-4.* As explained in the BLM ROD, PCW is to provide an APP (now Eagle Conservation Plan [ECP] and BBCS) that incorporate "additional data collection activities, avoidance and minimization measures, offsite mitigation strategies that could be implemented, and monitoring to determine effectiveness of mitigation measures." *See BLM 2012a at p. 1-2.* The ROD indicates that once PCW develops an ECP and BBCS, BLM will incorporate the measures "into subsequent NEPA analyses and ROW grants." *See BLM 2012a at pp. ES-2 & 1-2.*

In sum, the BLM FEIS and ROD contemplated that "conceptual" construction plans would be refined and become "final" plans or site-specific PODs that would be evaluated as part of BLM's tiered NEPA process for the CCSM Project. The ROD also requires action by USFWS with respect to PCW's ECP and BBCS. The process set out in the ROD identifies that PCW should work with USFWS in submitting refined wind turbine layouts in the applicable site-specific PODs that implement further avoidance and minimization measures. The ROD further provides that "BLM will not issue ROW grants to PCW [ ] until USFWS issues letters of concurrence for the [BBCS] and ECPs." *See BLM 2012a at p. 3-1.*

BLM's Supplemental Tiered NEPA Analysis

PCW's 2012 POD provided that its approach to construction of the CCSM Project would be finalized and detailed in the site-specific PODs submitted to BLM. *See BLM 2012a, App. B at p. 4-1.* PCW's POD also recognized that the "[p]roject design will continue to be updated and refined to utilize the best data and information available." *See BLM 2012a, App. B at p. 4-1.*

PCW submitted four site-specific PODs covering Phase I to BLM for review. In accordance with the ROD, BLM is preparing two EAs evaluating PCW's Phase I site-specific PODs. These EAs are tiered to the BLM FEIS. EA1 is complete and addresses PCW's site-specific PODs for: (1) Phase I Haul Road and Facilities; (2) West Sinclair Rail Facility; and (3) Road Rock Quarry. A Decision Record for EA1 was issued on December 23, 2014. *See BLM 2014a.* EA2 addresses PCW's site-specific POD for the Phase I Wind Turbine Development, including 500 wind turbines and approximately 1,500 MW. EA2 is currently being developed by BLM with a Decision Record anticipated in fall of 2015. USFWS and WGFD are acting as cooperating agencies on both of the EAs being prepared by BLM.

BLM held four public scoping meetings in September and December 2013 to provide the public with opportunities to provide input on each EA. BLM made a draft of EA1 available to the public for review and comment on August 11, 2014, including a draft Decision Record finding that "no new or significant impacts were identified beyond those already disclosed in the EIS." BLM issued the final Decision Record for EA1 on December 23, 2014, approving the Phase I Infrastructure Components. *See BLM 2014a.* The Decision Record clarifies BLM's intent regarding the ROD's requirements for coordination with USFWS and issuance of Notices to Proceed for the CCSM Project. According to the Decision Record, "[t]he Notice to Proceed (NTP) for individual [site-specific PODs] would be issued as permitting requirements are completed." *See BLM 2014a.* Specific to this Phase I BBCS, the Decision Record states that, "[t]he USFWS concurrence is dependent on PCW submitting a complete application for an eagle take permit, including an ECP and [BBCS] that has all the USFWS required components and is adequate for review of the application." *See BLM 2014a at p. 4.* According to the Decision Record, "[t]urbine construction will not be allowed before USFWS makes its decision regarding an [eagle take permit]." *See BLM 2014a at p. 4.*

USFWS Compliance with NEPA

PCW has submitted applications to USFWS for BGEPA non-purposeful take permits covering activities at Phase I of the CCSM Project. On June 15, 2015, PCW filed its application for a 30-year programmatic take permit for Phase I of the CCSM Project, as well as a standard take permit for potential disturbance take that may occur during construction of Phase I. PCW's applications for eagle take permits (ETPs) incorporate its detailed ECP for Phase I. The Phase I ECP documents PCW's: (a) identification of important eagle use areas; (b) comprehensive actions it has already taken and those it has committed to implement in the future to avoid and minimize adverse effects to eagles, including its commitment to compensatory mitigation; and (c) procedures it will employ to monitor for impacts to eagles during construction and operation of Phase I. Based on its commitments in the Phase I ECP, PCW believes Phase I meets the standards in 50 C.F.R. §22.26 for issuance of ETPs for incidental take.

USFWS's consideration of PCW's applications for ETPs is a discretionary federal action that is subject to NEPA. USFWS has determined that preparation of an EIS is appropriate to comply with NEPA. PCW notified USFWS of its intent to pursue ETPs for the CCSM Project in 2012. USFWS began preparation of its EIS on December 4, 2013, with the publication of a Notice of Intent in the Federal Register. *See 78 Fed. Reg. 72,926 (December 4, 2013).* As set forth in the Notice of Intent, USFWS's purpose and need is to respond to PCW's applications and consider whether or not to issue ETPs to PCW. In responding to PCW's applications for ETPs, USFWS must ensure compliance with BGEPA and its regulations as well as USFWS's goal to maintain stable or increasing breeding populations of bald and golden eagles. While the purpose and need for USFWS's EIS is to respond to PCW's applications for ETPs, the USFWS EIS will also consider the measures included in this Phase I BBCS.

USFWS is preparing its EIS to analyze the potential impacts to eagles and to evaluate potential issuance of ETPs for Phase I in parallel with BLM's preparation of the Phase I EAs. USFWS held public scoping meetings for its EIS in Rawlins and Saratoga, Wyoming, on December 16 and 17, 2013, respectively. The USFWS EIS will analyze the measures described in PCW's Phase I ECP and this Phase I BBCS as well as consider and incorporate where appropriate other relevant information sources, including BLM's NEPA documentation and PCW's site-specific PODs. USFWS is a cooperating agency on the two EAs being prepared by BLM. *See "BLM's Supplemental Tiered NEPA Analysis."*

Section 7 Consultation

The ESA directs all federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the Act. Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species. Under section 7, federal agencies must consult with USFWS when any action the agency carries out, funds, or authorizes (such as through a permit) *may affect* a listed endangered or threatened species or designated critical habitat.

For the CCSM Project, BLM formally consulted with USFWS resulting in the issuance of a Biological Opinion (BO). *See BLM 2012a, App. F.* All reasonable and prudent measures and terms and conditions for threatened and endangered species listed in the BO will be included by BLM as requirements of any ROW grants BLM issues for the CCSM Project. *See BLM 2012a at p. 4-2; 50 C.F.R. § 402.* In addition, the BO incorporates PCW's applicant-committed measures (ACMs) from the BLM FEIS and ROD; therefore, the ACMs are mandatory requirements of the BO. *See BLM 2012a at p. 4-2.* However, implementation of the conservation measures for proposed and candidate species identified in the BO to reduce potential adverse impacts are discretionary, unless already included in PCW's ACMs. *See BLM 2012a at p. 4-2.*

The migratory birds and bats that are the subject of this Phase I BBCS are not threatened or endangered species and are therefore not protected under the ESA and are not included in the section 7 consultation process. However, when considering PCW's applications for ETPs, USFWS may conduct "intra-Service consultation" regarding threatened and endangered species, as well as proposed species, and candidate species such as the greater sage-grouse, which USFWS found warranted but precluded from listing under the ESA. *See 75 Fed. Reg. 13,909 (March 23, 2010).* If necessary, this process would be completed in conjunction with USFWS's NEPA process. *See "USFWS Compliance with NEPA."*

1.3.3 State and County Permitting

In addition to complying with the requirements of BLM and USFWS, the CCSM Project is subject to state and county permitting. PCW has already obtained the principal state and county permits for the CCSM Project. The fact these permits have been issued will not negatively impact the ability of USFWS and BLM to require future modifications to the CCSM Project based on additional environmental analysis, or to enforce such modifications. Although the state and county permitting processes each have their own requirements, they complement and further the goals of BLM and USFWS to avoid, minimize and mitigate the environmental impacts of the CCSM Project. Moreover, they both require that PCW comply with all applicable federal and state laws, regulations, and standards, as well as any requirements of the federal permitting processes.

Wyoming State Permitting Process

Pursuant to Wyo. Stat. Ann. §35-12-101 *et seq.*, PCW is required to have a permit from the Wyoming Industrial Siting Council (ISC) to construct and operate the CCSM Project. On May 12, 2014, PCW filed its permit application with the Department of Environmental Quality, Industrial Siting Division. On July 18, 2014, the Division determined that PCW's application was complete pursuant to Wyo. Stat. Ann. § 35-12-109. The ISC held a two-day administrative hearing beginning on August 5, 2014, in Saratoga, Wyoming. At the end of the hearing, the ISC deliberated in public and unanimously voted to grant PCW a permit for the CCSM Project. The permit issued by ISC on September 12, 2014 requires PCW to comply with all applicable federal permits. Moreover, should BLM or USFWS require modifications to the CCSM Project, enforcement mechanisms are two-fold: (1) if PCW does not make the required modifications, BLM will not issue the ROW grants and the NTPs; and (2) PCW would be in violation of its Wyoming state permit for not meeting the applicable federal permit requirements.

Carbon County Permitting Process

PCW has obtained a Conditional Use Permit (CUP) for the CCSM Project from the Carbon County Board of Commissioners. On September 17, 2012, a public meeting of the Carbon County Planning and Zoning Commission was held, pursuant to section 5.11 of the Carbon County Zoning Resolution of 2003, as amended, in order to provide the opportunity for public comment on PCW's application for a CUP. After considering the Staff Recommendation from the Office of Planning and Development and both written and verbal public comments, the Planning and Zoning Commission voted to recommend approval of the CUP with conditions.

On October 2, 2012, the Carbon County Board of Commissioners (pursuant to section 5.11 of the Carbon County Zoning Regulations of 2003, as amended, and W.S. §18-5-501 *et seq.*) held a public meeting and convened a public hearing for purposes of allowing members of the public to comment on the CCSM Project. Following the hearing and the entry of specific findings into the record, the Board voted unanimously to approve PCW's application for a CUP.

On October 18, 2012, at a regularly scheduled meeting, the Board presented, read and adopted the Opinion of Board of County Commissioners Carbon County, Wyoming Regarding the Decision to Approve the CUP – Commercial Wind Energy Facility (C.U.W. Case File #2012-01) Rendered on October 2, 2012, (the Opinion). The Opinion reflects that the Board made specific and detailed findings of fact that: (1) according to the Carbon County Planning and Zoning Commission, the CCSM Project will comply with standards required by W.S. §18-5-504 and with all applicable zoning and county land use regulations; (2) the application for the CCSM Project meets all standards and requirements of W.S. §18-5-501 *et seq.* and all applicable zoning and county land use regulations; and (3) the CCSM Project is in general conformance with the Carbon County Comprehensive Land Use Plan, as amended, and otherwise promotes the health, safety and general welfare of the residents of Carbon County.

The CUP contains the following conditions of approval:

- Nothing in this permit's conditions is intended to preempt other applicable State and Federal laws or regulations. All WECS[4] Project facilities shall be constructed to meet and be maintained in compliance with all Federal, State, and County requirements, including all Wyoming Industrial Siting Council requirements.

- This Permit is subject to final approval and issuance of a permit by the Industrial Siting Council and a ROW grant by the Bureau of Land Management. The Applicant(s) shall submit a copy of all subsequent Federal and State approvals, including all required studies, reports and certifications prior to the issuance of any building permits.

These permit conditions ensure that any requirements imposed by BLM or USFWS subsequent to Carbon County's issuance of the CUP will be enforced. On July 15, 2014, the Carbon County Board of County Commissioners approved a one-year extension of the Conditional Use Permit's requirement to commence construction within two years of the original date of issuance. On July 2, 2015, PCW applied to the Carbon County Board of County Commissioners for an additional two-year extension of the Conditional Use Permit's requirement to commence construction within two years of the original date of issuance. If approved, the extension would require commencement of construction by October 2, 2017.

[4] WECS means Wind Energy Conversion System. See Carbon County §5.11 Wind Energy Overlay-District Regulations, Approved April 5, 2011 at 5.11(c)(1).

1.4 PCW's Objectives and Environmental Commitment

PCW is a limited liability company organized in Delaware and authorized to do business in Wyoming. The company is indirectly wholly-owned by The Anschutz Corporation (Anschutz), an energy and natural resource company based in Denver, Colorado. Anschutz is a diversified company with worldwide investments in energy exploration, ranching and agriculture, lodging, transportation, telecommunications, and entertainment including music, sports and film production. PCW was formed to develop the CCSM Project.

1.4.1 Objectives

PCW's objectives for the CCSM Project are detailed in its POD submitted to BLM in conjunction with BLM's preparation of the FEIS and are also detailed in BLM's ROD. *See BLM 2012a at §3.6.2.* Generally, PCW's objectives for the CCSM Project are to help satisfy the projected future market for power from renewable energy sources by extracting the maximum potential wind energy from the site and developing a 3,000 MW wind energy project consisting of up to 1,000 wind turbines. As reflected in the ROD, "[t]hrough a confidential economic analysis reviewed by the National Renewable Energy laboratory, the applicant has determined that a project size of up to 1,000 wind turbines for the Application Area would provide the greatest return on investment using the highest capacity wind turbines commercially available at the time of development." *See BLM 2012a.* Originally, PCW determined that the Application Area could host up to 2,387 wind turbines. However, 397 wind turbines were removed from greater sage-grouse cores areas designated in Wyoming Executive Order 2011-5, Attachment A, Sage-Grouse Core Breeding Areas Version 3 (Core Areas), 52 wind turbines were removed from below-acceptable wind resource areas, and spacing between wind turbines was increased to avoid significant wake losses further decreasing the potential project size. *See BLM 2012a.* The resulting CCSM Project size of 1,000 wind turbines was considered in the economic analysis reviewed by NREL.

PCW's objectives for Phase I are tied closely to PCW's objectives for the CCSM Project as a whole. As described in the site-specific POD for the Phase I Wind Turbine Development, PCW has determined that developing the CCSM Project in two phases of 500 wind turbines (1,500 MW) each will achieve its purpose and need for the CCSM Project. *See PCW 2015b.* This overall size and phased approach is supported by the current market for renewable energy in the Desert Southwest and independent studies by both the NREL and the Western Electricity Coordinating Council (WECC). *See PCW 2015b.* PCW's objectives for Phase I are detailed in its site-specific POD for the Phase I Wind Turbine Development. However, generally, PCW's objectives for Phase I are to permit and build an economically viable project and to extract the maximum potential wind energy from the site by developing the first phase of the CCSM Project consisting of 500 wind turbines with an installed capacity of 1,500 MW.

1.4.2 Environmental Commitment

PCW's approach to development of the CCSM Project is novel because during the process, PCW maintained the flexibility that allowed it to significantly redesign the project from what was originally proposed. PCW has adjusted wind turbine layouts multiple times when finalizing the site-specific POD for the Phase I Wind Turbine Development as more information became available regarding the applicable environmental and site constraints and wildlife considerations. Through iterative application of the tiers identified in the USFWS Wind Energy Guidelines, PCW has substantially revised the CCSM Project from the original Wind Energy Application Area and its original Proposed Action to address potential environmental risks to species of concern, including migratory birds and bats. *See Section 5.1.*

Further, PCW is in the unique position of being able to partner with an affiliate to use the approximately 320,000-acre Ranch for the development of the CCSM Project. Since the 1990s, PCW affiliate TOTCO has owned and operated one of the largest cattle ranching operations in the West. TOTCO has been a part of the Carbon County community and a steward of the land and wildlife resources on the Ranch for over 15 years. PCW has a wind easement, access easement, transmission easement and other non-exclusive rights with respect to TOTCO's privately-owned land on the Ranch. The CCSM Project will result in long-term surface disturbance of less than 2,000 acres of the 320,000-acre Ranch, and ranching operations will continue without material change during construction and operation of the project.

In sum, PCW has demonstrated its commitment to building and operating the CCSM Project in an environmentally responsible manner. Responsible development includes taking measures, such as those documented in this Phase I BBCS to avoid, minimize, and mitigate the CCSM Project's impact to wildlife populations, including migratory birds and bats, within the CCSM Project Site. The evolution of the CCSM Project illustrates: (1) PCW's attention to the early determination of potential environmental risks at the landscape scale; (2) PCW's adjustment of the CCSM Project siting and design based on species of concern and their habitat; (3) PCW's evaluation of potential environmental risks on the adjusted CCSM Project Site based on site-specific data; and (4) PCW's adjustment/limitation of the areas of potential wind turbine development on the CCSM Project Site to avoid, minimize, and mitigate the impacts to migratory birds, bats, and non-avian species.

2.0 Regulatory Framework

There is a comprehensive and complex existing legal framework designed to protect migratory birds and bats. This framework includes statutes in the United States Code (U.S.C.), federal regulations, state statutes, state regulations, the USFWS Wind Energy Guidelines, the WGFD State Wildlife Action Plan (SWAP), and the WGFC Wind Energy Recommendations. Brief summaries of the major components of this legal framework are set out below. While not all of the legal authorities summarized in this section apply to this Phase I BBCS, which is limited in scope to migratory birds and bats, they are included to provide context.

2.1 Migratory Bird Treaty Act[5]

The Migratory Bird Treaty Act (MBTA) is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It has been described as a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. Under the statute, actions resulting in a "taking" or possession (permanent or temporary) of a protected species, in the absence of an USFWS permit or regulatory authorization, are a violation of the MBTA.

The MBTA provides, "[u]nless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill . . . possess, offer for sale, sell . . . purchase . . . ship, export, import . . . transport or cause to be transported . . . any migratory bird, any part, nest, or eggs of any such bird . . . . [The MBTA] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." *See 16 U.S.C. § 703.* The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." *See 50 C.F.R. § 10.12.*

The MBTA provides criminal penalties for persons who commit any of the acts prohibited by the statute in section 703 on any of the species protected by the statute. *See 16 U.S.C. § 707.*

USFWS maintains a list of all species protected by the MBTA at 50 C.F.R. § 10.13. This list includes over 1,000 species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. The MBTA does not protect introduced species such as the house (English) sparrow, European starling, rock dove (pigeon), Eurasian collared-dove, and non-migratory upland game birds. USFWS maintains a list of introduced species not protected by the Act. *See 70 Fed. Reg. 12,710 (2005)*.

[5]Drawn from USFWS 2012a at p. 2.

2.2 Bald and Golden Eagle Protection Act[6]

This Phase I BBCS addresses migratory birds and bats other than bald and golden eagles. PCW has developed an ECP for Phase I and has applied for eagle take permits as described in section 1.3.2. Therefore, a brief summary of the Bald and Golden Eagle Protection Act (BGEPA) is provided for reference. Detailed information on the regulatory framework surrounding bald and golden eagles and PCW's commitments to avoid and minimize impacts to bald and golden eagles is included in the Phase I ECP. *See PCW 2015a.*

Under the authority of BGEPA, 16 U.S.C. §§ 668–668d, bald eagles and golden eagles are afforded additional legal protection. BGEPA prohibits the "take, sale, purchase, barter, offer of sale, purchase, or barter, transport, export or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof." *See 16 U.S.C. § 668.* BGEPA also defines take to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," and includes criminal and civil penalties for violating the statute. *See 16 U.S.C. § 668.* USFWS has further defined the term "disturb" as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. *See 50 C.F.R. § 22.3*. BGEPA authorizes USFWS to permit the take of eagles for certain purposes and under certain circumstances, including scientific or exhibition purposes, religious purposes of Indian tribes, and the protection of wildlife, agricultural, or other interests, so long as that take is compatible with the preservation of eagles. *See generally, 16 U.S.C. § 668(a).*

2.3 Endangered Species Act[7]

This BBCS addresses migratory birds and bats within Phase I of the CCSM Project. No migratory birds or bats that are listed, proposed, or candidate endangered and threatened species occur within Phase I of the CCSM Project. Nevertheless, while the provisions of the Endangered Species Act (ESA) do not apply to the species addressed in this Phase I BBCS, a summary of the ESA is provided for reference.

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. USFWS administers the ESA for terrestrial and freshwater organisms. Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened. The ESA directs USFWS to identify and protect endangered and threatened species and their critical habitat, and to provide a means to conserve their ecosystems.

6Drawn from USFWS 2012a at pp. 2 & 3.
7Drawn from USFWS 2013a at p. 2 and USFWS 2013c.

Section 7 of the ESA requires federal agencies to use their legal authorities to promote the conservation purposes of the ESA and to consult with USFWS, as appropriate, to ensure that effects of actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species. During consultation the "action" agency receives a "biological opinion" or concurrence letter addressing the proposed action. BLM consulted with USFWS under section 7 of the ESA for the CCSM Project. The biological opinion for the CCSM Project is included in BLM's ROD. *See BLM 2012a at App. F.* As noted in section 1.3.2, "[t]he USFWS concurrence [for Phase I] is dependent on PCW submitting a complete application for an eagle take permit, including an ECP and [BBCS] that has all the USFWS required components and is adequate for review of the application." *See BLM 2014a at p. 4.*

Section 9 of the ESA prohibits take of federally-listed species. Take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." *See 16 U.S.C. §1532.* The term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." *See 50 C.F.R. §17.3.* The ESA imposes civil and criminal penalties for violations of the statute or its regulations.

2.4 U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines[8]

USFWS's main approach to reducing impacts to migratory birds and bats from wind energy facilities is the use of the voluntary Wind Energy Guidelines. *See USFWS 2012a*. The Wind Energy Guidelines were developed by USFWS working with the Department of the Interior Wind Turbine Guidelines Advisory Committee, a federal advisory committee consisting of representatives of the wind energy industry, conservation groups, state wildlife agencies, and USFWS. They replace interim voluntary guidance published by USFWS in 2003.

The final voluntary USFWS Wind Energy Guidelines provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development. They also promote effective communication among wind energy developers and federal, state, and local conservation agencies and tribes. When used in concert with appropriate regulatory tools, the USFWS Wind Energy Guidelines form the best practical approach for conserving species of concern. The USFWS Wind Energy Guidelines discuss various risks to "species of concern" from wind energy projects, including collisions with wind turbines and associated infrastructure; loss and degradation of habitat from wind turbines and infrastructure; fragmentation of large habitat blocks into smaller segments that may not support sensitive species; displacement and behavioral changes; and indirect effects such as increased predator populations or introduction of invasive plants. *See USFWS 2012a at p. 7.* The USFWS Wind Energy Guidelines assist developers in identifying species of concern that may potentially be affected by their proposed project, including migratory birds; bats; bald and golden eagles and other

[8]Drawn from USFWS2012a at vi and vii.

birds of prey; prairie grouse and sage-grouse; and listed, proposed, or candidate endangered and threatened species. *See USFWS 2012a at p. 7.*

The USFWS Wind Energy Guidelines use a "tiered approach" for assessing potential adverse effects to species of concern and their habitats. The tiered approach is an iterative decision-making process for collecting information in increasing detail; quantifying the possible risks of proposed wind energy projects to species of concern and their habitats; and evaluating those risks to make siting, construction, and operation decisions. During pre-construction tiers (Tiers 1, 2, and 3), developers work to identify, avoid and minimize risks to species of concern. During post-construction tiers (Tiers 4 and 5), developers assess whether actions taken in earlier tiers to avoid and minimize impacts are successfully achieving the goals and, when necessary, take additional steps to compensate for impacts. Subsequent tiers refine and build upon issues raised and efforts undertaken in previous tiers. Each tier offers a set of questions to help developers evaluate the potential risk associated with developing a project at the given location.

The tiered approach provides the opportunity for evaluation and decision-making at each stage, enabling a developer to abandon or proceed with project development, or to collect additional information if required. This approach does not require that every tier, or every element within each tier, be implemented for every project. Instead, the tiered approach allows efficient use of developer and agency resources with increasing levels of effort. The USFWS Wind Energy Guidelines also provide Best Management Practices (BMPs) for site development, construction, retrofitting, repowering, and decommissioning.

The USFWS Wind Energy Guidelines include a Communications Protocol that provides guidance to both developers and USFWS personnel regarding appropriate communication and documentation. Adherence to the USFWS Wind Energy Guidelines is voluntary and does not relieve any individual, company, or agency of the responsibility to comply with laws and regulations. However, USFWS recommends that a BBCS be prepared in accordance with the USFWS Wind Energy Guidelines. USFWS has informed PCW that this Phase I BBCS should be prepared for Phase I in accordance with its Wind Energy Guidelines and that both the Phase I BBCS and Phase I ECP should be stand-alone documents. *Region 6, USFWS, personal communication, 2013*.

2.5 Wyoming Game and Fish Department State Wildlife Action Plan[9]

State Wildlife Action Plans (SWAPs) are comprehensive wildlife conservation strategies to maintain the health and diversity of wildlife within a state, including species with low and declining populations. *See WGFD 2010 at p. I-1-1.* They contain broad-based strategies to meet this goal, including conservation strategies aimed at preventing the need for listing additional species under the ESA. Special emphasis is given in the Wyoming SWAP to addressing wildlife species that have historically received less conservation attention, including those that are not hunted or fished. *See WGFD 2010 at p. I-2-1.*

[9] Drawn from WGFD 2010.

According to the Wyoming SWAP, conserving Wyoming's wildlife species is heavily dependent upon the future quantity and quality of available habitat, both terrestrial and aquatic. *See WGFD 2010 at p. I-2-2.* In turn, the amount and condition of available wildlife habitat is influenced by the success in developing strategies to address the issues which are having the greatest impact on wildlife and habitat resources. Accordingly, to develop conservation strategies, the Wyoming SWAP identifies: (1) the five leading conservation challenges in the state; (2) the terrestrial habitats and aquatic basins within the state; and (3) the wildlife species of greatest conservation need. The Wyoming SWAP then recommends appropriate conservation actions and strategies for these habitats and species.

The Wyoming SWAP addresses many of the migratory bird and bat species that are the subject of this Phase I BBCS. Further, the Wyoming SWAP specifically designates energy development, including wind energy, as one of five leading wildlife conservation challenges in Wyoming. *See WGFD 2010 at p. II-i-1.* To proactively address the wildlife conservation challenges identified in the Wyoming SWAP while balancing the interest in and opportunity to develop Wyoming's wind energy, the WGFC developed recommendations for wind energy development that incorporate many of the conservation actions included in the 2010 SWAP. *See "Wyoming Game and Fish Commission Wildlife Protection Recommendations for Wind Energy Development in Wyoming."*

2.6 Wyoming Game and Fish Commission Wildlife Protection Recommendations for Wind Energy Development in Wyoming

The WGFC serves as the policy-making board of the WGFD and through the WGFD, the WGFC provides a system of control, propagation, management, protection, and regulation for all wildlife in Wyoming. *See W.S. § 23-1-301:303 & W.S. § 23-1-401.* The WGFC Wind Energy Recommendations are "the result of a decision by the WGFC to address the need to protect wildlife resources while wind energy is developed in the state." *See WGFC 2010 at p. i.* The recommendations are a proactive step toward balancing Wyoming's desire to develop its wind energy resources "while affording adequate protection of the state's wildlife resources from activities associated with development of a wind industry." *See WGFC 2010 at p. i.*

The WGFC Wind Energy Recommendations provide recommendations for: (1) collecting baseline data prior to wind turbine siting to avoid potential conflicts with wildlife; (2) construction and operation monitoring; and (3) mitigating impacts to affected wildlife. *See WGFC 2010 at p.ii.* The WGFC Wind Energy Recommendations recognize that not all of the recommendations in the document are applicable to all wind energy projects and states that the recommendations are intended to be applied based on site-specific project characteristics. Therefore, the WGFC Wind Energy Recommendations advise early consultation with WGFD to determine applicability and develop site-specific recommendations. *See WGFC 2010 at p. 31.* As noted in the WGFC Wind Energy Recommendations, the recommendations contained in the document are voluntary and the role of WGFC and WGFD is consultative. *See WGFC 2010 at p. i.* This Phase I BBCS documents PCW's coordination with WGFD on the CCSM Project and its adoption of the applicable provisions of the WGFC Wind Energy Recommendations consistent with the site-specific characteristics of Phase I.

2.7 Avian Power Line Interaction Committee (APLIC) Guidance

The Avian Power Line Interaction Committee (APLIC) leads the electric utility industry in protecting avian resources while ensuring reliable electric energy delivery. Since its inception in 1989, APLIC has addressed a variety of avian interactions with electric facilities including electrocutions, collisions, nests, and avian impacts associated with construction activities. At present, APLIC membership includes over 50 electric utilities, the Edison Electric Institute, USFWS, National Rural Electric Cooperative Association, and Rural Utilities Service.

APLIC provides electric utilities, wildlife agencies, and other stakeholders with guidance for reducing bird electrocutions and collisions with electric power lines based on the most current information. APLIC has issued guidance designed to reduce operational and avian risks by identifying minimization methods for avian electrocutions and collisions, including its Suggested Practices for Avian Protection of Power Lines: State of the Art in 2006 (2006 Suggested Practices) and Mitigating Bird Collisions with Power Lines: The State of the Art in 2012 (Collision Manual). *See APLIC 2006; APLIC 2012.* In addition, APLIC released national APP Guidelines in conjunction with USFWS in 2005. *See APLIC 2005.* The measures outlined in the APP Guidelines, the 2006 Suggested Practices, and the Collision Manual are designed to avoid and minimize risk to migratory birds.

3.0 Project Description and Environmental Setting

This BBCS is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate BBCS; however, portions of this chapter describe the CCSM Project as a whole to provide context.

The CCSM Project, as described in this chapter, represents the culmination of more than eight years of data collection, planning, and design, considering the environmental analysis completed by BLM, and collaboration and communication with USFWS, various non-governmental organizations, and state and local agencies, such as WGFD.

3.1 Phase I Description

PCW is developing the CCSM Project in two phases. *See Figure 3.1.* When both Phase I and Phase II are complete, the CCSM Project will consist of 1,000 wind turbines capable of generating up to 3,000 MW of clean, renewable wind energy. Phase I consists of 500 wind turbines located in the western portions of two Wind Development Areas (WDAs) referred to as "Chokecherry" and "Sierra Madre" and associated infrastructure including the Road Rock Quarry, West Sinclair Rail Facility and Phase I Haul Road and Facilities. Phase I consists of 849 acres of long-term surface disturbance within the 74,066 acre Phase I Development Area. *See Section 3.2.* Phase II will include 500 wind turbines and associated infrastructure located in the eastern portions of the Chokecherry and Sierra Madre WDAs. The significance of the WDAs is that these are the only areas in which PCW will install wind turbines.

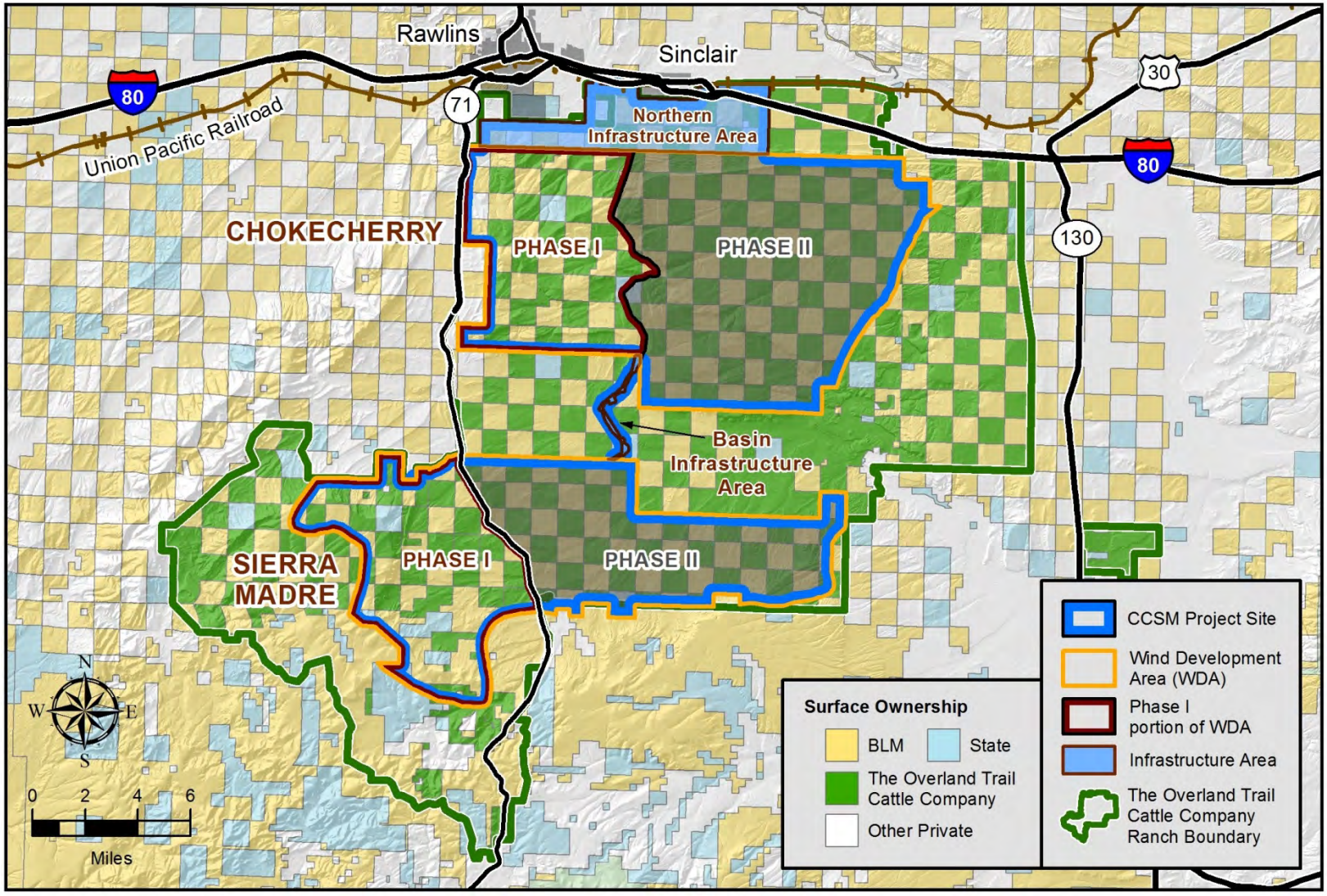


Figure 3.1. CCSM Project Overview.

As shown on Figure 3.2, Phase I within the Chokecherry WDA primarily includes the area west of the Haul Road. Within the Sierra Madre WDA, Phase I includes the area west of Highway 71/County Road 401. PCW submitted site-specific PODs to BLM for each component of Phase I. *See PCW 2014b; PCW 2014c; PCW 2014d; PCW 2015b*. As described in section 1.3.2, BLM issued its final Decision Record approving the Phase I Infrastructure Components (Phase I Haul Road and Facilities, West Sinclair Rail Facility, and Road Rock Quarry) on December 23, 2014, and is currently analyzing the Phase I Wind Turbine Development. The Phase I components included in each site-specific POD are summarized below and shown on Figure 3.2.

- **Phase I Haul Road and Facilities.** The Phase I Haul Road and Facilities include the Haul Road, certain arterial and facility access roads, water facilities, and laydown yards. *See PCW 2014c.* The Haul Road begins at the northern entrance to the CCSM Project where it connects to County Road [CR] 407. The Haul Road then travels west connecting to the West Sinclair Rail Facility and then south through the center of the Chokecherry WDA and finally through the Sierra Madre WDA.
- **West Sinclair Rail Facility (Rail Facility).** The West Sinclair Rail Facility consists of a rail connection to the Union Pacific Railroad main line between Rawlins and Sinclair and an associated laydown yard to receive, temporarily stage, and deliver components and construction-related materials. *See PCW 2014d.* The Rail Facility connects with the CCSM Project and is designed to minimize impacts on public roadways, provide more cost-effective transportation, and promote efficient project construction activities. The approximately 23 kilometers (14 miles) of track feature a wye, a lead track, a running track, a loop track, and several unloading areas. Vehicle access to the Rail Facility is from Interstate 80 (I-80), Exit 221 via the Haul Road.
- **Road Rock Quarry (Quarry).** Situated on private land within the CCSM Project Site at the location of an existing quarry approximately 3 kilometers (2 miles) south of Rawlins, the Road Rock Quarry will provide road construction material for the CCSM Project. *See PCW 2014b.* The Quarry will improve the efficiency of the CCSM Project by decreasing the number of train and truck trips from offsite quarries to the CCSM Project necessary for road base aggregate. The Quarry will be accessed via the Haul Road. Activities at the Quarry will involve surface rock mining and processing of sandstone and shale. The Quarry includes the excavation area, material processing area, materials storage piles, and the quarry access road (approximately 8 kilometers [5 miles] long).
- **Phase I Wind Turbine Development.** The Phase I Wind Turbine Development includes 500 wind turbines and associated elements for the CCSM Project such as roads, electrical lines, substations, operation and maintenance buildings, meteorological towers, utilities, and temporary construction features. *See PCW 2015b.* The Phase I Wind Turbine Development includes 202 wind turbines in the Chokecherry WDA and 298 wind turbines in the Sierra Madre WDA. The areas within the Phase I portions of the WDAs in which wind turbines will be constructed are referred to as Turbine Build Areas.

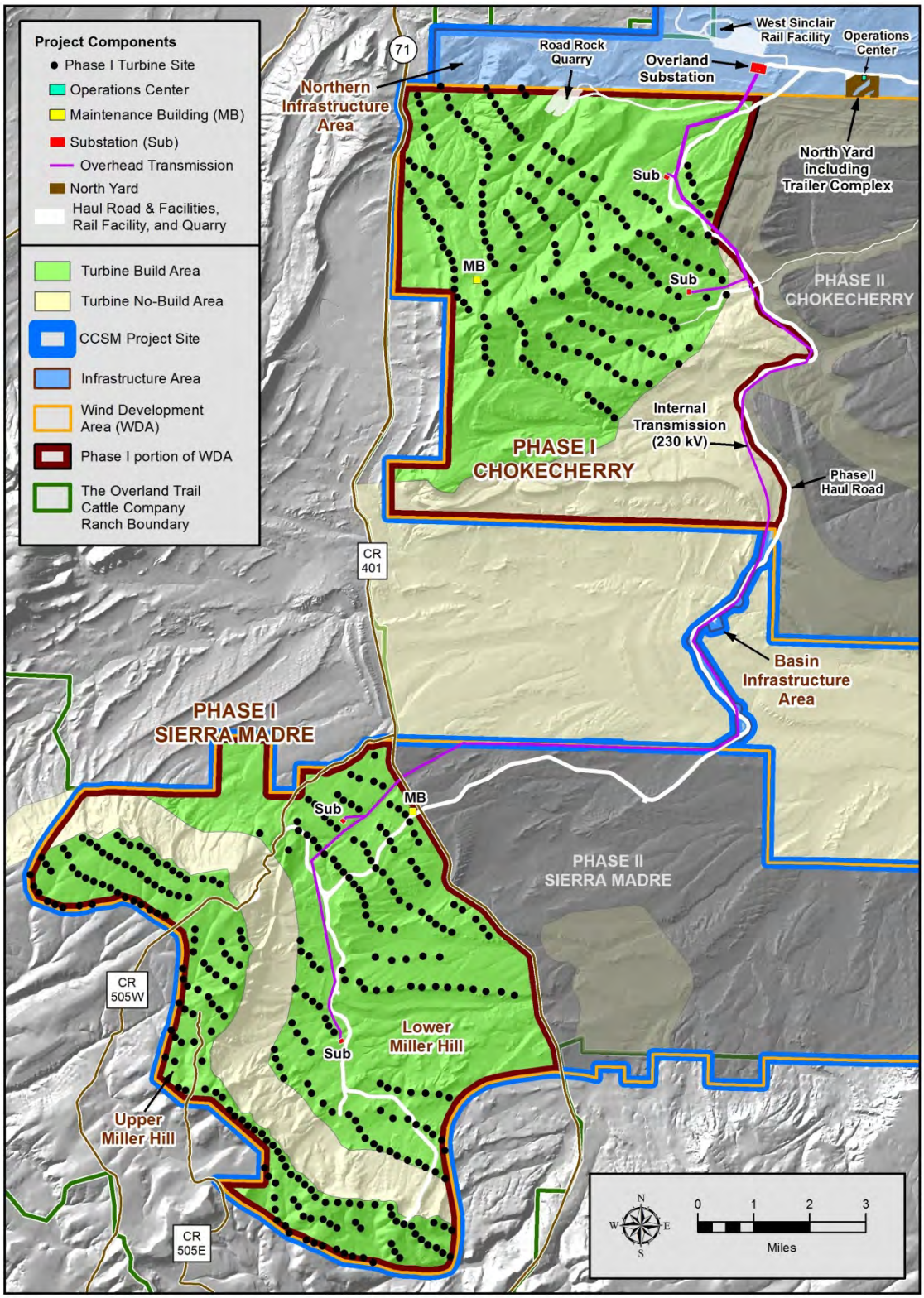


Figure 3.2. Phase I Layout.

3.1.1 Design

The Phase I Wind Turbine Development layout was developed in coordination with BLM, USFWS and WGFD using detailed site-specific information. The layout was designed to meet PCW's goals and objectives for the CCSM Project and Phase I while complying with BLM's ROD and guidance from USFWS and WGFD to avoid and minimize environmental impacts. The ROD considered and adopted numerous environmental constraints, applicant-committed measures, and mitigation measures to avoid or minimize environmental impacts. *See BLM 2012a at p. 3-13*. In addition, the USFWS Wind Energy Guidelines and the WGFC Wind Energy Recommendations recommend extensive measures including collecting site-specific survey data and the application of avoidance and minimization measures. *See USFWS 2012a; WGFC 2010.* In compliance with the ROD and the USFWS and WGFC guidance, PCW collected site-specific data and used a rigorous micrositing process to design the Phase I Wind Turbine Development.

As an initial matter, PCW's ability to site wind turbines was constrained to the WDAs as designated by BLM in the ROD. Within these designated WDAs, PCW used a four-step process to microsite the wind turbines for the Phase I Wind Turbine Development layout:

1. Gather technical data;
2. Complete field review;
3. Gather resource data; and
4. Incorporate agency input.

The Phase I wind turbine layout and infrastructure design went through numerous iterations. This process is described in more detail in chapter 4.0 of this Phase I BBCS. Figure 3.2 shows the Phase I wind turbine layout resulting from the design process, including PCW's consultation with USFWS and WGFD as described in this Phase I BBCS.

3.1.2 Wind Turbines

Wind turbines are designed according to industry standards to meet a range of wind and site conditions. For utility-scale wind turbines such as those required for the CCSM Project, vendors will review the Project's wind data and offer a model(s) that meets the requirements of the observed and predicted wind conditions. PCW is still evaluating wind turbine options for Phase I; however, all wind turbine models under consideration have the same general configuration, i.e. single-rotor, three-bladed upwind horizontal-axis design on a tubular tower. PCW will select wind turbine model(s) to maximize wind energy development potential while meeting the specifications identified as part of BLM's site-specific NEPA analyses and the specifications identified in this Phase I BBCS.

As analyzed in the BLM FEIS, all wind turbine models under consideration for the CCSM Project have a maximum tower height of 100 meters (328 feet) from ground level to the wind turbine hub and a maximum rotor diameter of 120 meters (394 feet). *See Figure 3.3 & Table 3.1.* While these dimensions represent the largest wind turbine dimensions under consideration, wind turbines that are presently being evaluated by PCW range in height from 80 meters (262 feet) to 85 meters (279 feet) with rotor diameters of 101 meters (331 feet) to 112 meters (367 feet). The area between the top of the rotor plane and the bottom of the rotor plane is referred to as the rotor swept zone (RSZ). Any wind turbine model selected by PCW will be painted the standard manufacturer color (approximately 5% grey) unless otherwise specified by BLM and approved by the Federal Aviation Administration (FAA).

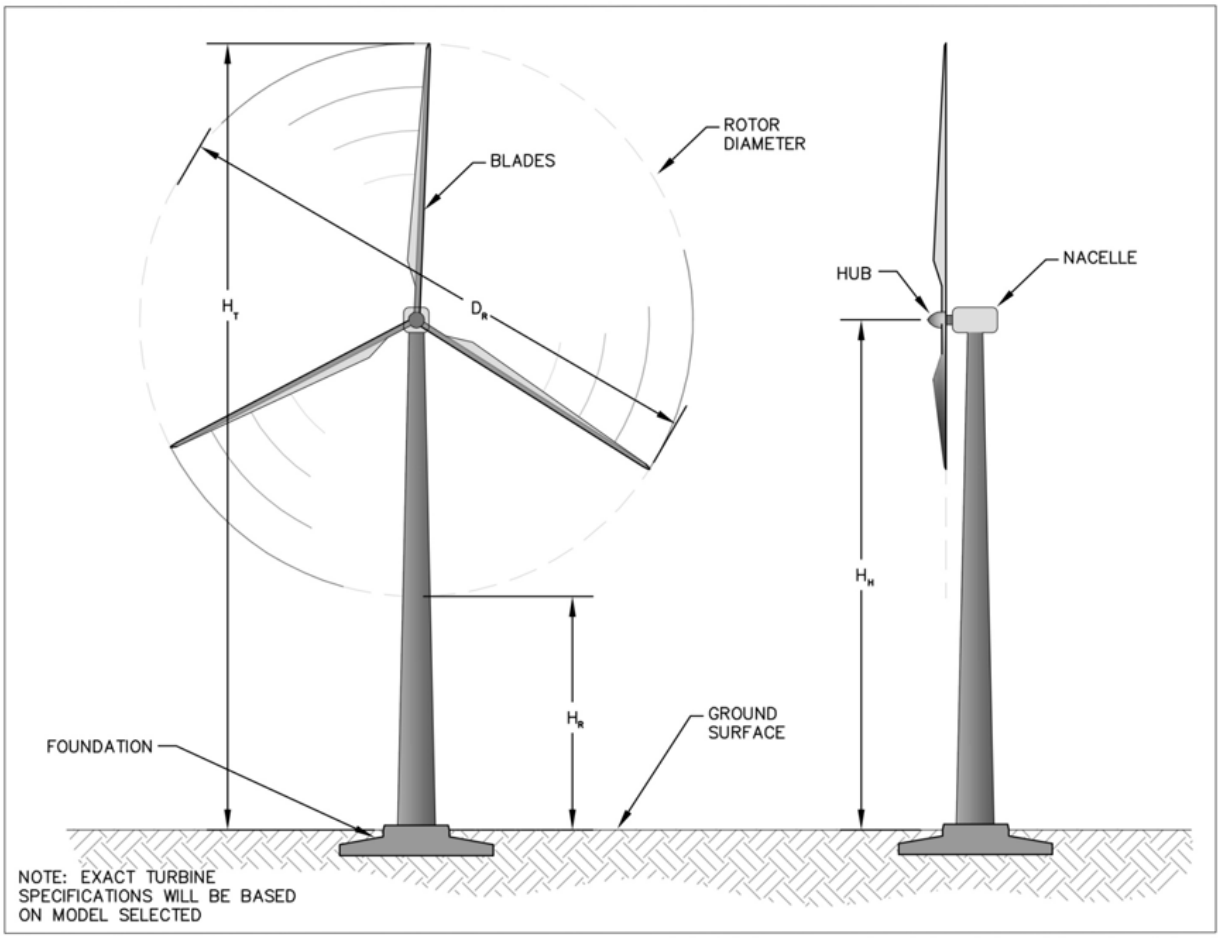


Figure 3.3. Wind Turbine Schematic.

Table 3.1. Phase I Wind Turbine Attributes.

Turbine Attribute	Expected Range
Rated Power	1.5 – 3.0 MW
Rotor Diameter (D_R)	253 – 394 ft. (77 – 120 m)
Tower Height (H_H)	256 – 328 ft. (78 – 100 m)
Top of Rotor Plane (H_T)	383 – 525 ft. (117 – 160 m)
Bottom of Rotor Plane (H_R)	130 – 197 ft. (40 –60 m)
Tower Type	Tubular Steel
Turbine Color	RAL 7035 (roughly 5% gray) or similar
Cut-In Wind Speed	7 – 9 mph (3 – 4 m/s)
Nominal Wind Speed	27 – 34 mph (12 – 15 m/s)
Cut-Out Wind Speed	48 – 56 mph (20 – 25 m/s)
Rotor Speed	4 – 20 RPM

3.1.3 Overhead Electrical System

The Phase I wind turbines are electrically connected via a 34.5kV electric collection system. The electric collection system transmits electricity from the individual wind turbines via overhead power lines to four collection substations. The Phase I 230 kV overhead transmission lines then connect to the collection substations and transfer the electrical generation from the collection substations to the interconnection substation where the electricity enters the regional electric grid. Detailed information on the Phase I electric collection and transmission system design is included in the Phase I Wind Turbine Development site-specific POD. *See PCW 2015b.*

The major equipment of the Phase I electric substations includes power transformers, aluminum and steel buswork and structures, circuit breakers and other protective devices, relaying and control instrumentation, area lighting, and a control house. The electric collection and transmission systems connect to the substations and wind turbines using a combination of underground cables and overhead lines. The design of the Phase I electric systems, including overhead electric line structure types and where underground and overhead lines are used, is based on the wind turbine and substation locations as well as a wide range of technical, environmental, and economic factors. Drawings of the Phase I overhead electric line structures and an example of a collection substation layout are included in Appendix C.

3.1.4 Surface Disturbance

Phase I surface disturbance includes initial surface disturbance, long-term surface disturbance, and activity areas. Initial surface disturbance is the total area that will be disturbed for construction of Phase I. Initial surface disturbance is inclusive of long-term surface disturbance, which consists of areas that will remain disturbed during operation of Phase I. Finally, activity areas are defined areas where activities may occur that do not require surface disturbance (would not be cleared or graded), e.g. locations for personnel to walk holding taglines that stabilize wind turbine component during lifts. Thick vegetation higher than one foot in activity areas may be trimmed to allow for safe vehicle access and minimize fire potential. Table 3.2 shows the estimated initial and long-term surface disturbance, as well as activity areas for Phase I by site-specific POD and cumulatively.

Table 3.2. Phase I Surface Disturbance and Activity Area Estimates.

Site-specific Plan of Development	Initial Surface Disturbance (acres)	Long-Term Surface Disturbance (acres)	Activity Area (acres)
Phase I Haul Road and Facilities	875	225	0
West Sinclair Rail Facility	370	121	0
Road Rock Quarry	184	18	0
Phase I Wind Turbine Development	3,035	485	440
Total Surface Disturbance	**4,464**	**849**	**N/A**

3.1.5 Schedule

Phase I construction is anticipated to begin in 2016 and be complete by 2020 as shown in Table 3.3. The Phase I schedule is designed to first open the site to road and rail access, then establish the on-site quarry, and finally proceed with wind turbine construction. In accordance with PCW's objective to develop the highest wind energy potential areas first, the Phase I portion of the Sierra Madre WDA will be constructed first followed by the Phase I portion of the Chokecherry WDA. PCW anticipates the installation of 229 wind turbines in 2019 and another 271 wind turbines in 2020. Following construction, Phase I has a proposed life of 30 years after which, subject to market conditions, it may be repowered as necessary to continue its operations.

Table 3.3. Phase I Construction Schedule.

Facility	2016	2017	2018	2019	2020[1]
Phase I Haul Road and Facilities					
Roads	Construct	Construct			
Laydown yards	Construct	Construct	Operate	Operate	Operate
Water facilities	Construct	Construct	Operate	Operate	Operate
West Sinclair Rail Facility					
Rail Facility		Construct	Construct	Operate	Operate
Access road	Construct				
Laydown yards		Construct	Construct	Operate	Operate
Road Rock Quarry					
Quarry	Construct	Mobilize & Operate	Operate	Operate	Operate
Access road	Construct				
Phase I Wind Turbine Development					
Roads			Construct	Construct	Construct
Wind turbine sites			Construct	Construct	Construct
Wind turbines				Construct/Operate[2]	Construct/Operate[2]
Substations and Transmission				Construct	Construct
Facilities		Construct	Construct	Construct	Construct

Notes:

1. Reclamation activities associated with Phase I construction will begin concurrent with construction in 2016 and may extend beyond 2020.
2. Wind turbines will be brought online as they are constructed. For purposes of this Phase I BBCS, commencement of commercial operation is considered to be the date that all 500 Phase I wind turbines are brought online and are available for dispatch. This is anticipated to occur at the end of the 2020 construction season.

3.2 Land Ownership

Phase I is located in Carbon County, Wyoming, within the bounds of the Ranch and the CCSM Project Site. The Ranch and CCSM Project Site boundaries are discussed below because they provide context for the environmental setting of Phase I and the conservation measures that will be discussed in subsequent chapters. As previously described, Phase I consists of 4,464 acres of initial surface disturbance, 849 acres of long-term surface disturbance, and 440 acres of activity areas over the approximately 74,066-acre Phase I Development Area. *See Sections 3.2.3 & 3.2.4.*

3.2.1 Overland Trail Ranch

Since the 1990s, PCW affiliate TOTCO has owned and operated the Ranch, one of the largest cattle ranching operations in the West. Located south of the City of Rawlins and Town of Sinclair in Carbon County, Wyoming, the Ranch encompasses approximately 320,000 acres or 500 square miles. *See Figure 3.1.* As described in chapter 1.0, the Ranch is located in Wyoming's "checkerboard" country. The checkerboard consists of alternating square miles of private land, largely owned by TOTCO, and federal land managed by BLM and leased to TOTCO for grazing, along with a small portion of Wyoming State Land Board and WGFD-managed land.

3.2.2 CCSM Project Site

The CCSM Project Site is located within the Ranch boundary but excludes the western most portions of the Ranch on top of Miller Hill and areas east of the North Platte River. *See Figure 3.1.* The CCSM Project Site expressly excludes any part of: (1) designated greater sage-grouse Core Areas identified by the State of Wyoming under the Governor's Executive Order 2011-5 (EO 2011-5 Version 3 map); and (2) the Red Rim-Grizzly Wildlife Habitat Management Area (WHMA) identified by BLM in the FEIS.

3.2.3 Phase I Development Area

The Phase I Development Area consists of the Phase I portions of the Chokecherry and Sierra Madre WDAs and two infrastructure areas, the Northern and Basin Infrastructure Areas. *See Figure 3.2.* The Phase I portion of each WDA is further divided into Turbine Build Areas and Turbine No-build Areas as designated in chapter 4.0 and shown in Figure 3.2. Table 3.4 shows the total acreage and land ownership within the Phase I Development Area.

Table 3.4. Phase I Development Area Land Ownership.

	Private Land (acres)	Federal Land (acres)	State Land (acres)	Total (acres)
Turbine Build Area	23,401	21,558	1,968	46,927
Turbine No-Build Area	6,665	7,020	1,475	15,160
Infrastructure Components	5,955	4,612	1,412	11,979
Phase I Development Area	**36,021**	**33,190**	**4,855**	**74,066**

3.2.4 Phase I

Phase I is defined as the initial surface disturbance, long-term surface disturbance and activity areas contained within the Phase I Development Area. *See Section 3.1.3.* Phase I surface disturbance and activity area estimates are shown in Table 3.2 and are further broken down by land ownership in Table 3.5.

Table 3.5. Phase I Land Ownership.

	Private Land (acres)	Federal Land (acres)	State Land (acres)	Total (acres)
Initial Surface Disturbance	1,568	1,346	121	**3,035**
Long-term Surface Disturbance	256	211	18	**485**
Activity Areas	264	153	23	**440**

3.3 Environmental Setting

The environmental setting of Phase I is described in the context of either the Ranch or the CCSM Project Site to provide perspective on the siting decisions and avoidance and minimization measures described in chapter 4.0. This section focuses on those elements of the environmental setting most relevant to migratory birds and bats. The environmental setting for other resources, such as air quality, soils, noxious and invasive weeds, range resources, cultural resources, paleontological resources, visual resources and socioeconomics for the CCSM Project are described in detail in BLM's FEIS and tiered EAs.

3.3.1 Land Use

Land use and land management affects migratory birds and bats. Current land use in Phase I and across the Ranch consists of agricultural operations, including cattle grazing and hay production. The Ranch includes the entire Pine Grove/Bolten grazing allotment as well as portions of 11 other grazing allotments. TOTCO manages the Ranch and each allotment to provide periodic growing season rest from grazing by decreasing stocking density and shortening the grazing period. *See BLM 2008a*. There are two areas of summer and winter range on the Ranch, and multiple potential grazing rotations across the Ranch. The grazing rotations allow rest for upland communities in spring and early summer, and late summer rest for riparian communities. Stocking rates and movement between various pastures within the allotments fluctuate yearly based on forage availability and resource conditions. According to BLM, since TOTCO has owned and operated the Ranch, the grazing management in the Bolten Ranch/Pine Grove allotment has been greatly improved; further, BLM has recognized that TOTCO's grazing management plan provides for a well-managed grazing program. *See BLM 2008a*.

In 2014, the BLM Rawlins Field Office once again recognized TOTCO for its environmental stewardship and range management initiatives across three of the BLM grazing allotments that TOTCO manages in Carbon County. Citing TOTCO's significant investments in range and water improvements on the Ranch, BLM found that all three allotments meet all six Rangeland Health Standards, including those that benefit wildlife such as migratory birds and bats. According to BLM, TOTCO's planned grazing rotations ensure all pastures receive growing season rest every other year, which has improved vegetation composition, condition and vigor while reducing bare ground. BLM cited improved grazing management as resulting in narrowed stream channels, increased woody plant composition and reduced sedimentation in streams. BLM also recognized TOTCO for its cooperative grazing management of the Grizzly allotment in conjunction with its three allotments, broadening benefits for wildlife habitat "on an even larger landscape level." *See BLM 2014c.*

3.3.2 Physiographic Setting

The Ranch, including the CCSM Project Site, is dominated by three topographic features, Chokecherry Plateau, Miller Hill, and Sage Creek Rim, separated by the Sage Creek Basin. As previously described, the CCSM Project Site is divided into two WDAs, Chokecherry to the north and Sierra Madre to the south. Each WDA is further divided into Phase I and Phase II. *See Figure 3.4.*

To the north, Chokecherry Plateau consists of ridges and rolling hills that generally slope northeasterly down toward the North Platte River. Approximately 40 kilometers (25 miles) of the North Platte River flow along the eastern edge of Chokecherry, with the vast majority occurring outside of the Chokecherry WDA. Most of the northern portion of Chokecherry is defined by a small, east/west ridge commonly known as a hogback, which is approximately 16 kilometers (10 miles) long, and the southern portion is defined by a cliff edge commonly referred to as the Bolten Rim, which is approximately 32 kilometers (20 miles) long. In addition, a prominent north/south ridge known as the Interior Chokecherry Rim bisects Chokecherry for approximately 19 kilometers (12 miles), and is cut by three ephemeral drainages, Smith Draw, Hugus Draw, and Iron Springs Draw. Phase I is located entirely west of the Interior Chokecherry Rim.

The southwestern portion of the Ranch is dominated by a steep-sloped mesa commonly known as Miller Hill. This predominant feature slopes gently toward the south and southwest, with relatively level terrain near the edge of the rim and becoming increasingly undulated towards the southwest. Phase I includes Upper Miller Hill and Lower Miller Hill within the Sierra Madre WDA. *See Figure 3.4.*

The southeastern portion of the Ranch includes Sage Creek Rim, which has similar characteristics to Miller Hill, although this feature is not as large or high. Development areas on the Sage Creek Rim are included in Phase II of the CCSM Project.

The area between the Chokecherry and Sierra Madre WDAs is a high desert basin transected by Sage Creek and several smaller ephemeral tributaries. The majority of this basin is outside the WDAs; however, the Haul Road and internal transmission lines included in Phase I will traverse the Sage Creek Basin and connect the WDAs. Larger waterbodies, which include the Teton, Kindt, Rasmussen, and Sage Creek Reservoirs, are interspersed throughout this arid landscape outside of Phase I.

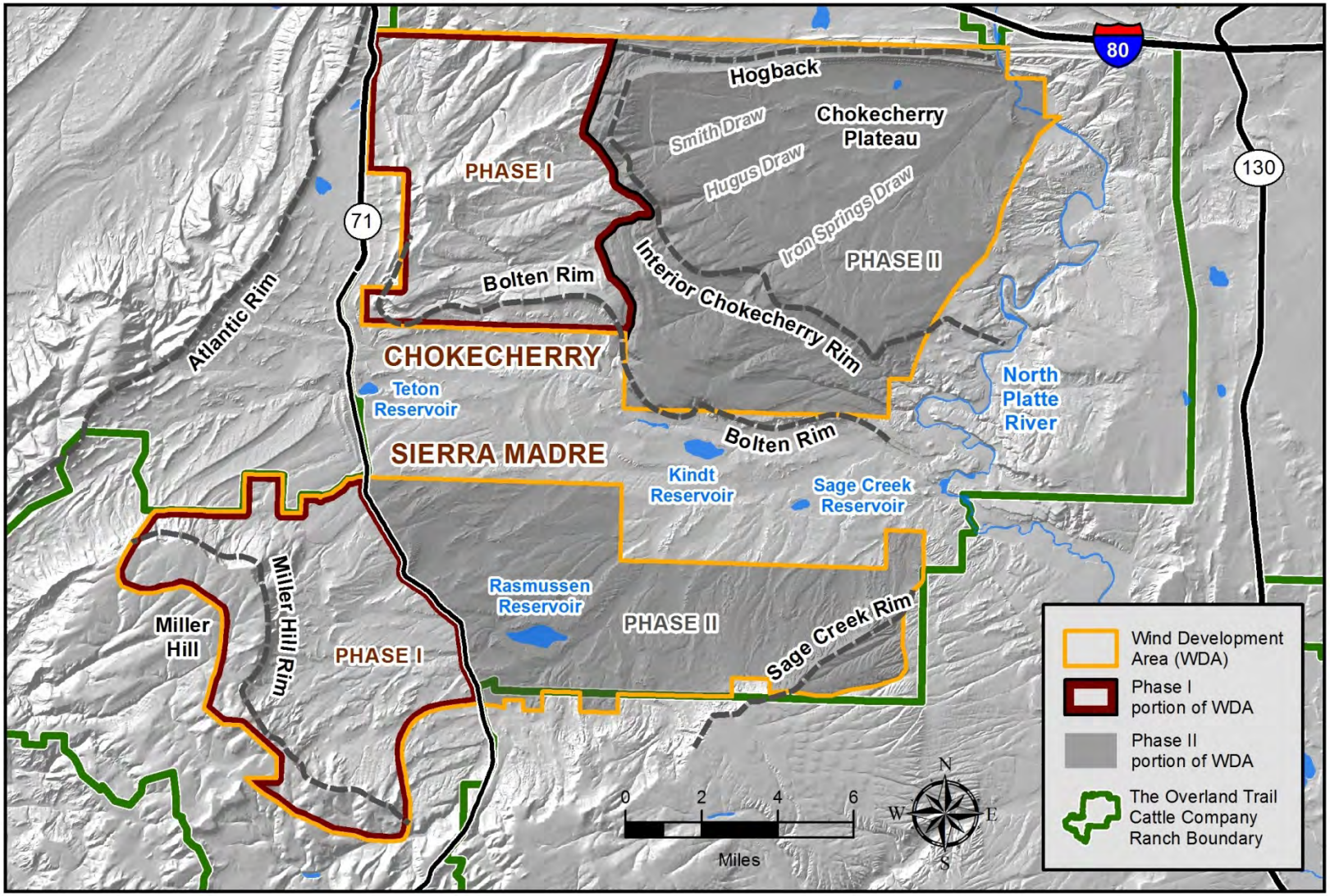


Figure 3.4. CCSM Project Physiographic Features.

3.3.3 Vegetation

Vegetation cover within the CCSM Project Site is typical of Wyoming Basin and Southern Rockies ecoregions, defined by rolling sagebrush steppe, salt-desert shrub basins, and foothill shrublands (Chapman *et al.* 2004). Rolling sagebrush steppe communities are dominated by various densities of Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) and mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) at higher elevations, with areas of silver sagebrush (*Artemisia cana*) in the lowlands and black sagebrush (*Artemisia nova*) and low sagebrush (*Artemisia arbuscula*) in exposed, rocky soils. *See Figure 3.5 & Figure 3.6.*

Sagebrush steppe communities are interspersed with bunchgrass/rhizomatous grass communities and allied shrubs, and generally have relatively low forb cover. Salt-desert shrub basins are characterized by sparse vegetation cover of cushion plant communities with dominant shrub cover of Gardner's saltbush (*Atriplex gardneri*), shadscale (*Atriplex confertifolia*), and black greasewood (*Sarcobatus vermiculatum*). Perennial streams throughout salt-desert shrub basins are typically surrounded by basin big sagebrush (*Artemisia tridentata ssp. tridentata*) and riparian communities dominated by willows (*Salix spp*.), sedges (*Carex spp.*), and rushes (*Juncus spp.*). Foothill shrubland communities are dominated by montane deciduous shrubland consisting of mountain big sagebrush, snowberry (*Symphoricarpos spp.*), serviceberry (*Amelanchier spp.*), and mountain mahogany (*Cercocarpus spp.*), surrounded by extended groves of quaking aspen (*Populus tremuloides*), low-growing common juniper (*Juniperus communis*), and patches of limber pine (*Pinus flexilis*).

Table 3.6 summarizes the vegetation community distribution within the Phase I surface disturbance and activity areas. Additional detail on vegetation communities within Phase I can be found in the site-specific PODs for Phase I of the CCSM Project. *See PCW 2014b; PCW 2014c; PCW 2014d; PCW 2015b*.

Table 3.6. Phase I Vegetation Communities.

Vegetation Community[1]	Total Acreage within Phase I Development Area	Initial Surface Disturbance (acres)	Long-term Surface Disturbance (acres)	Activity Areas (acres)
Agriculture/Pasture	408	18	4	11
Aspen-Mixed Conifer Woodland	2,564	19	3	2
Barren/Developed	1,052	211	55	7
Lowland Mesic Zone	1,413	42	6	4
Mixed Conifer Woodland	6	0	0	0
Montane Shrubland	2,593	45	5	9
Open Water	37	0	0	0
Sagebrush Steppe	36,888	2,355	403	255
Sagebrush Steppe - Dense	9,133	335	60	41
Salt-Desert Shrub	9,681	822	200	52
Sparsely Vegetated	2,653	114	30	11
Upland Grassland	7,638	503	83	48
Total	**74,066**	**4,464**	**849**	**440**

Notes:
1. As defined in the site-specific PODs for Phase I. *See PCW 2014b; PCW 2014c; PCW 2014d; PCW 2015b*.

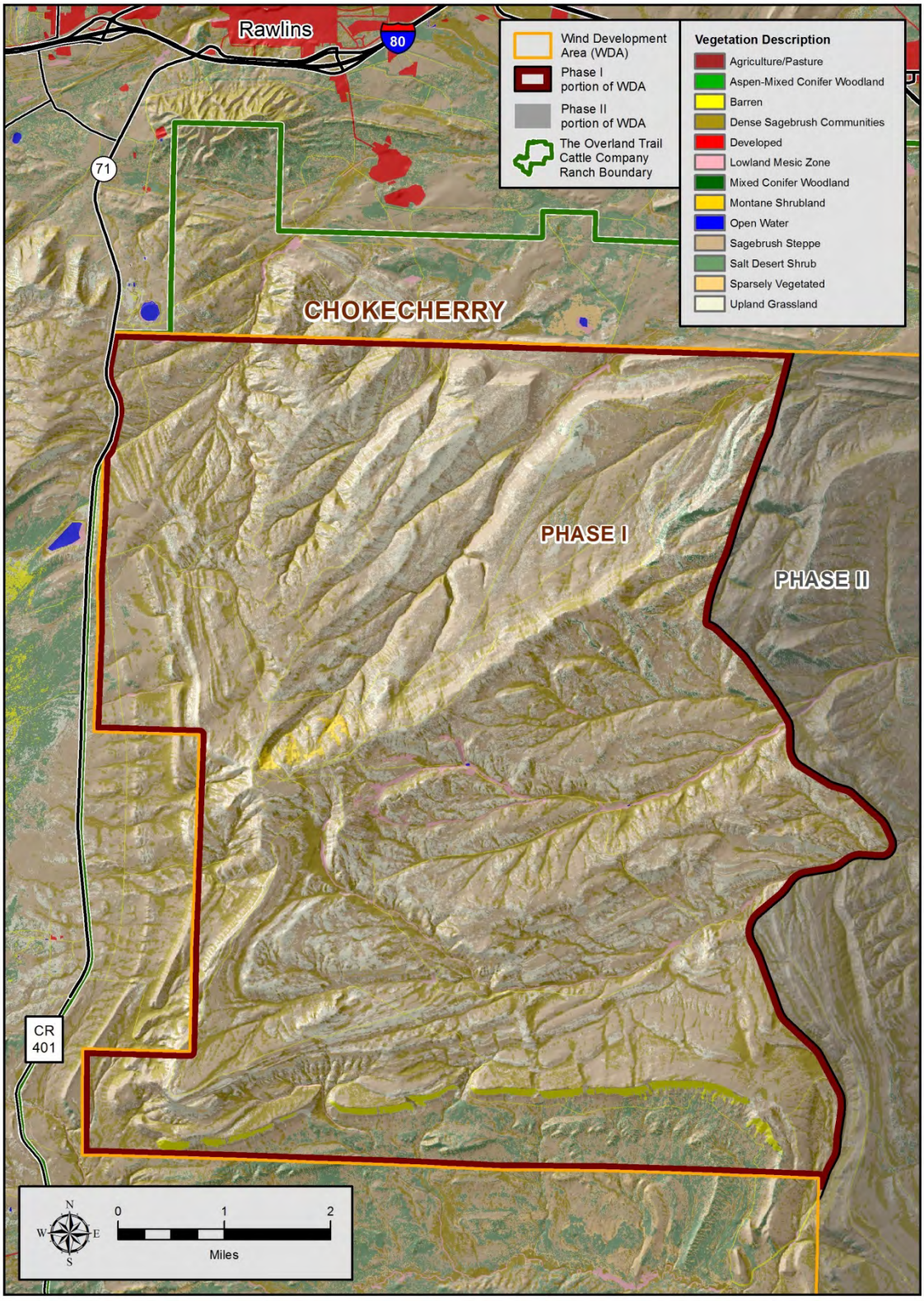


Figure 3.5. Phase I Chokecherry WDA Vegetation Cover.

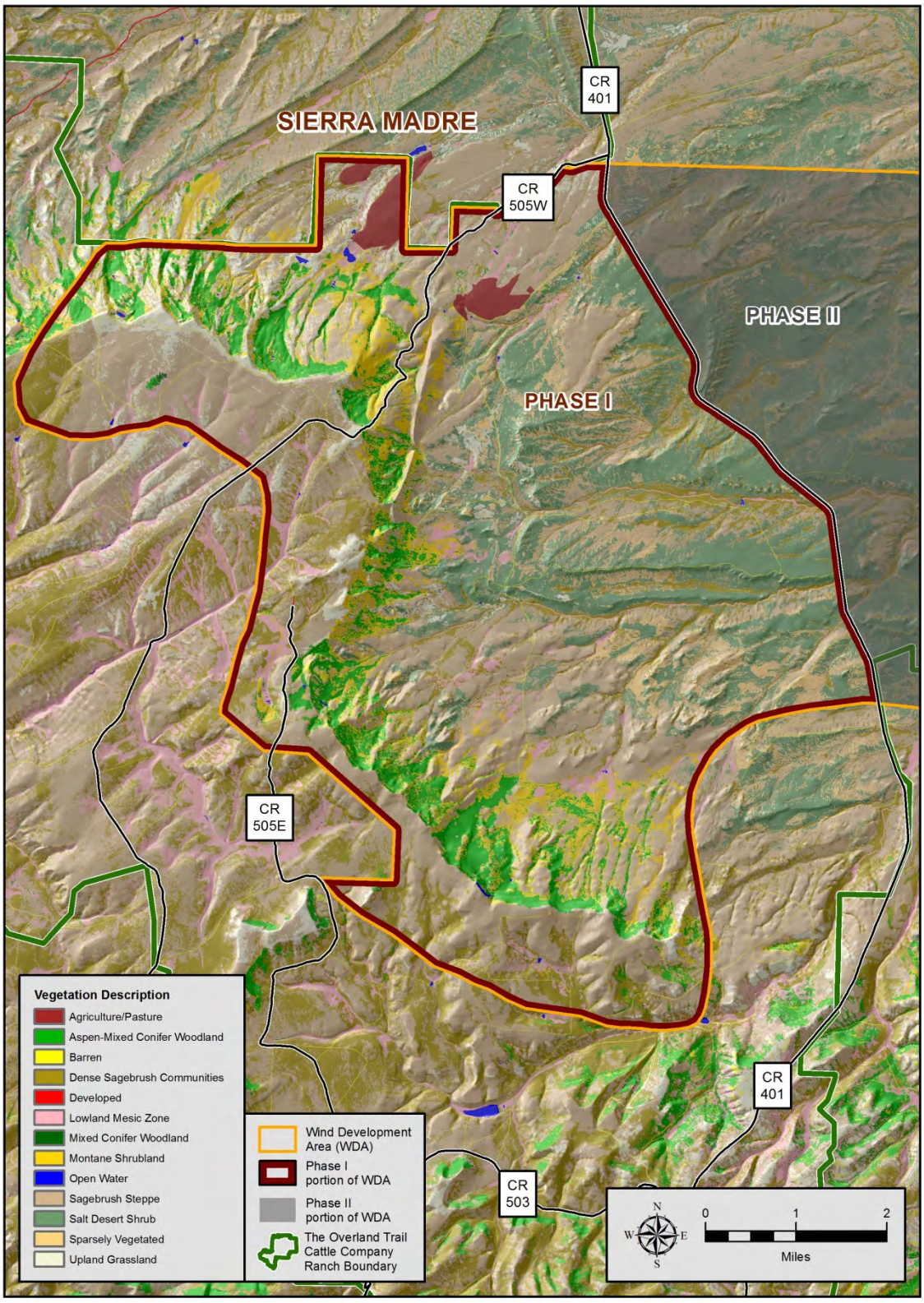


Figure 3.6. Phase I Sierra Madre WDA Vegetation Cover.

3.3.4 Water Resources

The surface water resources on the Ranch include the North Platte River, as well as several streams including Sage Creek, Miller Creek, and Rasmussen Creek in the North Platte River Basin and McKinney Creek, Grove Creek, and Stony Creek in the Yampa-White River Basin. *See Figure 3.7 & Figure 3.8.* In addition, several small ephemeral streams and a few isolated springs are located throughout the Ranch. There are also numerous stock ponds and some larger reservoirs in the vicinity including Teton, Kindt, Rasmussen, and Sage Creek Reservoirs. During the spring, summer, and fall seasons these irrigation reservoirs support use by waterfowl, primarily ducks and geese, with infrequent use by small groups of shorebirds and pelicans.

Water resources within Phase I include several named and unnamed ephemeral and perennial drainages. Within the Chokecherry WDA, the headwaters of Smith Draw and Hugus Draw flow east toward the North Platte River, and multiple other unnamed drainages cross through the area. In the Upper Miller Hill area, the headwaters of Grove Creek and McKinney Creek trend southwest from the Miller Hill Rim. In Lower Miller Hill, Deadman Creek, Lone Tree Creek, Rasmussen Creek, and several unnamed drainages flow east toward the Sage Creek Basin. No large waterbodies or reservoirs occur within Phase I.

Additional detail on water resources within Phase I can be found in the site-specific plans of development for Phase I of the CCSM Project. *See PCW 2014b; PCW 2014c; PCW 2014d; PCW 2015b*.

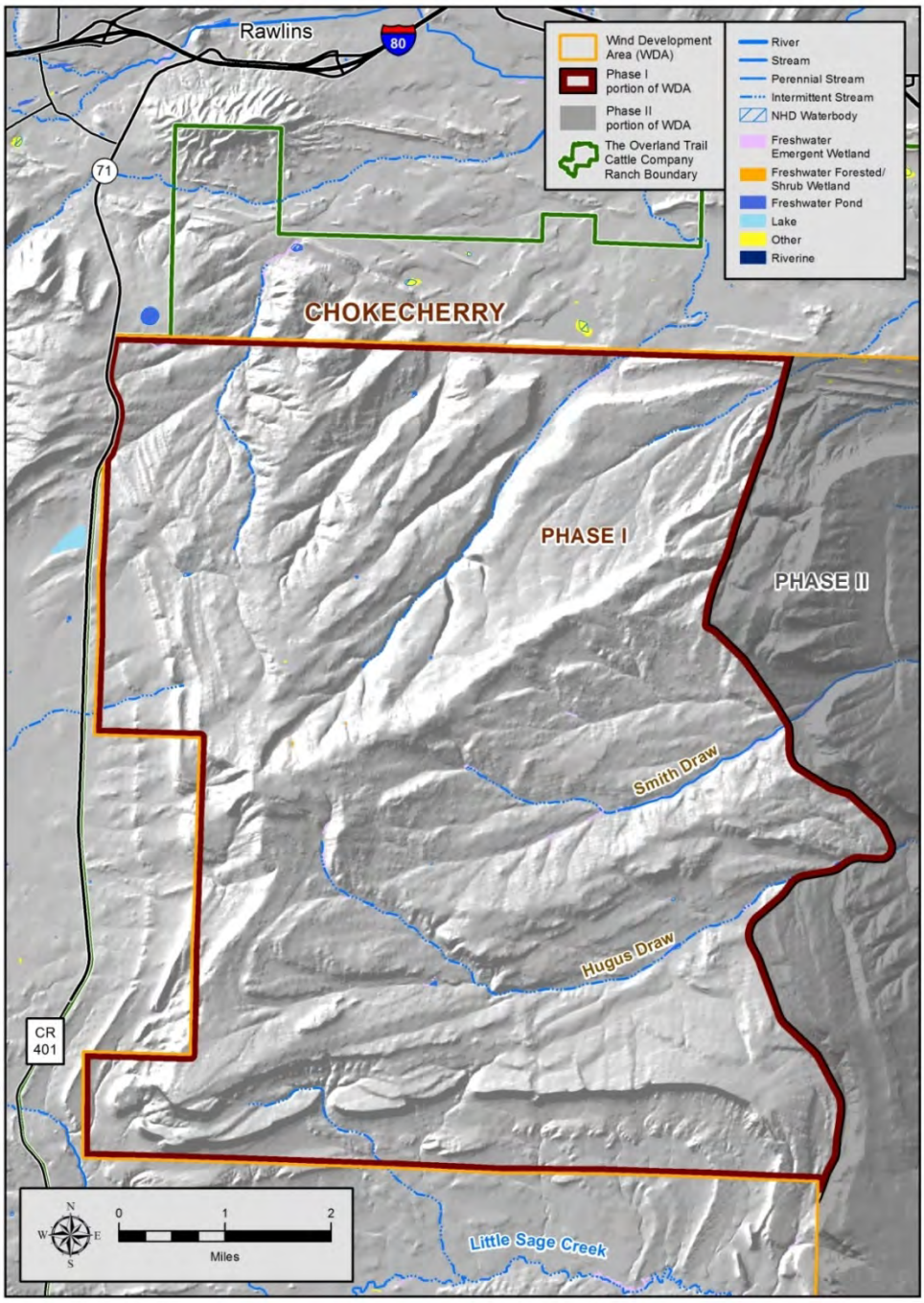


Figure 3.7. Phase I Chokecherry WDA Water Features. [10]

[10] The wetlands indicated on this figure are those mapped by the USFWS National Wetlands Inventory. A wetland delineation was completed by PCW to refine the NWI data that ultimately determined that a number of these areas are not in fact wetlands; however the delineation is limited to Phase I. The NWI data is presented in this figure to provide an overview of the wetlands that may be present within the Phase I Development Area as a whole.

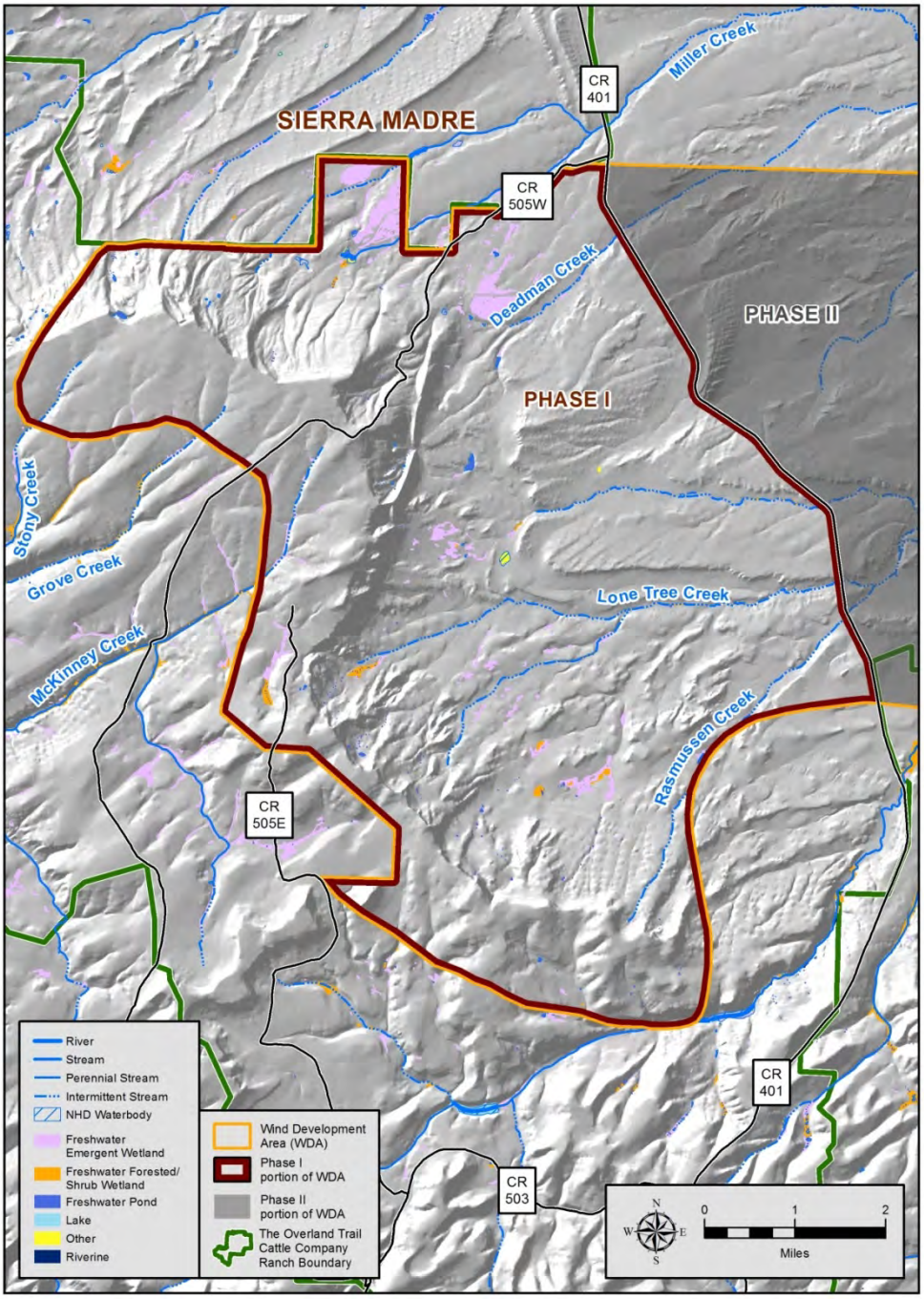


Figure 3.8. Phase I Sierra Madre WDA Water Features. [11]

[11] The wetlands indicated on this figure are those mapped by the USFWS National Wetlands Inventory. A wetland delineation was completed by PCW to refine the NWI data that ultimately determined that a number of these areas are not in fact wetlands; however the delineation is limited to Phase I. The NWI data is presented in this figure to provide an overview of the wetlands that may be present within the Phase I Development Area as a whole.

4.0 Pre-construction Migratory Bird and Bat Risk Assessment (USFWS Wind Energy Guidelines – Tiers 1 through 3; WGFC Wind Energy Recommendations – Tiers 1 and 2)

This BBCS is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate BBCS; however, portions of this chapter describe the monitoring and risk assessment process for the CCSM Project as a whole to provide context.

The WGFC Wind Energy Recommendations and USFWS Wind Energy Guidelines both recommend a tiered approach for assessing risks to migratory birds and bats. *See Section 2.4.* The tiered approach sets out an iterative decision-making process for collecting information in increasing detail; quantifying the possible risks of proposed wind energy projects to species of concern and their habitats; and evaluating those risks to make siting, construction, and operation decisions. *See USFWS 2012a at p. vi.* Each subsequent tier refines and builds upon the issues raised and efforts undertaken in previous tiers. Each tier also offers a set of questions to help evaluate the potential risk to migratory birds and bats associated with developing a wind energy project at a given location. *See USFWS 2012a at p vi.*

The pre-construction tiers, Tiers 1 through 3 of the USFWS Wind Energy Guidelines and Tiers 1 and 2 of the WGFC Wind Energy Recommendations, are designed to identify, avoid, and minimize risks to migratory bird and bat species of concern from proposed wind energy projects. PCW selected the original CCSM Project Site for wind energy development in 2006, approximately six years prior to the 2012 release of the USFWS Wind Energy Guidelines and four years prior to the release of the WGFC Wind Energy Recommendations. According to the USFWS Wind Energy Guidelines, "[p]rojects that are already under development or are in operation are not expected to start over or return to the beginning of a specific tier." *See USFWS 2012a at p. 4.* Instead, the guidelines instruct a developer to consider where it is in the planning process relative to the appropriate tier. When the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations were published, the BLM FEIS was already published and PCW was conducting migratory bird and bat studies for the CCSM Project consistent with Tier 3 of the USFWS Wind Energy Guidelines and Tier 2 of the WGFC Wind Energy Recommendations.

While the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations were not available, i.e. had not been published, at the time of site selection for the CCSM Project, PCW coordinated extensively with BLM, USFWS, and WGFD throughout the development of the project, including Phase I. PCW has collected detailed data for migratory birds and bats and has followed a robust avoidance and minimization process that complies with the tiered approach recommended in the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations. PCW's pre-construction risk identification and avoidance and minimization process for Phase I is documented below. PCW evaluated the CCSM Project and answered the questions posed by the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations as it would have if the guidance had been place throughout the CCSM Project development.

4.1 Summary of Potential Risks to Migratory Birds and Bats

Understanding the potential risks to migratory birds and bats from wind energy projects provides context for the risk evaluation and avoidance and minimization process documented in the remainder of this Phase I BBCS. A summary of the potential risks to migratory bird and bats from wind energy projects is provided below based on: (1) the USFWS Wind Energy Guidelines; (2) the WGFC Wind Energy Recommendations; and (3) the APLIC Recommendations for Power Pole Configurations at Wind Energy Projects. *See APLIC 2015.* The information provided below is not specific to the CCSM Project or Phase I; instead this is a generalized overview of potential risks wind energy projects may pose to migratory birds and bats.

4.1.1 Wind Turbines[12]

The USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations discuss various risks to migratory birds and bats from wind energy projects, generally including: (1) collisions with wind turbines and associated infrastructure; (2) habitat loss and degradation; (3) fragmentation of large habitat blocks into smaller segments that may not support sensitive species; (4) displacement and behavioral changes; and (5) indirect effects such as increased predator populations or introduction of invasive plants. *See USFWS 2012a at p. vi.* The pre-construction risk evaluation described in this chapter evaluates the potential risks to migratory birds and bats from Phase I for the purposes of avoiding and minimizing the identified risks and developing appropriate conservation measures and post construction monitoring. *See Chapters 5.0 & 6.0.* The types of potential risks to migratory birds and bats from wind energy projects are described in additional detail below.

Collision

Direct mortality to migratory birds and bats may occur at wind energy projects due to collisions with wind turbines, electric power lines, and meteorological towers. According to USFWS, "[c]ollision likelihood for individual birds and bats at a particular wind energy facility may be the result of complex interactions among species distribution, "relative abundance," behavior, visibility, weather conditions, and site characteristics." *See USFWS 2012a at p. 25.* The likelihood of collision for individual migratory bird and bat species is affected by abundance, ecology, and behavior. A detailed description of the current understanding of collision risk to specific types of migratory birds and bats is included in the WGFC Wind Energy Recommendations. *See WGFC 2010 at pp. 2:6,10:12.*

[12] Drawn generally from USFWS 2012a at pp. 25:26.

Habitat Loss and Degradation

Habitat loss and modification at wind energy projects may occur due to surface disturbance. USFWS acknowledges that "many of North America's native landscapes are greatly diminished or degraded from multiple causes unrelated to wind energy." *See USFWS 2012a at p. 25.* However, species that depend on these landscapes may still be susceptible to further loss of habitat, which could affect their ability to reproduce and survive. Migratory bird and bat species that may be susceptible to habitat loss and modification are also identified in the WGFC Wind Energy Recommendations. *See WGFC 2010 at pp.2:6, 10:12.*

Habitat Fragmentation

Both USFWS and WGFC identify habitat fragmentation as a concern for some migratory bird and bat species, e.g. sagebrush obligates. Surface disturbance at wind energy projects can cause habitat fragmentation, particularly disturbance associated with roads. "Habitat fragmentation separates blocks of habitat for some species into segments, such that the individuals in the remaining habitat segments may suffer from effects such as decreased survival, reproduction, distribution, or use of the area." *See USFWS 2012a at p. 25.* Surface disturbance may displace some species or fragment continuous habitat areas into smaller, isolated tracts. Sensitivity to fragmentation effects varies among migratory bird and bat species, as described in the WGFC Wind Energy Recommendations. *See WGFC 2010 at pp.2:6,10:12.*

Displacement and Behavioral Changes

According to USFWS, "[e]stimating displacement risk requires an understanding of animal behavior in response to a project and its infrastructure and activities, and a pre-construction estimate of presence/absence of species whose behavior would cause them to avoid or seek areas in proximity to turbines, roads, and other components of the project." *See USFWS 2012a at p. 26.* Displacement affects each species and individual differently. Those species that may be sensitive to displacement are identified in the WGFC Wind Energy Recommendations. *See WGFC 2010 at pp.2:6,10:12.*

Indirect Effects

"Indirect effects include reduced nesting and breeding densities and the social ramifications of those reductions; loss or modification of foraging habitat; loss of population vigor and overall population density; increased isolation between habitat patches, loss of habitat refugia; attraction to modified habitats; effects on behavior, physiological disturbance, and habitat unsuitability." *See USFWS 2012a at p. 26.* Indirect effects from wind energy projects may be due to a number of factors including the introduction and establishment of invasive plants that affect habitat suitability and quality or changes in the natural fire regime.

4.1.2 Overhead Electric System[13]

As described in section 2.7, APLIC provides electric utilities, wildlife agencies, and other stakeholders with guidance for managing avian interactions with electric facilities. As part of its guidelines and recommendations, APLIC has identified the primary risks to migratory birds from electric facilities, including those associated with wind energy projects. As described in this chapter, PCW has evaluated these potential risks to migratory birds and bats from Phase I for the purposes of avoiding and minimizing the identified risks and developing appropriate conservation measures and post construction monitoring. *See Chapters 5.0 & 6.0.* The types of risks that the electric facilities associated with wind energy projects may pose to migratory birds and bats are described in additional detail below.

Electrocutions

Bird electrocutions from wind energy project electric facilities may occur due to a combination of biological, environmental, and electrical design factors. Biological and environmental factors include:

- Habitat
- Bird species
- Body size
- Behavior
- Distribution
- Abundance
- Prey availability

The key electrical design factor is the physical separation between energized and or grounded portions of electrical facilities. If the distance between energized conductors or between an energized conductor and grounded hardware is less than that of the head-to-foot or wrist-to-wrist distance of a bird (the wrist is the joint toward the middle of the leading edge of a bird's wing), the bird is at risk of electrocution. Because a bird's feathers provide insulation when dry, contact must typically be made with fleshy parts, such as the skin, feet, or bill, for electrocution to occur.

The majority of electrocutions are associated with low-voltage electric power lines or transformers, rather than high-voltage electric power lines. *See Lehman 2001; Lehman et al. 2007.* Most avian electrocutions occur on low-voltage electric power lines of 35 kV or less. Electric power lines of 69 kV and above pose a very low electrocution because the lines are designed with sufficient spacing between conductors (electric wires or lines) such that phase to phase or phase to ground contact is not generally possible. *See APLIC 2006.* Low-voltage electric power lines have closer conductor spacing, which presents a greater electrocution hazard to avian species. *See APLIC 2006.* Consequently, most electrocutions are of large birds, such as eagles, hawks, and ravens. *See APLIC 2006.*

[13] Drawn generally from APLIC 2006, APLIC 2012, and APLIC 2015.

Collisions

Bird collisions from wind energy project electric facilities may occur because of a combination of biological, environmental and electrical design factors. Such factors include:

- Habitat
- Weather
- Time of day
- Lighting
- Human activity
- Bird species
- Body size
- Flight behavior
- Distribution
- Abundance
- Flocking behavior
- Age
- Sex
- Electric facility configuration
- Electric facility location

Electric facilities located between feeding and roosting areas of flocking birds may present an increased collision risk. This is especially true for power lines near rivers, lakes, or wetlands where fog may be common, making lines less visible. Human activity near lines may flush birds, with startled birds potentially colliding with power lines. Heavy-bodied, less agile birds, or those within flocks may lack the ability to quickly negotiate obstacles, making them more vulnerable to power line collisions. Collisions occur most often with the overhead static wire, which may be less visible than energized conductors due to its smaller diameter. Most bird collisions involve waterfowl, pelicans, and cranes. *See APLIC 2012*.

Nesting

Raptors and other migratory bird species can benefit from the presence of power line structures by using them for nesting. Most species that nest on power line structures inhabit open, arid areas, e.g. red-tailed hawks, great-horned owls, rough-legged hawks and prairie falcons. *See APLIC 2006.* One notable exception is the osprey, which uses utility structures for nesting more than any other North American raptor. Osprey typically select poles that are located near or over waters where fish are abundant.[14] *See APLIC 2006*. A number of non-raptor migratory bird species also nest on utility structures. Latticework structures can provide suitable nesting substrate for ravens, herons, cormorants and other large birds. Power poles are also used by smaller birds that build their nests on support brackets, transformers, or capacitors. *See APLIC 2006.*

Utility structures can provide nesting substrates in habitats where natural sites are scarce. Power line structures can facilitate range expansion, increase local density, and offer some protection from the elements. In addition, some raptors have increased their nest success and productivity on power line structures. *See APLIC 2006.* However, raptors and migratory birds that nest on power poles face disadvantages that include: increased risk of electrocution and collision, susceptibility to nest damage

[14] Although ospreys are known to use areas adjacent to the North Platte River, there is no suitable osprey nesting habitat within Phase I and no ospreys were observed during Phase I surveys. *See Sections 4.3 & 4.4*.

from wind and weather, disturbance from maintenance or construction, and vulnerability to shooting. Raptors nesting on power line structures may also impact some prey species and can reduce power reliability by contaminating equipment with excrement or nesting material. *See APLIC 2006.*

Although short-lived, the activity and alteration of surrounding habitat that occurs during power-line construction can disturb raptors and other migratory bird species. Maintenance operations may also temporarily disrupt normal bird nesting, hunting and roosting behavior. *See APLIC 2006.* While electrocution of birds that nest on power line structures during operation is infrequent, the nests themselves can cause operational problems and reduce power reliability creating the need for nest management. For example, nesting material or prey debris can cause interruptions and outages. *See APLIC 2006.*

4.2 Preliminary Site Evaluation (USFWS Wind Energy Guidelines – Tier 1; WGFC Wind Energy Recommendations – Tier 1)

The USFWS Wind Energy Guidelines call for a preliminary site evaluation using a landscape-level assessment of habitat for species of concern based on existing information and literature. *See USFWS 2012a at p. vi.* The preliminary site evaluation (Tier 1 of the USFWS Wind Energy Guidelines) corresponds to the Tier 1 site selection process outlined in the WGFC Wind Energy Recommendations. *See WGFC 2010 at pp. 37:38.* During the preliminary site evaluation and site selection process, the project proponent gathers existing information and literature and then uses this information to select and refine potential project sites by balancing suitability for development with potential risk to protected wildlife and their habitats, in this case migratory birds and bats.

For the CCSM Project, site selection occurred in 2006. In 2006, PCW's potential wind development site included the entire 320,000-acre Ranch owned and operated by PCW's affiliate, TOTCO. PCW did not possess the required property rights to consider or evaluate land located outside of the Ranch boundary for wind energy development. However, within the boundaries of the Ranch, PCW evaluated a number of project designs using different land and development scenarios. This is consistent with the USFWS Wind Energy Guidelines which indicate that the preliminary site evaluation (Tier 1) can be used to: (1) "screen" a landscape to avoid areas with the highest habitat values; or (2) begin to determine if a single potential site poses serious risk to species of concern or their habitats. *See USFWS 2012a at p. 12.*

4.2.1 Site Evaluation Data

In 2006, there was limited data available on migratory birds and bats specific to the Ranch. However, PCW reviewed and evaluated available data including the BLM Rawlins Field Office (RFO) Resource Management Plans (RMP), the BLM nest database, available data from WGFD, and existing vegetation and habitat maps. *See BLM 1990; BLM 2004; WGFD 2005.*

4.2.2 Site Evaluation Questions

Both the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations pose a series of questions to guide the site evaluation and site selection process. The site evaluation and site selection questions are intended to help determine potential environmental risks and potential or known conflicts with wildlife resources at the landscape scale. As contemplated in the USFWS Wind Energy Guidelines, the questions are most useful to "screen" the Ranch to identify sites with the highest habitat values and to determine if any areas pose a serious risk to migratory birds and bats or their habitats. *See USFWS 2012a at p. 12.* PCW's response to the site evaluation questions and its risk assessment are based on the information available in 2006 at the time of site selection for the CCSM Project.

USFWS Wind Energy Guidelines[15]

1. *Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?*

   In 2006, PCW evaluated the Ranch for the presence of species of concern or their habitat using existing data, including publically available data from USFWS, WGFD and BLM. In 2006, no federally-listed migratory bird or bat species were known to occur on the Ranch.[16] However, the 1990 RFO RMP, 2004 RFO draft RMP, and the 2005 WGFD list of species of greatest conservation need (SGCN) identified migratory bird and bat species of concern that may occur on the Ranch. *See BLM 1990; BLM 2004; WGFD 2005.* The BLM and WGFD migratory bird and bat species of concern that were identified in 2006 are included in Table 1.1 and Table 1.2 of this Phase I BBCS.

[15] *See USFWS 2012a at p. 13.*
[16] In 2006 bald eagles were listed as threatened under the ESA; however, bald eagles are no longer listed under the ESA. Further, potential impacts to bald eagles from Phase I are addressed in PCW's Phase I ECP. Therefore, potential impacts to bald eagles are not discussed in this Phase I BBCS. *See Section 1.2.*

2. *Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information?*

   The Ranch does not include areas where development is precluded by law. However, portions of the Ranch are within WGFD's Red Rim-Grizzly WHMA. The Red Rim-Grizzly WHMA is managed by WGFD for the co-existence of wildlife and livestock. *See WGFD 2013.* According to WGFD, the Red Rim-Grizzly WHMA also provides habitat for migratory birds such as ferruginous hawk, red-tailed hawk (*Buteo jamaicensis*), and passerines. *See WGFD 2013.*

3. *Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?*

   No critical areas of wildlife congregation for migratory bird or bat species were known in 2006. WGFD identified big game winter range and greater sage-grouse leks on the Ranch; however, these features are not related to the migratory bird and bat species that are the subject of this Phase I BBCS. *See Section 1.2.*

4. *Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?*

   In 2006, species of habitat fragmentation concern were not designated. In addition, there was no detailed habitat information available on the Ranch. Therefore, there was not adequate information in 2006 to evaluate the suitability of the existing habitat and the potential for fragmentation.

WGFC Wind Energy Recommendations[17]

1. *Are there species or habitat(s) of concern present on the site?*

   In 2006, PCW identified migratory bird and bat species designated by WGFD as SGCN that may occur on the Ranch. These species are listed in Table 1.1 and Table 1.2 of this Phase I BBCS. See response to question 1 above under USFWS Wind Energy Guidelines.

2. *Does the landscape contain areas where development is precluded by law, regulation or policy?*

   The Ranch does not include areas where development is precluded by law. However, portions of the Ranch are within WGFD's Red Rim-Grizzly WHMA. See response to question 2 above under USFWS Wind Energy Guidelines.

[17] *See WGFC 2012 at pp. 37:38*

3. *Are there known crucial areas for wildlife such as hibernacula, winter ranges, migration corridors, or other vital/sensitive habitats?*

   No crucial areas for wildlife congregation for migratory bird or bat species were known in 2006. See response to question 3 above under USFWS Wind Energy Guidelines.

4. *Are there large areas of intact habitat with species where habitat impacts are a concern?*

   There was no detailed habitat information available for the Ranch in 2006. Therefore, there was not adequate information in 2006 to evaluate potential impacts to existing habitat. See response to question 4 above under USFWS Wind Energy Guidelines.

5. *Using best available scientific information, has the potential presence of important species or crucial/vital habitat been documented?*

   In 2006, PCW identified migratory bird and bat species designated by WGFD as SGCN that may occur on the Ranch. These species are included in Table 1.1 and Table 1.2 of this Phase I BBCS. See response to question 1 above under USFWS Wind Energy Guidelines.

6. *Which SGCN or interest is likely to use the proposed site based upon known data?*

   The migratory bird and bat SGCN most likely to use the Ranch are listed in Table 1.1 and Table 1.2 of this Phase I BBCS.

4.2.3 Site Evaluation Risk Assessment

As reflected in the responses to the site evaluation questions, there was insufficient information in 2006 to adequately assess risk to migratory birds and bats. Therefore, as recommended in the USFWS Wind Energy Guidelines and in coordination with BLM, USFWS, and WGFD, PCW proceeded to Site Characterization (Tier 2) with a specific emphasis on collecting the additional data necessary to characterize the site and further assess potential impacts to wildlife. *See USFWS 2012a at p. 9.*

4.3 Site Characterization (USFWS Wind Energy Guidelines – Tier 2)

The site characterization process in the USFWS Wind Energy Guidelines (Tier 2) is intended to characterize a potential site in terms of the risk that wind energy development may pose to species of concern and their habitats. According to the USFWS Wind Energy Guidelines, site characterization generally involves one or more visits by a qualified biologist to assess the potential site. Site characterization is an intermediary step in the USFWS Wind Energy Guidelines that has no direct counterpart in the WGFC Wind Energy Recommendations. However, the USFWS Wind Energy Guidelines call for the involvement of state wildlife agencies such as WGFD throughout the site characterization process.

According to the USFWS Wind Energy Guidelines, site characterization should be based on a combination of: (1) existing information; (2) input from federal, state, and local agencies or organizations that have relevant scientific information; and (3) reconnaissance-level site visits by a wildlife biologist. The data collection and agency coordination conducted for the CCSM Project EIS meets the recommendations for the USFWS Tier 2 site characterization process. *See Section 4.3.1.* Therefore, the site characterization and risk assessment process described in this section is based on the information compiled for and contained in the BLM FEIS. *See BLM 2012b.* Data collection for the CCSM Project site characterization process was completed in 2008 and 2009; these data were then incorporated into the 2012 FEIS.

4.3.1 Site Characterization Data

The site characterization and Tier 2 risk assessment for the CCSM Project, including Phase I, is based on the information collected to support the BLM EIS. As described in section 1.3.2, BLM began preparation of its EIS in 2008. In support of the EIS, both PCW and BLM collected existing information on the CCSM Project Site. In addition, PCW collected additional site-specific wildlife data for the original proposed action, including data on migratory birds and bats. Through public outreach and cooperating agency involvement, BLM coordinated with interested parties to insure that local, state, and federal agencies, the public, and non-governmental organizations had an opportunity to provide relevant information and to comment on the EIS analysis. The data and information collected in 2008 and 2009 by PCW and BLM in support of BLM's EIS is consistent with the site characterization data called for in Tier 2 of the USFWS Wind Energy Guidelines.

Vegetation Surveys

PCW completed extensive field mapping and vegetation classification of the Ranch in 2009. Vegetation was sampled at 500 randomly selected 50-meter transects. Dominant vegetation classes and associated plant communities were characterized, and detailed measurements of vegetation structure (e.g., canopy cover, canopy height, understory height) were collected. Using the field survey data, aerial imagery, and remote sensing, a detailed 4-meter resolution vegetation classification was developed for the Ranch and a 3-mile buffer around the Ranch. Thirteen vegetation classes were created to capture the diversity of the landscape. To characterize potential habitat use by bird species, PCW evaluated the potential for migratory bird and bat species to use each of the vegetation communities and habitat types identified. Raptors and other large species such as ravens (*Corvus corax*), American crow(*Corvus brachyrhynchos*), and black-billed magpie (*Pica hudsonia*) can be found in any of the vegetation communities occurring in the Ranch. Many small bird species including vesper sparrow (*Pooecetes gramineus*) and horned lark (*Eremophila alpestris*) and bats can also be found across multiple vegetation assemblages. Characterizations of the major vegetation types and habitats on the Ranch are below along with descriptions of the migratory bird and bat species most likely to use each habitat.

Sagebrush Steppe Communities

Sagebrush steppe is the most common vegetation type on the Ranch occurring across approximately 63% of the Ranch. Sagebrush habitats within the Ranch consist of a mosaic of sagebrush, allied shrubs and forbs, and grasses and are dominated or co-dominated by one or more *Artemisia* species, such as Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). In higher elevations, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is present. Sagebrush communities occur across approximately 60% of the Ranch. Migratory bird species found in sagebrush steppe include sagebrush obligates such as sagebrush sparrow, Brewer's sparrow, loggerhead shrike, and sage thrasher. Other species commonly found within sagebrush communities on the Ranch include horned lark and vesper sparrow.

Salt-desert Shrub Communities

Salt-desert shrub communities are the second most common vegetation and occur across approximately 20% of the Ranch. Salt-desert shrub communities are characterized by salt-tolerant plants with a dominant shrub component of one or more *Atriplex* species such as Gardner's saltbush (*Atriplex gardneri*) or shadscale (*Atriplex confertifolia*) and are often co-dominant with birdsfoot sagebrush (*Artemisia pedatifida*), black greasewood (*Sarcobatus vermiculatus*), or other allied shrub and herbaceous species. These communities primarily occur within the northern flats north of the Chokecherry WDA, the Sage Creek Basin, and saline soils in the Lower Miller Hill area. Salt-desert shrub communities also occur in the eastern portions of the Chokecherry WDA. Horned lark is the most commonly observed species within salt-desert shrub communities. Other species characteristic of salt-desert shrub communities include vesper sparrow, killdeer (*Charadrius vociferous*), and rock wren (*Salpinctes obsoletus*).

Sparsely Vegetated and Barren Communities

Sparsely vegetated and barren vegetation communities are scattered and occur across 4-5% of the Ranch. These communities primarily occur in association with salt-desert shrub communities although sparsely vegetated areas also occur in association with sagebrush communities, especially in windswept areas or areas with shallow soils. Vegetation in these areas is generally characterized by a patchy distribution of upland sedges, cushion plants, and mat-forming forbs. Various buckwheat species (*Eriogonum* spp.) and pricklypear (*Opuntia* spp.) often co-dominate these barren landscapes, but cover is minimal. Horned lark are often found within sparsely vegetated communities. Additionally, killdeer may nest in barren locations.

Aspen Mixed-conifer Woodlands and Riparian Communities

Aspen mixed-conifer woodlands and riparian communities occur at elevations greater than 7,500 feet within the southwestern portions of the Ranch below the rim of Miller Hill. These communities occupy less than 2% of the Ranch. The predominant overstory vegetation is an open-canopy of quaking aspen (*Populus tremuloides*) interspersed with a variety of conifers and willows. The dense understory consists of forbs, grasses, and montane shrubs. Migratory bird species associated with this habitat include American robin (*Turdus migratorius*), black-capped chickadee (*Poecile atricapillus*), dark-eyed junco (*Junco hyemalis*), green-tailed towhee (*Pipilo chlorurus*), northern flicker (*Colaptes auratus*), and American goldfinch (*Spinus tristis*).

Mixed Mountain Shrub/ Montane Shrubland Communities

Mixed mountain shrub/ montane shrubland communities cover approximately 1% of the Ranch, predominantly located in the southern and southwestern portions at elevations ranging between 7,200 to 8,100 feet. These systems are typically associated with dry, exposed sites and are often in the uplands adjacent to aspen communities. Inclusions of sagebrush steppe or grassland often occur, but the vegetation is typically dominated by a variety of shrubs including serviceberry (*Amelanchier* spp.), mountain mahogany (*Cercocarpus montanus*), antelope bitterbrush (*Purshia tridentata*), and skunkbush sumac (*Rhus trilobata*). Migratory bird species associated with this habitat type are similar to those found in aspen mixed-conifer woodlands and may also include mountain bluebird (*Sialia currucoides*) and rock wren.

Upland Grassland Communities

Upland grassland communities occur throughout the Ranch, although the Chokecherry WDA has a greater occurrence of contiguous grassland cover. These communities typically occur between 6,500 to 8,400 feet in elevation and occur across approximately 7% of the Ranch. The vegetation is characterized as mixed-grass prairie on gentle to moderate slopes (0–20%), growing on drainage terraces, draws, alluvial flats and plains, escarpments, gulches, hillslopes, knobs, knolls, bluffs, and plateaus. Upland grasslands form a matrix with the surrounding sagebrush steppe, creating a mosaic landscape of rolling grasslands interspersed throughout sagebrush communities. Migratory bird species associated with this habitat type include western meadowlark, horned lark, vesper sparrow, mourning dove (*Zenaida macroura*), mountain bluebird, and long-billed curlew (*Numenius americanus*).

Avian Use Surveys

PCW completed baseline wildlife surveys, including surveys for raptors and other avian species in 2008 and 2009 for the purpose of estimating the impacts of the CCSM Project on wildlife and to assist with siting wind turbines to avoid and minimize these impacts. *See Appendix D & E*. The 2008-2009 survey area was based upon the CCSM Project as originally proposed in PCW's POD submitted to BLM in 2008. *See Chapter 5.0.*

The pre-construction avian use surveys were initiated in June 2008 and concluded in June 2009. Nineteen points for fixed-point avian use surveys were selected in habitats and topography representative of the original CCSM Project configuration. *See Figure 4.1*. *See BLM 2011b; BLM 2012b.* The fixed-point avian use surveys (variable circular plots) were conducted using methods described by Reynolds *et al.* (1980). Surveys at each 800-meter radius plot consisted of a 20-minute point count conducted approximately bi-weekly during the summer and winter (June 15 to August 31 and November 16 to December 31, respectively) and weekly during the fall and spring (September 1 to October 15 and March 16 to May 31, respectively). All raptors and large bird observations were recorded out to a distance of 800 meters from the point center. Small bird observations were restricted to those within 100 meters. Data were collected for each observation, including species, number of individuals, distance from point center, and altitude above ground, among other variables. Sampling intensity was designed to document bird use and behavior by vegetation community and season.

The 2008-2009 year-long avian use survey data characterize seasonal, spatial, and temporal migratory bird use within the boundaries of the Original Proposed Action (also referred to by BLM as the Study Area), which included portions of Phase I. *See Figure 4.1. See Section 5.1.2*. These data inform site characterization completed as part of Tier 2 of the USFWS Wind Energy Guidelines.

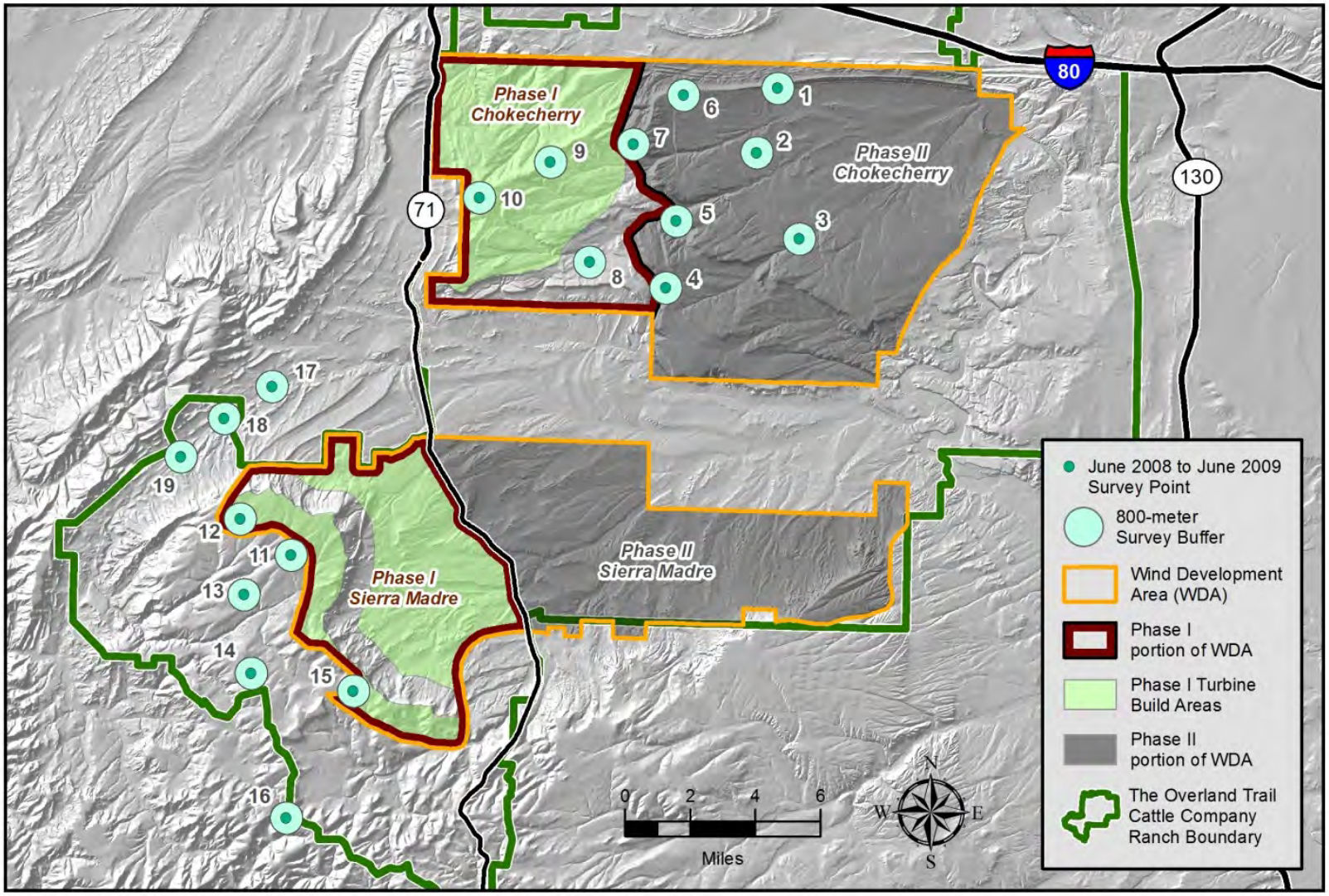


Figure 4.1. Avian Use Survey Locations, June 2008 to June 2009.

During the June 2008 to June 2009 avian use surveys, 1,903 migratory birds representing over 50 species were recorded. *See Table 4.1.* Detailed data from the 2008-2009 avian use surveys is included in Appendix E. In summary, small birds (i.e., those within 100 meters) were detected more frequently than raptors accounting for 1,484 individuals or 78% of all individuals. Horned lark accounted for 805 individuals or 42% of all detections followed by common raven (175 detections; 9%) and vesper sparrow (121 detections; 6%). The most frequently observed non-eagle raptors were American kestrel (*Falco sparverius*), northern harrier (*Circus cyaneus*), and red-tailed hawk representing approximately 6% of all detections (115 individuals). Avian use was greatest in spring, summer, and fall when migratory bird species were present. Approximately 99% of all individuals (1,883 individuals) were observed during these three seasons. During the winter season, most species migrate south away from Wyoming and the CCSM Project. Only 20 individuals or 1% of all individuals were observed during winter surveys.

When considering only small birds (i.e., those within 100 meters), horned lark accounted for 54% of the 1,484 small birds detected. Other small birds, in order of prevalence, were vesper sparrow (8%; 121 individuals), Brewer's sparrow (5%; 80 individuals), western meadowlark (5%; 69 individuals), and sage thrasher (4%; 65 individuals). The total number of small bird detections was similar in spring (593 individuals) and summer (632 individuals), but more than 50% lower in fall (255 individuals) and almost non-existent in winter (4 individuals). The only small bird identified during winter surveys was a single horned lark. The remaining individuals were unidentified.

The predominance of the five small bird species listed above (horned lark, vesper sparrow, Brewer's sparrow, western meadowlark, and sage thrasher) is primarily due to high numbers of each recorded during the spring and summer season. Dominant species composition varied during the spring and fall seasons, with Brewer's blackbird (*Euphagus cyanocephalus*) (spring), mountain bluebird (spring and fall), and sagebrush sparrow (spring) among the species contributing higher numbers during those seasons.

The most frequently observed non-eagle raptors during the 2008-2009 avian use surveys were American kestrel (43 individuals), northern harrier (42 individuals), and red-tailed hawk (30 individuals). The total number of non-eagle raptors was similar for summer (86 individuals) and fall (88 individuals), but more than 38% lower during the spring (53 individuals) and almost nonexistent in the winter (1 individual). The only non-eagle raptor recorded during winter surveys was one ferruginous hawk.

Table 4.1. Migratory Bird Observations, 2008-2009 Avian Use Surveys.

Species/Species Group	Spring	Summer	Fall	Winter	Total
Corvids					
American crow	16	49	---	---	**65**
common raven	44	16	102	13	**175**
Other Corvids	---	1	3	2	**6**
Passerines					
Brewer's blackbird	26	9	---	---	**35**
Brewer's sparrow	18	57	5	---	**80**
horned lark	368	264	172	1	**805**
mountain bluebird	14	4	16	---	**34**
sagebrush sparrow	52	7	---	---	**59**
sage thrasher	8	55	2	---	**65**
vesper sparrow	38	79	4	---	**121**
western meadowlark	28	34	7	---	**69**
Other Passerines	36	90	49	3	**178**
Non-eagle Raptors, Owls, and Allies					
American kestrel	16	25	2	---	**43**
ferruginous hawk	1	1	2	1	**5**
northern harrier	5	15	22	---	**42**
prairie falcon	4	1	1	---	**6**
red-tailed hawk	8	16	6	---	**30**
rough-legged hawk (*Buteo lagopus*)	2	---	9	---	**11**
Swainson's hawk	1	8	---	---	**9**
Other Non-Eagle Raptors, Owls, and Allies	3	1	8	---	**12**
Waterfowl, Waterbirds, and Wading Birds					
American white pelican (*Pelecanus erythrorhynchos*)	14	---	---	---	**14**
Other Waterfowl, Waterbirds, and Wading Birds	3	---	---	---	**3**

Species/Species Group	Spring	Summer	Fall	Winter	Total
Other Birds					
common nighthawk (*Chordeiles minor*)	---	6	---	---	**6**
mourning dove	---	10	---	---	**10**
northern flicker	1	1	---	---	**2**
unidentified hummingbird	---	2	---	---	**2**
white-throated swift (*Aeronautes saxatalis*)	3	13	---	---	**16**
Totals	**709**	**764**	**410**	**20**	**1903**

Raptor Nest Surveys

Understanding the use of raptor nests and identifying appropriate measures to avoid and minimize impacts to those nests requires an evaluation of the occupancy of the nest as well as the type of activity that is occurring at the nest location. *See Chapter 5.0.* For purposes of determining nest status during raptor nest surveys, PCW used the following definitions that are consistent with those used in PCW's Phase I ECP[18]:

- **Occupied Nest.** An occupied nest is a nest used for breeding in the current year by a pair of raptors. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current year's mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not uncommon for a pair of raptors to occupy a nest yet never lay eggs; such nests are considered occupied. *See PCW 2015a; USFWS 2013b*.
- **Unoccupied Nest.** Unoccupied nests are "those nests not selected by raptors for use in the current nesting season." *See PCW 2015a; USFWS 2013b*.

BLM has collected information on raptor nests within the CCSM Project Site since 1980 (a 33-year period). Prior to 1996, BLM mapped raptor nest locations opportunistically. Since 1996, both aerial and ground-based surveys have been conducted to map raptor nests within the RFO. BLM's records have been supplemented with raptor nests located as part of the permitting process for other development activities such as pipelines and oil and gas development. *See BLM 2012b*. In addition, PCW conducted helicopter-based aerial nest surveys between May 14 and 30, 2008. These aerial surveys for raptor

[18] The definitions of occupied and unoccupied nests are consistent between the Phase I ECP and Phase I BBCS for purposes of determining nest occupancy during raptor nest surveys. However, the avoidance and minimization measures for occupied and unoccupied nests developed in the Phase I ECP are specific to eagle nests and are not intended to be applied to the non-eagle raptor nests described in this Phase I BBCS. Further, the MBTA uses the term "active" to describe nest status. Consistent with the MBTA, the avoidance and minimization measures in this Phase I BBCS were developed to address "active" nests. The term "active" is defined in section 5.2.1 of this Phase I BBCS.

nests were completed within a 1600-meter (1-mile) buffer of the Original Proposed Action, surveying a total of approximately 270 square miles. *See Johnson et al. 2008. See Appendix F.* The surveys documented nest species and occupancy to the extent it could be determined. Surveys were conducted by flying over suitable nesting habitat (e.g., cliff bands, rocky areas, and stands of trees) and recording a geospatial location and noting the status for all known or potential raptor nests. The 2008 surveys also documented nests located incidental to other surveys and project activities.

As described above, BLM has collected information on nests within the CCSM Project Site since 1980 (a 33-year period) and helicopter-based aerial nest surveys were completed for the CCSM Project, including Phase I in 2008. For the CCSM Project Site, red-tailed hawk, prairie falcon, and ferruginous hawk were the most commonly recorded species in the BLM nest database. Nest occupancy was not always recorded and there is a large variance in the current condition of the historic raptor nests in BLM's database. Many of the historic nests recorded by BLM are in poor condition as observed and documented during aerial flights conducted by PCW. Nests in poor condition are less likely to be used for nesting because they require an extensive rebuild in order to be used for future nesting activities and because nearby alternate nests in good condition are often available.

During the 2008 nest surveys, a total of 21 occupied non-eagle raptor nests (11 red-tailed hawk, 5 prairie falcon, and 5 great horned owl [*Bubo virginianus*]) were located within the survey area, of which only 8 were located within the Phase I Development Area. *See Figure 4.2 & Figure 4.3.* The majority of the nests detected in 2008 were red-tailed hawk nests located outside of the CCSM Project Site. Within the Phase I portion of the Sierra Madre WDA there were 2 red-tailed hawk nests and 2 great horned owl nests. Within the Phase I portion of the Chokecherry WDA there were 2 prairie falcon nests and 1 red-tailed hawk nest.[19]

[19] The red-tailed hawk nest is not shown on Figure 4.2. The 2008 report indicated one occupied red-tailed hawk nest in the Chokecherry WDA; however the precise location of this nest was not reported and is not available.

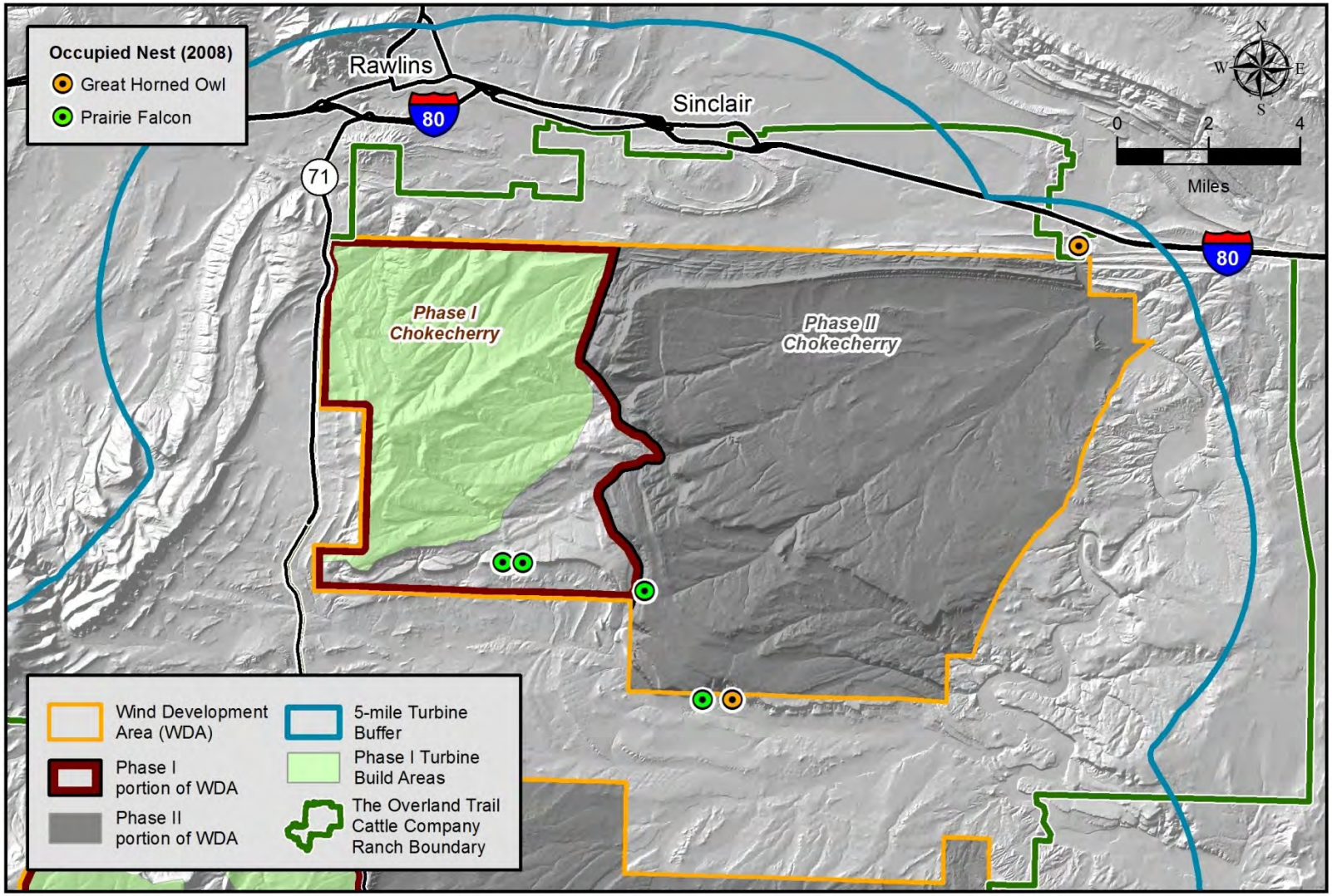


Figure 4.2. Chokecherry WDA Occupied Non-eagle Raptor Nests, 2008.

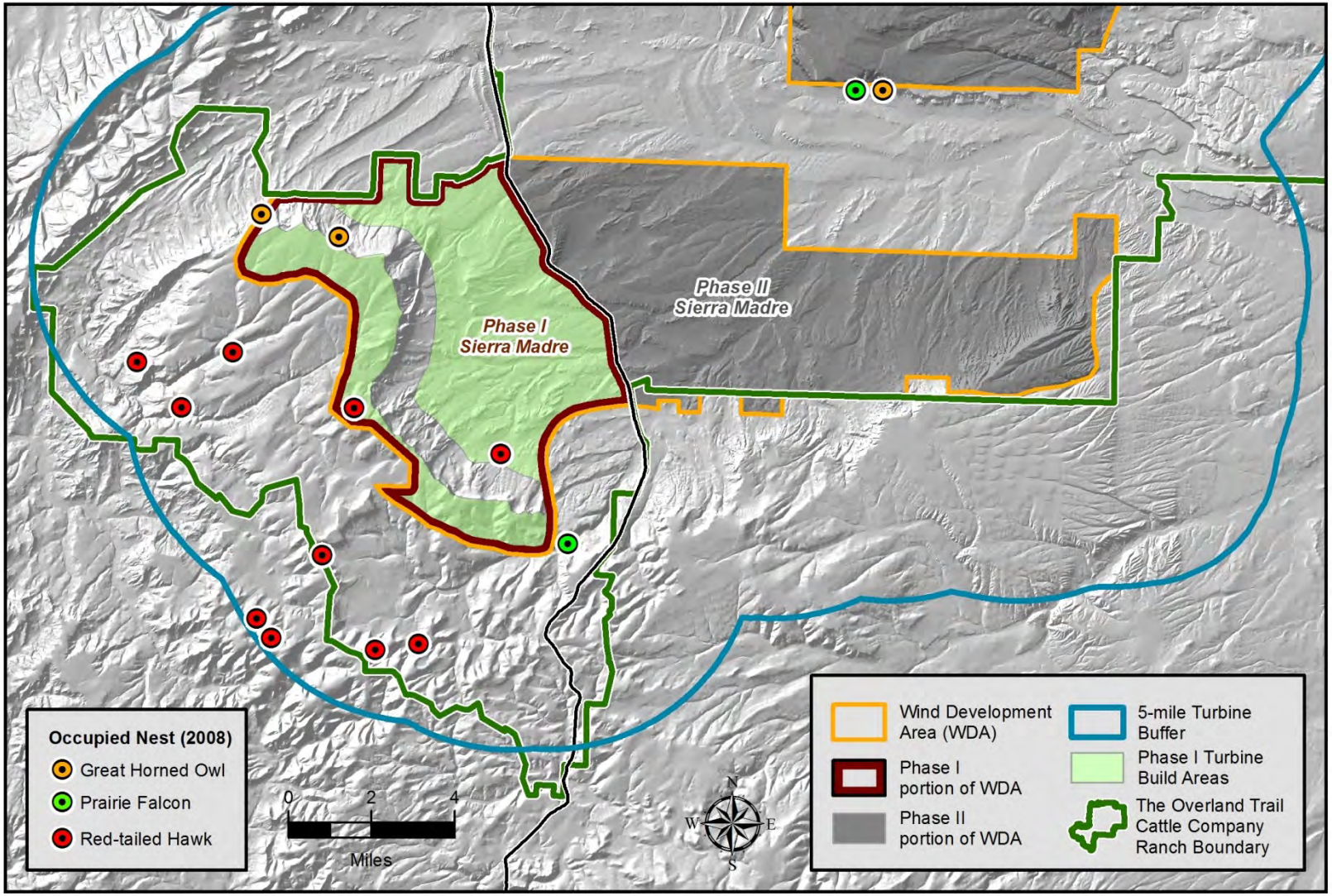


Figure 4.3. Sierra Madre WDA Occupied Non-eagle Raptor Nests, 2008.

Acoustic Bat Surveys

AnaBat detection systems manufactured by Titley Electronics were used for acoustic bat surveys conducted on the CCSM Project Site. Bat species produce echolocation vocalizations based on their ecological niche requirements, which may demand different frequency bandwidth, pulse duration, and other characteristics discernible in sonograms. AnaBat systems are capable of detecting and recording these ultrasonic sounds and producing sonograms, individual pulses on a frequency graph plotted against time. AnaBat sonograms generally have enough information to label a pulse sequence to a group of bats with similar acoustic characteristics (e.g., 25-kilohertz [kHz] bats) and even allow for identification of acoustically distinctive species (e.g., hoary bat). *See Kunz et al. 2007.* In North America, Myotis bat species are generally recognized as being the most difficult to differentiate due to similarities in vocalization characteristics; therefore these pulses are often placed within a frequency group (e.g., 40-kHz Myotis).

For acoustic bat surveys conducted for the CCSM Project in 2008, a standard index of bat activity was generated by counting the number of bat passes per detector-night at each survey location. *See Hayes 1997; Kunz et al. 2007.* A bat pass is defined as a pulse sequence (commonly referred to as a "call") consisting of at least one individual pulse that was separated by more than 1 second from the next pulse. *See White and Gehrt 2001*. Individual bats are not identifiable in an acoustical dataset since pulses may have been produced by the same or different individuals over the course of a single night survey period; therefore, an index of activity is used because the exact number of bats cannot be quantified from acoustic data. *See Hayes 2000; Kunz et al. 2007.*

All bat passes were categorized through assessment of both qualitative (e.g., shape) and quantitative (e.g., characteristic frequency) qualities as demonstrated by Weller and Baldwin (2012). Bat passes were classified as pertaining to low (<35 kilohertz [kHz]) or high (>35 kHz) characteristic frequency groups. Diagnostic call sequences in the datasets were labeled only for hoary bat as that species has a unique call pattern easily distinguished from other bat species.

Passive acoustic bat surveys were conducted from July 13 to October 13, 2008. *See Solick et al. 2008*. Six sites were surveyed with eight AnaBat units, two of which were placed on meteorological towers approximately 45 meters above the ground, with the remaining six AnaBat units being ground-based. *See Figure 4.4.* The study resulted in 3,021 bat passes across 669 detector-nights for an average of 4.52 bat passes/detector-night. However, this mean value is heavily influenced by site A3 located in Hugus Draw, which comprised 63% of all bat passes recorded during 2008 (average 20.62 passes/detector-night). *See Figure 4.4.* Site A3 is located near a wetland/stock pond outside of the Phase I Turbine Build Area. *See Figure 4.4.* As no impacts to bats will occur at site A3 because of its location, it was removed from the dataset as an outlier. After removal of site A3, the remaining seven AnaBat sites demonstrated more consistent bat use with an average of 1.9 bat passes per detector-night. *See Table 4.2.*

Bat activity in 2008 was highest from July 13 through the end of August, with activity peaks on July 27 and August 22. Very low activity was recorded in September and October. Temporal variation was similar among AnaBat sites across the CCSM Project.

Approximately 63% of all bat passes recorded were of high-frequency bats. Ground-based AnaBat units recorded similar ratios of low- and high-frequency bats, though there was variation between sites and across the survey period. However, elevated units deployed on meteorological towers consistently recorded disproportionately high numbers of low-frequency bat passes than high-frequency, with hoary bat comprising 7% of all bat passes. Trends in activity for hoary bat were consistent with patterns observed for all bat frequency groups, including a peak in activity on August 22.

Table 4.2. 2008 Acoustic Bat Survey Data.

Characteristic	Value
High Frequency Bat Passes	1909
Low Frequency Bat Passes	895
Hoary Bat Passes	217
Total Bat Passes	**3,021**
Total Bat Passes (Excluding Site A3)	1124
Total Detector Nights (Excluding Site A3)	577
Bat Passes per Detector Night Excluding Site A3	**1.9**

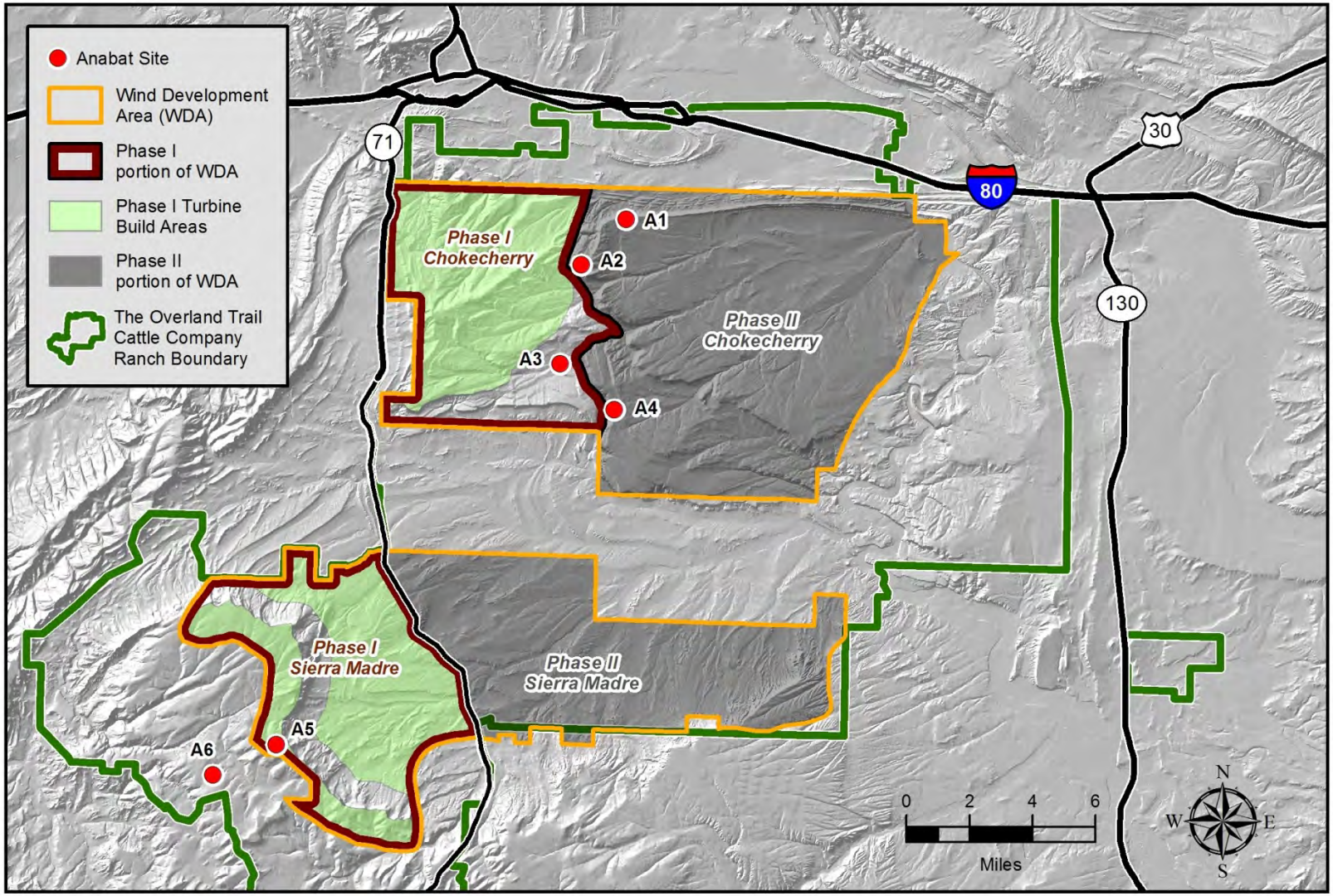


Figure 4.4. 2008 Acoustic Bat Survey Sites.

4.3.2 Site Characterization Questions

As described above, the site characterization and risk assessment process for the CCSM Project, including Phase I, is based on the information compiled for and contained in the BLM FEIS. *See BLM 2012b.* Consistent with the USFWS Wind Energy Guidelines, the BLM FEIS reviewed available data from: (1) existing data sources, such as peer-reviewed literature, agency technical reports, CCSM Project-specific technical reports, Wyoming Geographic Information Science Center datasets, and Wyoming Natural Diversity Database records; (2) other federal, state and local agencies, non-governmental organizations, and the public; and (3) site-specific field data collected by qualified wildlife biologists.

1. *Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?*

   The BLM FEIS identified 11 migratory bird and 3 bat species listed on the BLM Wyoming Sensitive Species Policy and List that have the potential to occur on the CCSM Project Site. *See BLM 2012b at p. 3.15-5. See Appendix B.* In addition, data supporting the analysis in the BLM FEIS identified 21 migratory bird and 8 bat species included in the SWAP as SGCN that have the potential to occur on the CCSM Project Site. *See WGFD 2010. See Appendix B.* Some of the BLM and WGFD species of concern are the same; when this redundancy is removed there are a total of 22 migratory bird and 9 bat species of concern that have the potential to occur on the CCSM Project Site. *See Table 1.1 & Table 1.2.*

2. *Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information?*

   Consistent with the site evaluation, the Red Rim-Grizzly WHMA is the only avian-related sensitive area in the vicinity of the CCSM Project Site identified in the BLM FEIS. The Grizzly portion of the WHMA is managed for several raptor species. *See WGFD and BLM 1992.* At the time of the CCSM Project Site characterization, development was proposed for a small portion of the Red Rim-Grizzly WHMA. However, as discussed in section 5.1, the CCSM Project was ultimately reconfigured to eliminate development in the Red Rim-Grizzly WHMA. *See BLM 2012a.*

   In addition to the Red Rim-Grizzly WHMA, the 2008 BLM RFO RMP designated the Upper Muddy Creek Watershed/Grizzly WHMA on BLM lands adjacent to the Red-Rim Grizzly WHMA. *See BLM 2008a.* However, the Upper Muddy Creek Watershed/Grizzly WHMA was designated for purposes of managing habitat for Colorado River fish species and crucial winter habitat for elk and mule deer. As the Upper Muddy Creek Watershed/Grizzly WHMA is not designated for purposes of managing migratory birds and bats, this WHMA is not discussed further in this Phase I BBCS.

3. *Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?*

   Based on the results of migratory bird point count surveys, acoustic bat monitoring, and other wildlife surveys across the CCSM Project Site, the BLM FEIS did not identify any maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors for migratory birds and bats within the CCSM Project Site or surrounding areas. *See BLM 2012b at pp. 13.14-1 & 13.15-1.* Areas of seasonal importance were identified including nesting sites and several small reservoirs that may provide habitat and stopover sites for waterfowl and wading birds. Some of these areas were originally proposed for development; however, the majority of these areas were eventually eliminated from the CCSM Project, including Phase I, as described in section 5.1. WGFD identified big game winter range and greater sage-grouse leks within the CCSM Project Site, including Phase I. However, these features are not related to the migratory bird and bat species that are the subject of this Phase I BBCS. *See Section 1.2.*

4. *Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?*

   BLM analyzed the impacts of the CCSM Project on sagebrush obligate species (sage thrasher, sagebrush sparrow, Brewer's sparrow, loggerhead shrike). This species group is generally believed to be sensitive to fragmentation of sagebrush ecosystems. *See Rich et al. 2005*. The BLM FEIS also identified large tracts of rangelands and other agricultural use areas across the CCSM Project Site. These habitats are relatively intact but are regularly bisected by state highways, county roads, ranch roads, electrical transmission and distribution lines, oil and gas pipelines, and communications facilities. As described in the BLM FEIS, the CCSM Project may result in increased disturbance within intact habitats and increase potential for fragmentation or displacement. *See BLM 2012b at p. 3.14-1*. However, BLM identified that impacts to sagebrush obligate species (sage thrasher, sagebrush sparrow, Brewer's sparrow, loggerhead shrike) would not be significant. In addition, based on the site-specific data, PCW has developed a number of measures to minimize impacts to sagebrush steppe communities and other habitats in Phase I. These measures are described in chapter 5.0.

5. *Using best available scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?*

   As identified in the vegetation surveys and BLM FEIS, the CCSM Project Site contains several intact patches of sagebrush steppe that support sagebrush-obligate species. As described above, BLM did not identify any significant impacts to these species from the CCSM Project in its EIS.
   In addition to sagebrush obligates, the Wyoming SWAP specifically mentions habitat fragmentation as a concern for ferruginous hawk and Swainson's hawk. *See WGFD 2010.* BLM's FEIS considered effects to these species, including direct effects and indirect effects such as habitat fragmentation, displacement, and collision with wind turbines. *See BLM 2012b at p. 4.14-8.* The BLM FEIS concluded that the development and implementation of this Phase I BBCS and the associated adaptive management process would avoid and minimize impacts to all migratory bird and bat species, including those of habitat fragmentation concern. *See BLM 2012b at pp. 4-14-17 & 4.14-24.*

6. *Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?*

   Common non-eagle raptor species identified in the avian use surveys include American kestrel, northern harrier, red-tailed hawk, and Swainson's hawk. *See Section 4.3.1.* The most common passerine species within the CCSM Project Site include horned lark, western meadowlark, vesper sparrow, Brewer's sparrow, sagebrush sparrow, and sage thrasher. *See Section 4.3.1.* The BLM FEIS found that passerine species (e.g., small songbirds) are most likely to be at risk from wind energy development. *See BLM 2012b at p. 4.14-24.* Therefore, it is anticipated that horned lark, western meadowlark, vesper sparrow, Brewer's sparrow, sagebrush sparrow, and sage thrasher would be the species most likely to be impacted by the CCSM Project, including Phase I.

   The BLM FEIS found that there was low potential for impacts from the CCSM Project to the three BLM sensitive bat species (long-eared myotis, fringed myotis, and Townsend's big-eared bat) from the CCSM Project. *See BLM 2012b at p.4.14-18.* The BLM FEIS also determined that the species of bats most likely to be impacted by wind energy development in the western United States are the hoary bat and the silver-haired bats. *See BLM 2012b at p. 4.14-17.* However, hoary bats were detected in just 7% of all bat passes recorded on the CCSM Project Site, or 217 bat passes out of a total of 3,021. *See Section 4.3.1.* The low occurrence of hoary bats on the CCSM Project Site indicates that impacts to this species will be minimal. As described in the FEIS, it is likely that hoary bat and silver-haired bat would have the greatest risk for impacts resulting from the CCSM Project. *See BLM 2012b at p. 4.14-16*. However, the overall risk to bats remains low. *See Appendix D.*

7. *Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?*

   As identified in the CCSM Project avian use surveys, certain migratory bird and bats species of concern may be present on the CCSM Project Site. *See Section 4.3.1.* The BLM FEIS analyzed potential impacts to these species from the CCSM Project and concluded that no significant impacts would occur to sagebrush obligate bird species or BLM-sensitive bat and WGFD SGCN bat species. *See BLM 2012b at pp. 4.14-17 & 4.14-25*. The FEIS found that, while adverse impacts may occur to some bird species on a localized basis, the avoidance and minimization measure in this Phase I BBCS would likely substantially reduce impacts to migratory bird and bat species. *See BLM 2012b at pp. 4.14-17 & 4.14-24*.

   The migratory bird and bat species and habitats most likely to be impacted by the CCSM Project, including Phase I, are ubiquitous throughout south-central Wyoming and much of the western United States. As such, localized impacts associated with the CCSM Project are not likely to have significant impacts to the availability of habitats or populations of the migratory bird and bat species observed during survey efforts and addressed in this Phase I BBCS. In addition, PCW has developed extensive avoidance, minimization and conservation measures in this Phase I BBCS to avoid and minimize impacts to migratory birds and bats. *See Chapter 5.0.*

4.3.3 Site Characterization Risk Assessment

The site characterization process for the CCSM Project, including Phase I, concluded that there are no threatened or endangered migratory birds or bat species present on the CCSM Project Site. However, PCW determined that migratory bird or bat species of concern may be present. *See Appendix B.* Therefore, consistent with the USFWS Wind Energy Guidelines, PCW identified additional measures to avoid and minimize impacts to migratory bird and bat species. *See USFWS 2012a at p. 49.* The avoidance and minimization measures included a substantial re-design of the entire CCSM Project, and specifically Phase I. The Phase I avoidance and minimization process and the conservation measures and best management practices identified for migratory birds and bats are described in chapter 5.0.

Following completion of the site characterization process and development of the associated avoidance and minimization measures, PCW determined that the answer to one or more of the site characterization (Tier 2) questions was still inconclusive. Therefore, PCW conducted additional in-depth field studies on migratory bird and bat use based on the issues raised during site characterization.

4.4 Field Studies and Impact Prediction (USFWS Wind Energy Guidelines – Tier 3; WGFC Wind Energy Recommendations – Tier 2)

As discussed above, after completion of the CCSM Project site characterization process, PCW determined that additional field studies were appropriate to assess the potential risk to migratory birds and bats from the CCSM Project, including Phase I. The completion of additional field studies, i.e. additional data collection, is consistent with Tier 3 of the USFWS Wind Energy Guidelines and Tier 2 of the WGFC Wind Energy Recommendations.

Tier 2 of the WGFC Wind Energy Recommendations and Tier 3 of the USFWS Wind Energy Guidelines recommend the collection of quantitative data using scientifically rigorous studies. The intent of these studies is to assess the potential risk of a proposed project to migratory bird and bat species and to inform appropriate measures to avoid and minimize that risk. The field studies are also intended to inform the duration and level of effort of post-construction monitoring. *See Chapter 6.0.*

In compliance with Tier 2 of the WGFC Wind Energy Recommendations and Tier 3 of the USFWS Wind Energy Guidelines, PCW conducted additional site-specific, scientifically rigorous migratory bird and bat field studies following completion of the 2008-2009 site characterization surveys. The field studies were designed in coordination with USFWS, WGFD, and BLM based on data collected during the site characterization process. *See Section 4.3.*

4.4.1 Field Study Data

To assess the potential risk to migratory birds and bats from the CCSM Project, including Phase I, PCW conducted numerous field studies and surveys. *See Table 4.3.* These studies and surveys include:

1. Raptor use surveys designed to characterize raptor use and identify important raptor-use areas;
2. Raptor nest surveys designed to characterize local area nesting population;
3. Migratory bird surveys to assess the diversity and abundance of migratory birds;
4. Avian radar surveys to identify patterns of migratory bird and bat use;
5. Breeding bird surveys to document use of habitats during nesting season;
6. Waterbird/ waterfowl surveys to document the diversity and abundance of waterbirds and waterfowl using reservoirs in the vicinity of the CCSM Project; and
7. Acoustic bat surveys to document bat activity at additional locations within the CCSM Project Site.

Table 4.3. CCSM Project Migratory Bird and Bat Surveys.

Survey	Date
Raptor Use Surveys	
Long-watch Raptor Use and Migration Surveys	April 2011 - July 2012
800-meter Raptor Count Surveys	August 2012 - August 2013
Raptor Nest Surveys	
Raptor Nest Surveys	May 2008 May - July 2011 April - July 2012 April - July 2013 April - July 2014
Migratory Bird Use Surveys	
Migratory Bird Surveys	April 2011 - April 2012
Avian Radar Surveys	March 2011 - March 2013
Bats	
Acoustic Bat Surveys	April, August, October 2011
Other	
Breeding Bird Density Surveys	June 2011
Waterbird/ Waterfowl Surveys	April, August, October 2011

Following the site characterization process described in section 4.3, PCW initiated discussions with USFWS, BLM, and WGFD to begin development of a BBCS for the CCSM Project. During this collaborative process, USFWS and BLM reviewed the existing data and determined that additional data would be useful for more detailed risk assessments and siting efforts consistent with Tier 3 of the USFWS Wind Energy Guidelines. Therefore, USFWS and BLM recommended that PCW conduct additional surveys to identify high avian use areas and requested that PCW develop survey protocols to assess site-specific risk within the WDAs. USFWS emphasized the importance of identifying high avian use areas within the WDAs that might be avoided during development of final wind turbine layouts and micrositing of facilities. Specifically, USFWS and BLM identified avian radar technology in combination with long-watch raptor surveys and standard point counts as a desired method to map areas of high avian use.

In December 2010, PCW circulated draft survey protocols to the USFWS, BLM and WGFD for review and comment. PCW incorporated USFWS, BLM and WGFD recommendations and comments into the final survey protocols in March 2011. *See Appendix D*. PCW provided the March 2011 survey protocols to USFWS and received USFWS's concurrence with and endorsement of the protocols.[20] PCW implemented the March 2011 protocols and completed a full year of surveys from April 2011 to March 2012. These surveys included long-watch raptor surveys, avian radar studies, raptor nest surveys, migratory bird surveys, breeding bird surveys, and waterbird/ waterfowl surveys.

In April 2012, working with the USFWS, PCW identified an additional long-watch raptor survey protocol and new survey locations to: (1) refine important avian use areas; (2) identify additional avian use areas; and (3) inform the implementation of appropriate avoidance and minimization approaches to reduce risks to migratory bird and bat species. *See Appendix D.* Surveys were conducted under the additional protocol between April 2012 and July 2012. During this period, PCW also completed raptor nest surveys and continued avian radar surveys. The 2011 and 2012 protocols were implemented to provide site-specific data to identify important raptor use areas including those related to nesting activity, migration, foraging, and roosting as well as to provide the data necessary to complete a risk assessment for the CCSM Project, including Phase I. The data collected from these comprehensive surveys, were used to redesign the CCSM Project and develop the final wind turbine layout for Phase I. *See Chapter 5.0*.

During implementation of the 2011 and 2012 protocols, PCW worked closely with the USFWS to identify additional data collection and survey needs. During a meeting on July 24, 2012, USFWS recommended that raptor survey protocols be revised again for the CCSM Project to focus on 800-meter radius surveys to collect data that would be compatible with upcoming USFWS guidance. PCW revised its survey protocols as recommended by USFWS, and on August 20, 2012, 800-meter raptor count surveys began at 40 locations across the CCSM Project Site. After further coordination with USFWS, the 800-meter raptor count surveys were expanded again on November 12, 2012, to cover 60 locations within the CCSM Project Site to aid in the further refinement of important raptor use areas and inform avoidance and minimization measures. *See Appendix D*. Surveys continued at the 60 point locations through the end of August 2013.

[20] In a March 3, 2011 email, Mr. Sanderson, a USFWS employee, stated "[a]s we have stated all along, we are 100% behind the monitoring protocols . . . ." On May 5, 2011, Mr. Sanderson reiterated the USFWS's approval of the monitoring protocols and BBCS/ECP development approach in an email stating "[a]s discussed previously, the Service is entirely on-board with the proposed monitoring protocols . . . ."

Long-watch Raptor Surveys

Between April 4, 2011, and July 24, 2012, biweekly long-watch raptor surveys were completed throughout the CCSM Project Site. From April 2011 through March 2012, surveys were completed at 15 locations. From April 2012 through July 2012, surveys were completed at 14 locations. *See Figure 4.5. See Appendix E & F*. The duration and frequency of long-watch raptor surveys varied by season in accordance with the recommendations of the federal and state agencies; however, survey minutes were evenly distributed across all daylight hours and between sites within each season.

Long-watch raptor surveys were conducted for 4–8 hours at each location, with summer and winter surveys having the shortest duration, based on agency recommendations. Data collected for each raptor detected included species, number of individuals, age, sex, distance from observer, bearing to the bird, heading of the bird, height, and flight behavior. Flight paths were also recorded on aerial maps for each raptor detected. Long-watch raptor surveys were conducted in 4,000-meter radius plots strategically distributed across the WDAs to maximize coverage for the purposes of identifying high use areas and potential migratory pathways and other raptor use areas while maintaining observer confidence in species identification. While data were collected on raptor use out to 4,000 meters, for purposes of comparison with other raptor data collected for the CCSM Project, only those raptors observed within 800 meters of each long-watch raptor survey location are reported here. *See Table 4.4*. This is necessary because small raptors such as kestrels have a lower probability of detection beyond 800 meters than large raptors such as ferruginous hawks.

From April 2011 through July 2012, 430 surveys were conducted for a total of 146,876 minutes (2,447.9 hours) or more than 40% of the daylight minutes during this period. The entirety (100%) of the Phase I wind turbine layout was covered during the long-watch raptor surveys between April 2011 and July 2012. The data collected through the long-watch surveys was used to identify areas of high raptor use within the CCSM Project Site for the purposes of micrositing wind turbines and other facilities to avoid and minimize impacts to raptors and other migratory bird and bat species. In addition, the results were used to identify Turbine No-Build Areas in which wind turbines would not be constructed to further avoid impacts to raptors and other migratory bird and bat species using those areas. *See Chapter 5.0*.

A total of 452 hours of survey were completed at the Phase I long-watch raptor survey sites located in the Chokecherry WDA and 661 hours of survey were completed for the Sierra Madre WDA Phase I long-watch raptor survey sites. A total of 303 non-eagle raptors were observed within 800 meters of Phase I long-watch raptor survey locations. Non-eagle raptor use was relatively consistent during spring, summer, and fall survey periods across Phase I. Slightly higher numbers of raptors were observed during spring presumably as a result of increased use during migration. Non-eagle raptors were not observed during winter surveys conducted in 2011-2012. *See Table 4.4*.

During surveys of the Phase I portion of the Chokecherry WDA, American kestrel was the most commonly observed non-eagle raptor within 800 meters of the long-watch raptor survey locations comprising 42 of 76 total non-eagle raptors (55%), followed by red-tailed hawk (9 individuals, 12%), and prairie falcon (9 individuals, 12%).

During surveys of the Phase I portion of the Sierra Madre WDA, red-tailed hawk was the most commonly observed non-eagle raptor within 800 meters of the long-watch raptor survey locations accounting for 80 of the 227 individuals (35%), followed by American kestrel (50 individuals, 22%), northern harrier (28 individuals, 12%), Swainson's hawk (19 individuals, 8%), and prairie falcon (18 individuals, 8%).

Table 4.4. Phase I Non-eagle Raptor Observations, 2011-2012 Long-watch Raptor Surveys.

Species	Spring 2011	Summer 2011	Fall 2011	Winter 2011-2012	Spring 2012	Total
Phase I Chokecherry WDA						
American Kestrel	32	8	---	---	2	**42**
Ferruginous Hawk	1	---	2	---	---	**3**
Merlin (*Falco columbarius*)	---	---	2	---	---	**2**
Northern Harrier	4	---	2	---	---	**6**
Prairie Falcon	9	---	---	---	---	**9**
Red-tailed Hawk	1	4	4	---	---	**9**
Sharp-shinned Hawk (*Accipiter striatus*)	1	---	1	---	1	**3**
Turkey Vulture (*Cathartes aura*)	---	---	---	---	1	**1**
Unknown Buteo	1	---	---	---	---	**1**
Phase I Sierra Madre WDA						
American Kestrel	14	16	9	---	11	**50**
Cooper's Hawk	3	---	2	---	1	**6**
Ferruginous Hawk	2	3	---	---	---	**5**
Merlin	---	---	1	---	2	**3**
Northern Goshawk	---	---	---	---	1	**1**
Northern Harrier	18	4	6	---	---	**28**
Peregrine Falcon	---	1	1	---	---	**2**

Species	Spring 2011	Summer 2011	Fall 2011	Winter 2011-2012	Spring 2012	Total
Prairie Falcon	7	7	3	---	1	**18**
Rough-legged Hawk	---	---	1	---	---	**1**
Red-tailed Hawk	58	5	8	---	9	**80**
Sharp-shinned Hawk	2	---	4	---	---	**6**
Swainson's Hawk	3	10	---	---	6	**19**
Turkey Vulture	---	2	1	---	---	**3**
Unknown Accipiter	1	---	---	---	---	**1**
Unknown Buteo	1	---	1	---	---	**2**
Unknown Raptor	1	---	---	---	1	**2**
Total	**159**	**60**	**48**	**0**	**36**	**303**

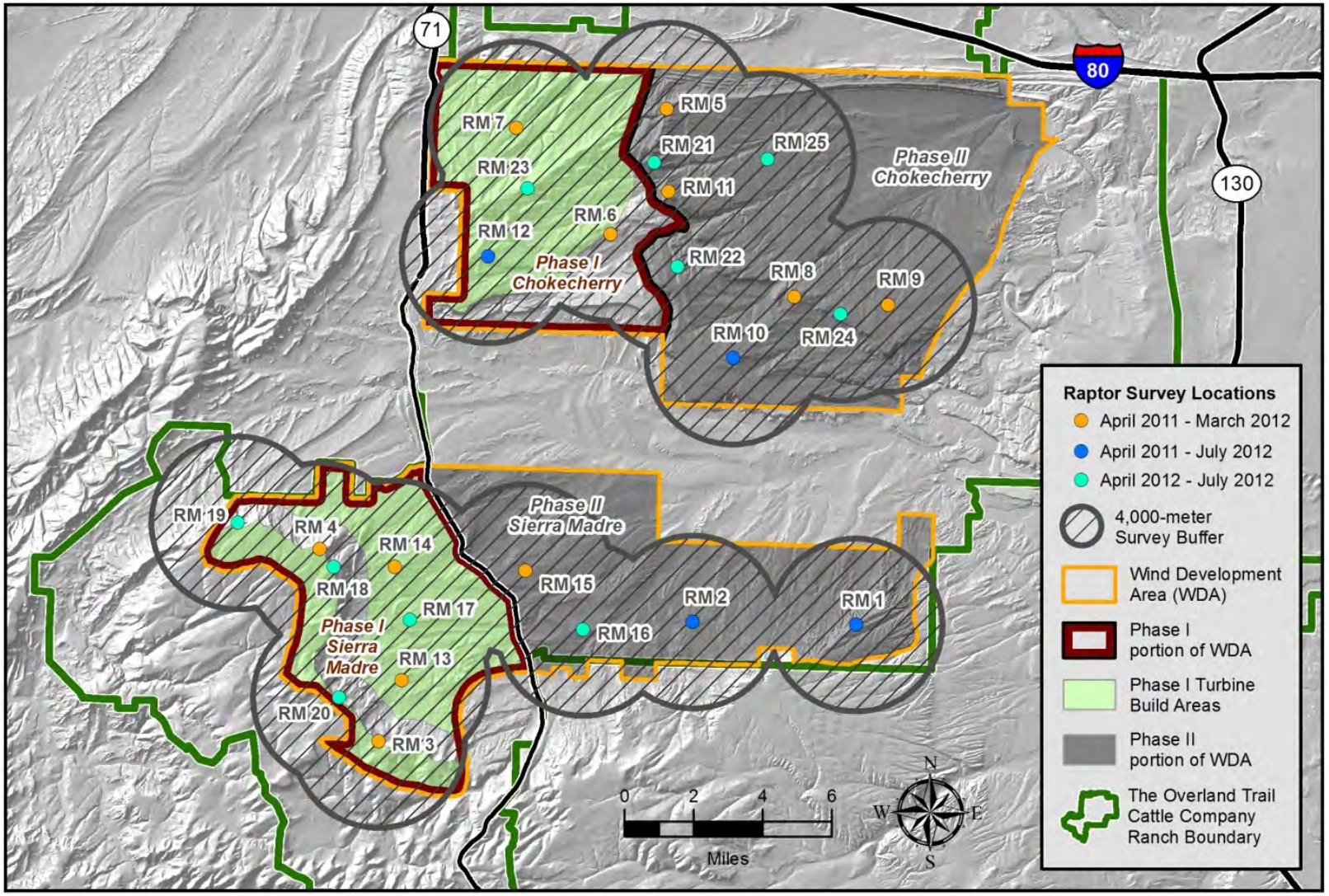


Figure 4.5. Long-watch Raptor Survey Locations, April 2011 to July 2012.

800-meter Raptor Count Surveys

Between August 20, 2012, and November 9, 2012, 1,382 biweekly 800-meter raptor count surveys were conducted at 40 locations within the CCSM Project Site. *See Figure 4.6*. Following discussion with USFWS, the biweekly 800-meter raptor count surveys were increased to 60 sites between November 12, 2012, and August 30, 2013, to achieve additional coverage. *See Figure 4.7. See Appendix E & F*.

PCW's 800-meter raptor count surveys provide more than 30% coverage of the Phase I wind turbine layout. To obtain the desired coverage, minimum convex polygons (MCPs) were placed around potential wind turbine construction areas in the WDAs and were evaluated for differences in habitat characteristics, forage potential, and topography. Using the Geostatistical Analyst tools in ArcGIS, spatially balanced 800-meter raptor count survey locations were sequentially selected to capture the variability in habitat conditions, terrain features, and wind turbine numbers and densities, while ensuring that no overlap occurred between survey locations. The total number of sampling locations per MCP was based on the relative surface area, number of wind turbines, and wind turbine densities in each MCP.

The 800-meter raptor count surveys were generally conducted for 1 hour at each site (on rare occasions weather conditions and visibility truncated the 1 hour survey time), and data collected for each raptor observed during these surveys included species, number of individuals, age, sex, distance from observer, bearing to the bird, heading of the bird, height, flight behavior, and number of flight minutes. Flight paths were also recorded on aerial maps for each raptor detected. The 800-meter raptor count surveys were conducted within 800-meter radius plots in order to maintain high confidence in detection and identification of raptors, and in the recording of their flight paths.

From August 2012 to August 2013, 800-meter raptor count surveys were conducted across the CCSM Project Site for a total of 97,573 minutes (1,626 hours), covering 35.5% of the total daylight minutes during this period. Of these surveys, 51,964 minutes (866 hours) of survey were conducted within the Phase I Development Area. Fifteen survey locations in the Phase I portion of the Chokecherry WDA were surveyed for a total of 21,364 minutes. Eighteen survey locations in the Phase I portion of the Sierra Madre WDA were surveyed for a total of 30,600 minutes. Data from the 800-meter raptor count surveys were used to further identify high raptor use areas for the purpose of micrositing Phase I to avoid and minimize impacts to raptors and other migratory bird and bat species.

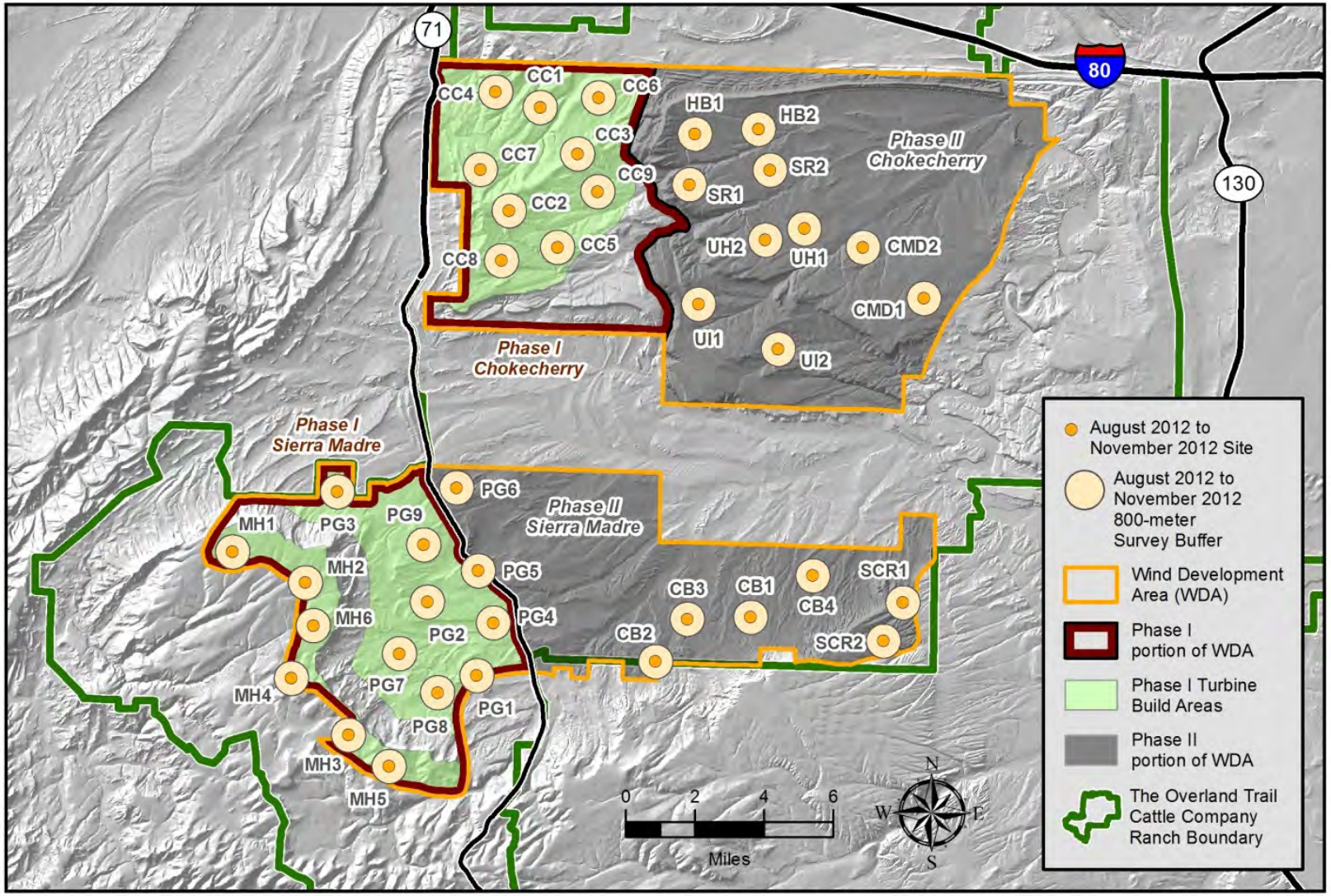


Figure 4.6. 800-meter Raptor Count Locations, August 2012 to November 2012.

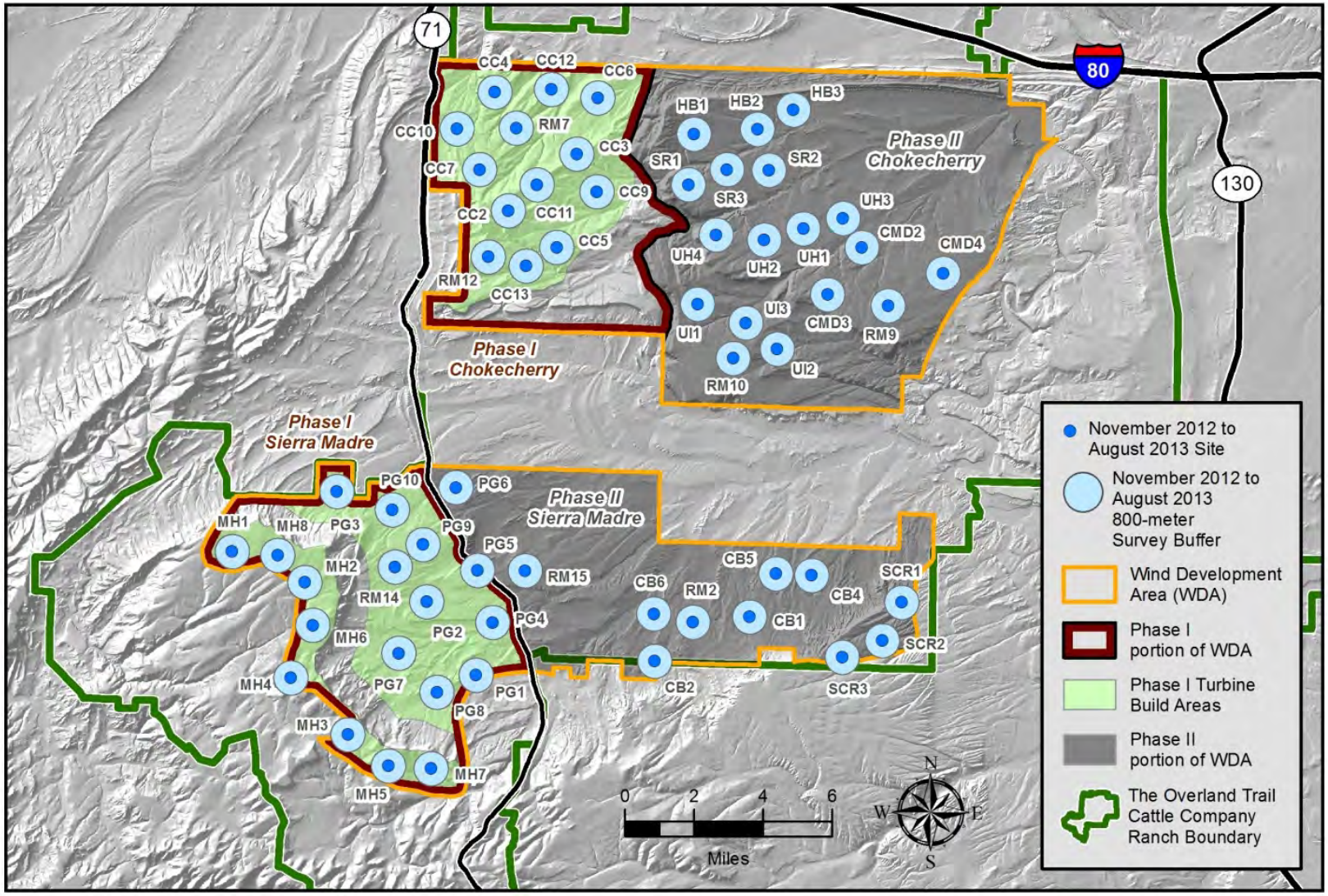


Figure 4.7. 800-meter Raptor Count Locations, November 2012 to August 2013.

A total of 104 non-eagle raptors were observed during the 2012-2013, 800-meter raptor counts. The number of non-eagle raptors observed was highest during the fall of 2012 with slightly fewer individuals observed during the spring and summer months of 2013. Very low use was observed during winter 2012-2013, with only 3 individual non-eagle raptors observed. American kestrel was the most commonly observed species in the Phase I portions of both the Chokecherry and Sierra Madre WDAs and made up 28% (29 of 104 observations) of all non-eagle raptor observations. Other common non-eagle raptor species in order of abundance included Swainson's hawk (24 observations, 23%), northern harrier (15 observations, 14%), and red-tailed hawk (14 observations, 13%). While Swainson's hawk was the second most abundant species based on number of individuals observed, 13 of the 24 individuals (54%) were observed in a single migrating group on September 11, 2012. *See Table 4.5*.

During the fall of 2012 (August 20 to November 9, 2012), over 281.6 hours of survey were completed within the Phase I Development Area. American kestrel, Swainson's hawk, red-tailed hawk, and northern harrier were the most commonly observed non-eagle raptor species in both the Sierra Madre and Chokecherry WDAs. As described above, 13 of the 18 (72%) of the Swainson's hawks observed during Fall 2012 were associated with a single migrating group. Ferruginous hawk, merlin, prairie falcon, rough-legged hawk, and sharp-shinned hawk were also observed, primarily in the Sierra Madre WDA, but accounted for a small percentage of total observations and use.

During the winter of 2012-2013 (November 12, 2012, to March 29, 2013), over 267.5 hours of survey were completed within the Phase I Development Area. Use of the Phase I Development Area by raptors was very low during the winter months. Rough-legged hawk was the only non-eagle raptor observed during winter months. A single ferruginous hawk was recorded in late March 2013 (March 21), likely an early spring migrant. During winter months, there was no observed non-eagle raptor use in the Phase I portions of the Sierra Madre WDA. All winter non-eagle raptor use across the Phase I Development Area occurred in the Chokecherry WDA.

During the spring of 2013 (April 1 to June 21, 2013), over 178 hours of survey were completed within the Phase I Development Area. American kestrel, red-tailed hawk, northern harrier, and Swainson's hawk were the most commonly observed species. Additional species observed during this period included prairie falcon, rough-legged hawk, ferruginous hawk, and merlin.

During the summer of 2013 (June 24 to August 30, 2013), over 160 hours of survey were completed within the Phase I Development Area. Species observed included American kestrel, northern harrier, red-tailed hawk, prairie falcon, and Swainson's hawk.

Table 4.5. Phase I Non-eagle Raptor Observations, 2012-2013 800-meter Raptor Count Surveys.

Species	Fall 2012	Winter 2012-2013	Spring 2013	Summer 2013	Total
Phase I Chokecherry WDA					
American Kestrel	2	---	2	1	5
Ferruginous Hawk	---	1	---	---	1
Northern Harrier	1	---	1	---	2
Prairie Falcon	---	---	1	---	1
Rough-legged Hawk	---	2	1	---	3
Red-tailed Hawk	---	---	1	---	1
Swainson's Hawk	1	---	---	---	1
Unknown Buteo	---	---	1	---	1
Phase I Sierra Madre WDA					
American Kestrel	10	---	3	11	24
Ferruginous Hawk	2	---	3	---	5
Merlin	1	---	1	---	2
Northern Harrier	3	---	5	5	13
Prairie Falcon	1	---	1	4	6
Rough-legged Hawk	1	---	---	---	1
Red-tailed Hawk	5	---	4	4	13
Sharp-shinned hawk	1	---	---	---	1
Swainson's Hawk	17	---	4	2	23
Unknown Buteo	---	---	1	---	1
Totals	**45**	**3**	**29**	**27**	**104**

Raptor Nest Surveys

As discussed in section 4.3.1, BLM has collected information on nests within the CCSM Project Site since 1980 (a 33-year period) and in May of 2008 PCW conducted aerial surveys for raptor nests within a 1-mile buffer of the Original Proposed Action. To provide further site-specific data to assess potential impacts to raptors from the CCSM Project, PCW conducted additional raptor nest surveys in April and May of 2011, 2012, 2013 and 2014. PCW's 2011 through 2014 raptor nest surveys were conducted in suitable nesting habitats within the CCSM Project Site and a 8-kilometer (5-mile) buffer surrounding the CCSM Project (approximately 700 square miles), which includes all of Phase I. *See Figure 4.8. See Appendix F.* An 8-kilometer-wide (5-mile-wide) buffer was determined to be appropriate for the CCSM Project in coordination with USFWS and BLM based on calculated golden eagle inter-nest distances in the CCSM Project vicinity. Within the survey area, all previously recorded nest locations identified in BLM's nest database were visited. Additionally, surveys recorded all new nests that were not previously identified in BLM's nest database or as part of 2008 raptor nest surveys. Ground surveys were conducted for all ferruginous hawk nest locations identified in BLM's nest database within the 8-kilometer survey buffer.

Location, nesting substrate, condition, and nesting status were recorded for each observed nest. For occupied nests, species, adult activity, and nestling activity were also recorded. Unoccupied nests were marked as unknown stick nests as it is not possible to determine what species may have built the nest, or what species may use the nest in the future. The quality of unoccupied nests was also assessed and placed into categories of good, fair, poor, or non-functional. Good nests were those that could support nesting activity with minimal rebuild or maintenance. Fair nests were those that would require substantial rebuild or maintenance. Poor nests were those that had evidence of nest structure but would require an entire rebuild of the nest. Non-functional nests were those that had only marginal evidence of past nesting (a few sticks on a ledge), had been destroyed, or had completely fallen from the nest substrate.

Ground surveys were conducted to monitor the status of occupied nests located during the aerial nest surveys and to search areas that were inaccessible during aerial surveys due to high winds or other weather conditions. For all occupied nests, ground surveys were conducted once every three weeks until a nest was determined to have fledged or failed at which time the nest was reclassified as unoccupied. During each visit, nests were surveyed for four hours or until current status was determined. Data collected included date and time of visit, condition of the nest, number of adults/eggs/nestlings present at the nest, behavior of the birds present, and any other notes pertinent to the current activity or status of the nest.

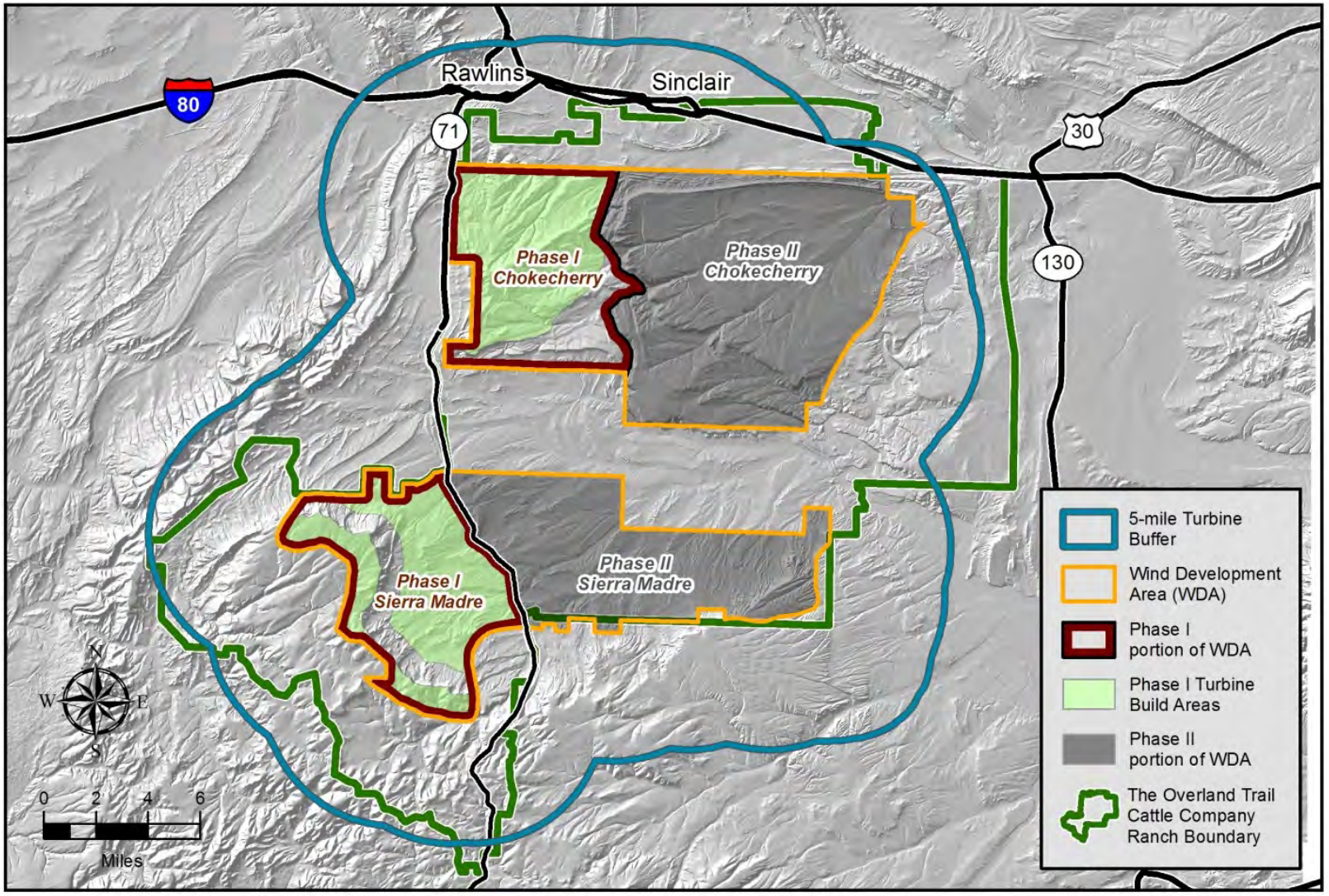


Figure 4.8. Aerial Raptor Nest Survey Area, 2011 through 2014.

2011 Nest Surveys

In 2011, aerial raptor nest surveys were conducted for the CCSM Project on May 25 and June 10 to assess nest activity. Follow-up ground surveys were completed between July 5 and August 2, 2011, to monitor the status of occupied nests. A total of 11 occupied non-eagle raptor nests (6 red-tailed hawk, 3 prairie falcon, 1 unknown *Buteo*, and 1 American kestrel) were located within the raptor nest survey area primarily outside of the CCSM Project WDAs. *See Appendix F*. One occupied red-tailed hawk nest was located within the Phase I portion of the Chokecherry WDA, and one occupied American kestrel nest was located near the Phase I portion of the Chokecherry WDA. One occupied red-tailed hawk nest was located within the Phase I portion of the Sierra Madre WDA. *See Figure 4.9 & Figure 4.10.*

In 2011, PCW also visited all historic ferruginous hawk nests within the raptor nest survey area that were recorded in the BLM nest database. These nests were surveyed to determine the current status and condition. Data collected included presence/absence of a nest at each site; a description of the condition of the nest (if a nest was detected); a description of the habitat surrounding the site; photographs of the nest and surrounding habitat; and the presence of other features that could suggest recent ferruginous hawk activity (e.g., feathers, whitewash, fresh nesting materials, etc.). All historic ferruginous hawk nests in the survey area were unoccupied in 2011, and many of the nests were categorized as non-functional. Of the 40 nests in the BLM database, only 15 nests were located, many with almost no structure remaining and only 2 to 3 in a condition that suggests they have recently supported nesting activities. *See Appendix F.*

2012 Nest Surveys

Aerial raptor nest surveys were conducted for the CCSM Project on April 25-26 and May 8, 2012, with follow-up ground surveys from May 24 to July 27, 2012. A total of 22 occupied non-eagle raptor nests (10 red-tailed hawk, 9 prairie falcon, 2 American kestrel, and 1 great horned owl) were located within the raptor nest survey area primarily outside of the CCSM Project WDAs. *See Figure 4.11 & Figure 4.12.* No occupied nests were located within the Phase I portion of the Chokecherry WDA. Two occupied red-tailed hawk nests were located within the Phase I portion of the Sierra Madre WDA. *See Figure 4.11 & Figure 4.12*. No occupied ferruginous hawk nests were located in 2012. *See Appendix F*.

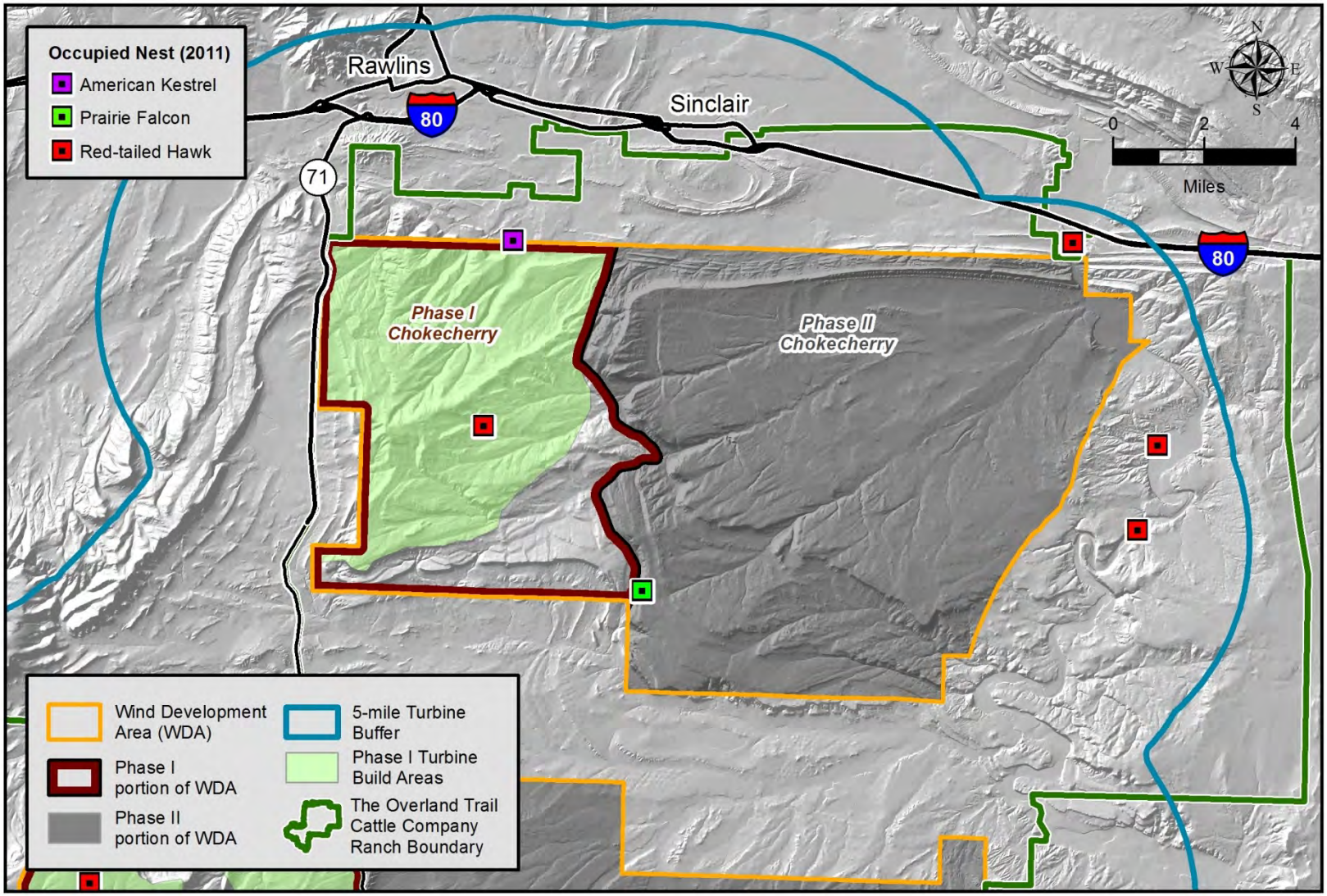


Figure 4.9. Chokecherry WDA Occupied Non-eagle Raptor Nests, 2011.

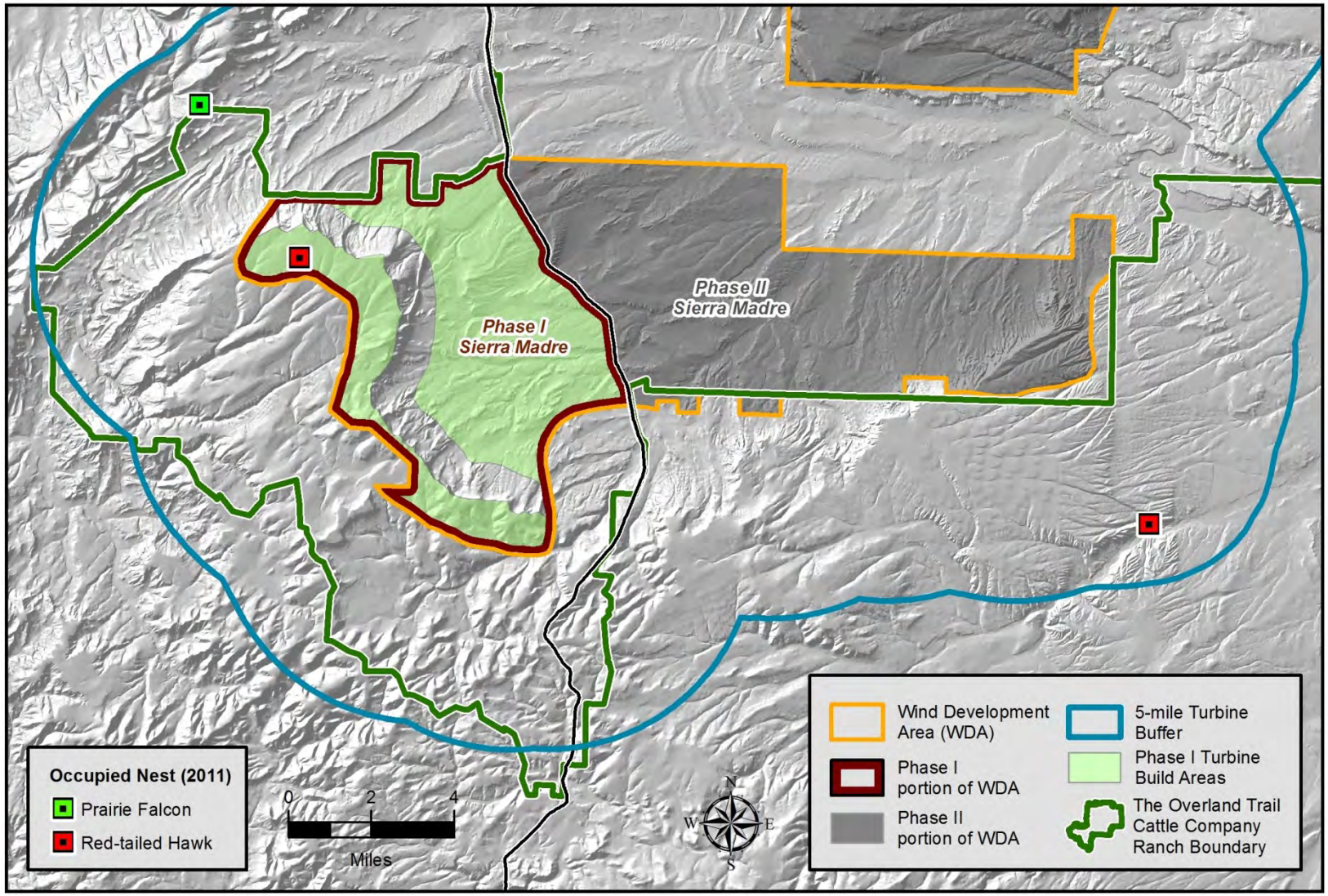


Figure 4.10. Sierra Madre WDA Occupied Non-eagle Raptor Nests, 2011.

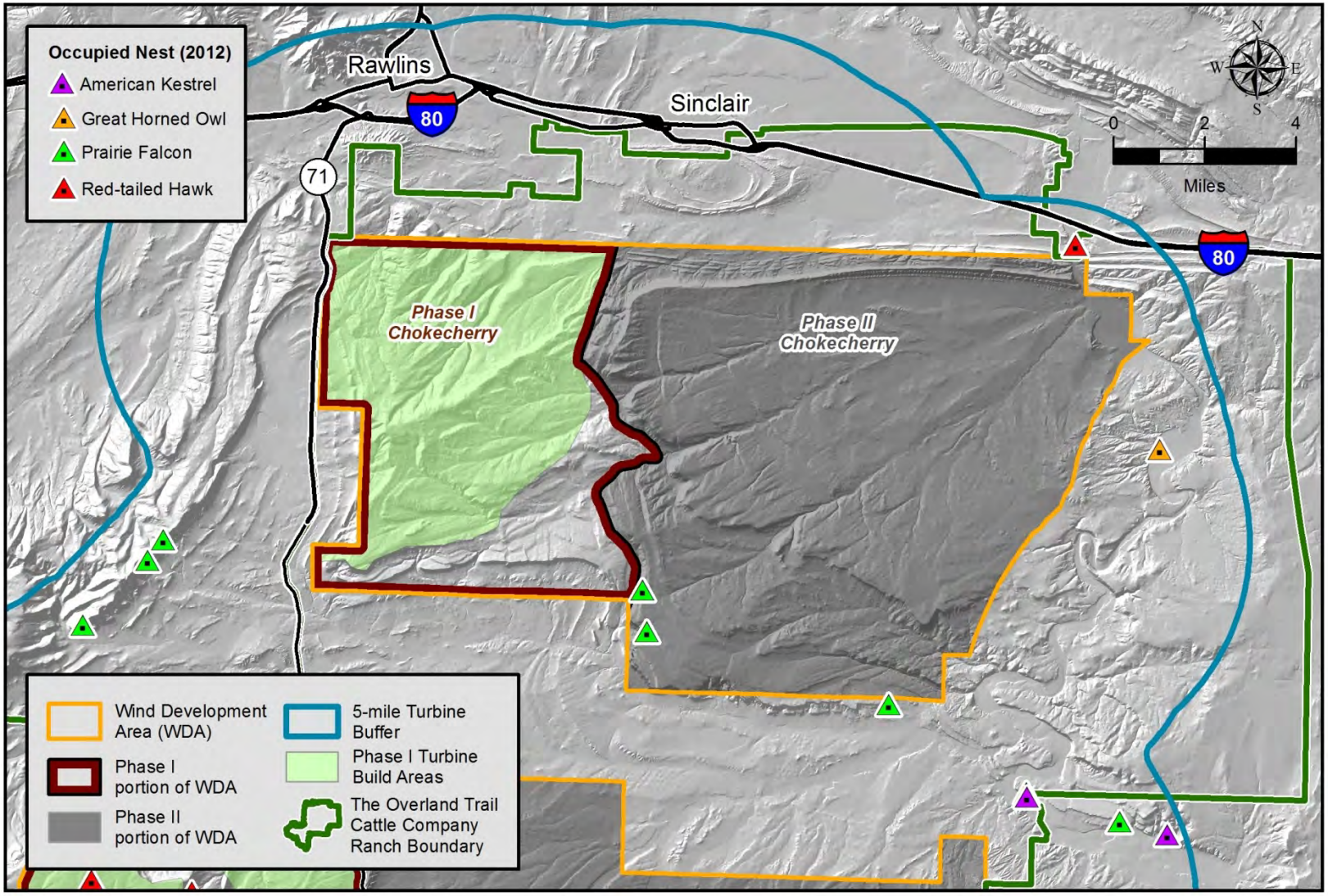


Figure 4.11. Chokecherry WDA Occupied Non-eagle Raptor Nests, 2012.

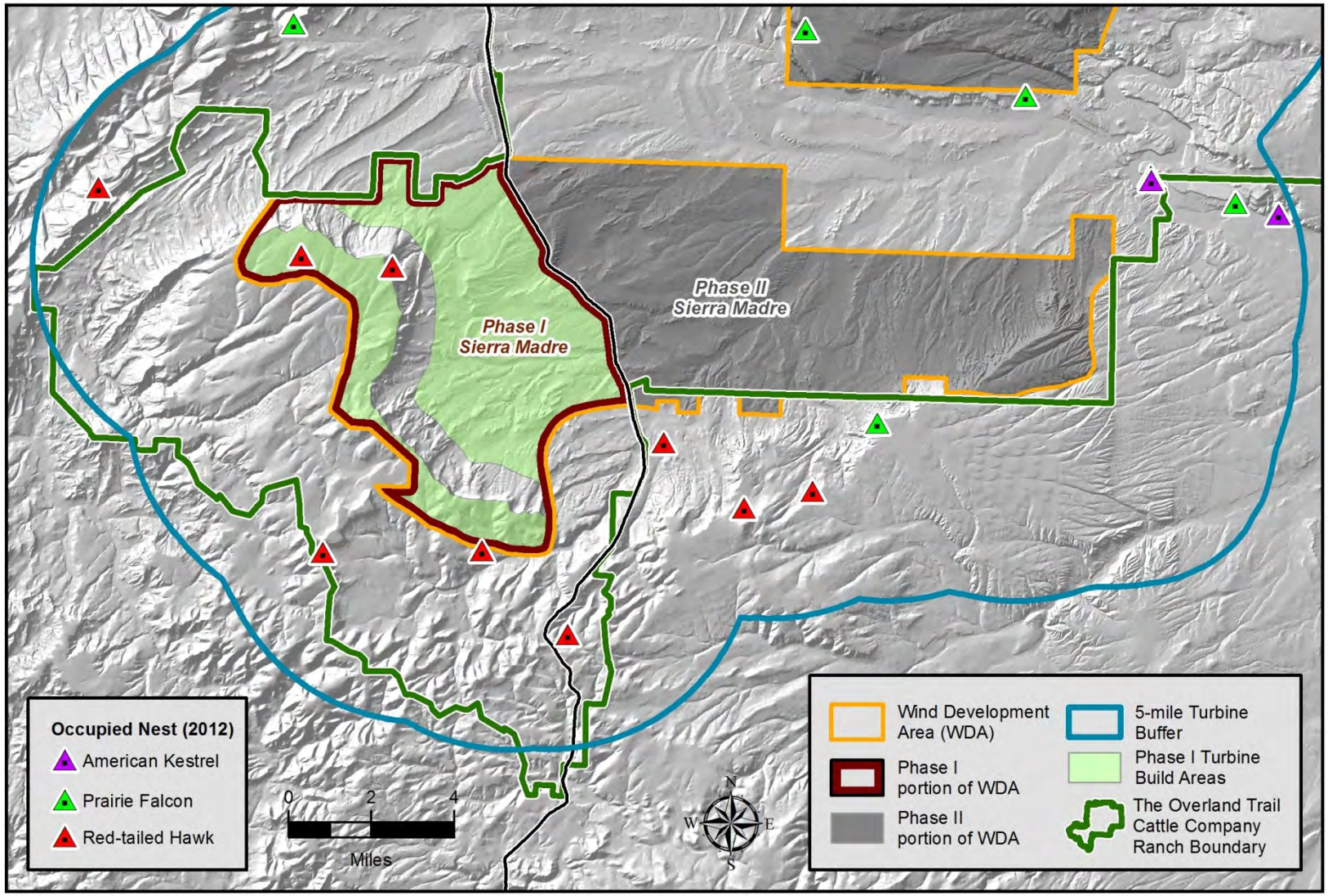


Figure 4.12. Sierra Madre WDA Occupied Non-eagle Raptor Nests, 2012.

2013 Nest Surveys

Aerial raptor nest surveys were conducted for the CCSM Project on April 24-25, 2013, with follow-up ground surveys conducted between May 21 and July 26. A total of 14 occupied non-eagle raptor nests (6 red-tailed hawk, 4 prairie falcon, 3 great horned owl, and 1 American kestrel) were located in the survey area primarily outside of the CCSM Project WDAs. One occupied red-tailed hawk nest was located in the Phase I portion of the Chokecherry WDA. One occupied red-tailed hawk nest and one occupied American kestrel nest were located in the Phase I portion of the Sierra Madre WDA. *See Figure 4.13 & Figure 4.14.* No occupied ferruginous hawk nests were located in 2013. *See Appendix F*.

2014 Nest Surveys

Aerial raptor nest surveys were conducted for the CCSM Project May 1 and 14, 2014, with follow-up ground surveys conducted between May 22 and July 21. A total of 24 occupied non-eagle raptor nests (12 red-tailed hawk, 5 great horned owl, 4 prairie falcon, 2 Swainson's hawk, and 1 unidentified *Buteo*) were located in the survey area primarily outside of the CCSM Project WDAs. One occupied red-tailed hawk nest and one occupied great horned owl nest were located in the Phase I portion of the Sierra Madre WDA. *See Figure 4.15 & Figure 4.16.* No occupied ferruginous hawk nests were located in 2014. *See Appendix F*.

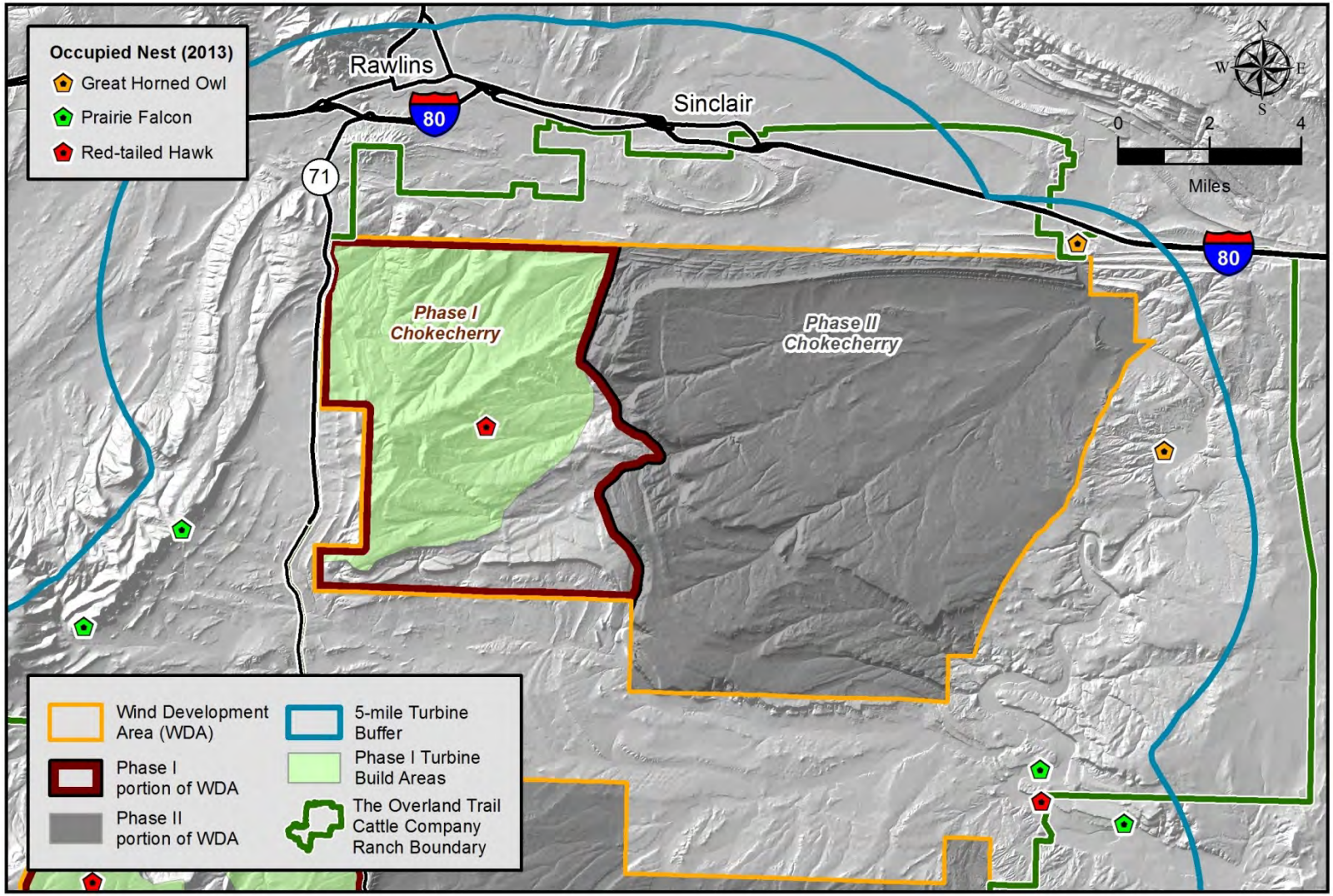


Figure 4.13. Chokecherry WDA Occupied Non-eagle Raptor Nests, 2013.

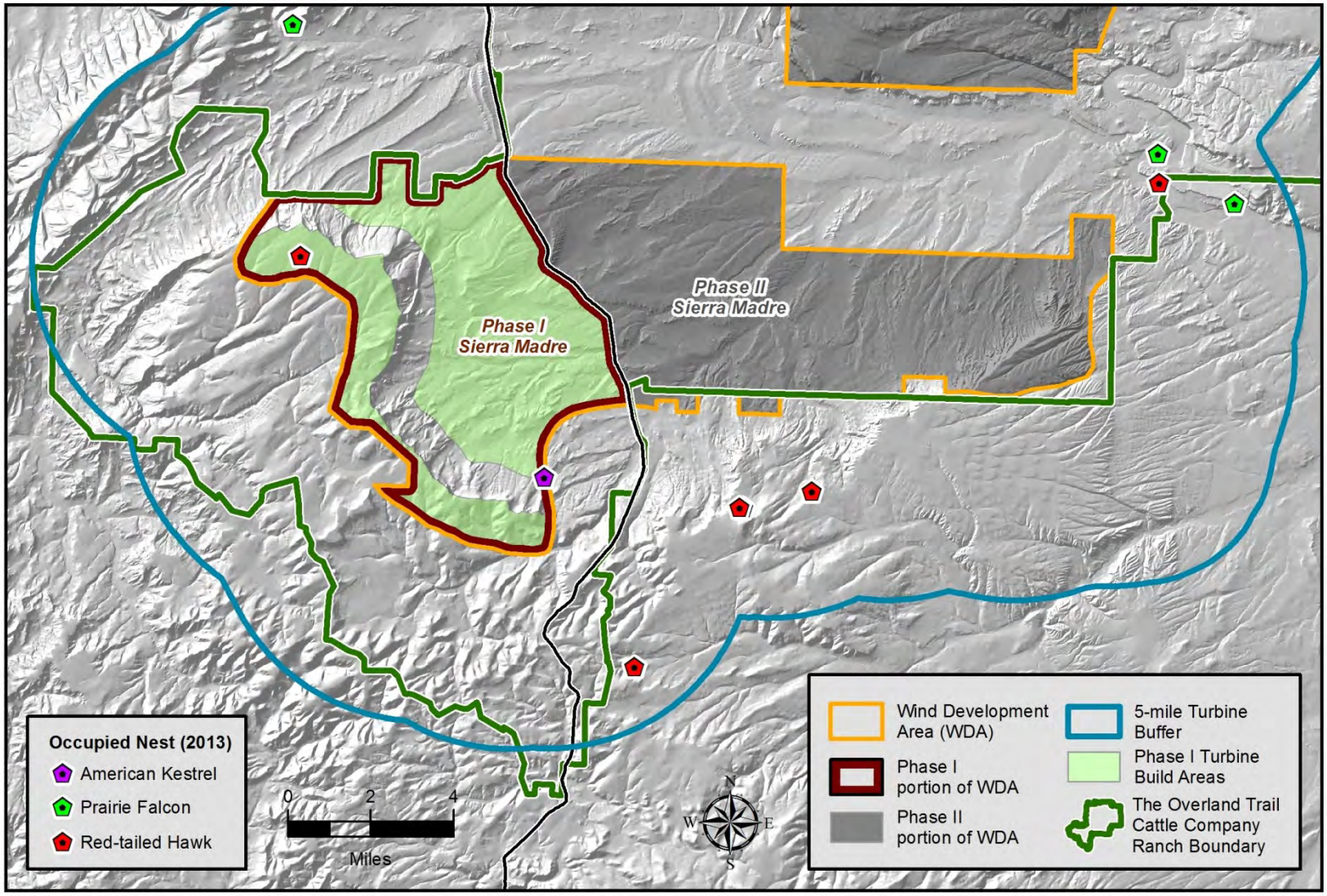


Figure 4.14. Sierra Madre WDA Occupied Non-eagle Raptor Nests, 2013.

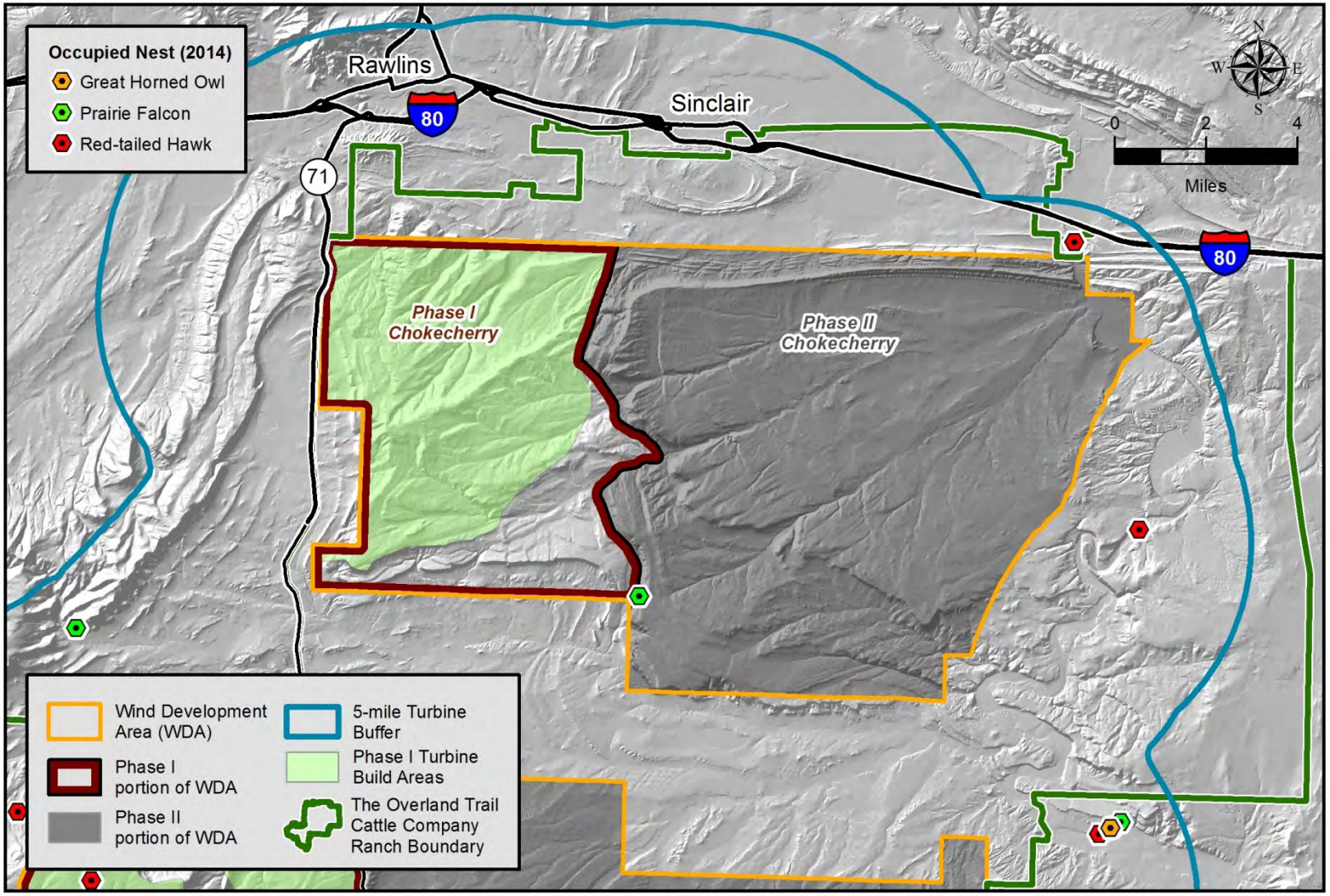


Figure 4.15. Chokecherry WDA Occupied Non-eagle Raptor Nests, 2014.

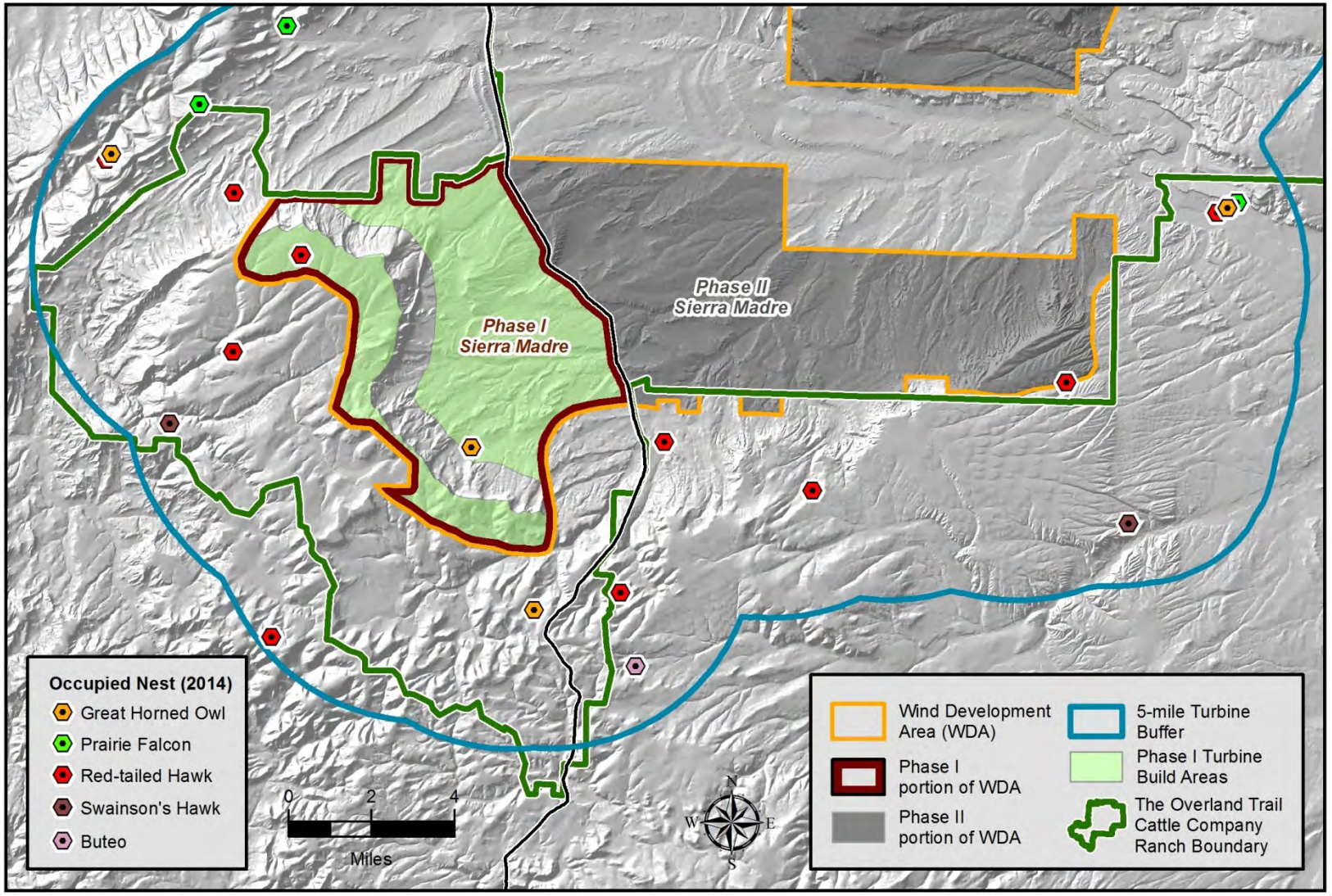


Figure 4.16. Sierra Madre WDA Occupied Non-eagle Raptor Nests, 2014.

Migratory Bird Surveys

From April 2011 through March 2012, PCW completed 295 migratory bird point count surveys at 15 locations across the CCSM Project Site with 136 surveys completed at the 7 locations within the Phase I Development Area. *See Figure 4.17.* Migratory bird point count surveys were completed in conjunction with long-watch raptor surveys. *See "Long-watch Raptor Surveys."* Similar to the long-watch raptor surveys, the duration and frequency of the migratory bird point count surveys varied by season in accordance with the recommendations of the federal and state agencies. However, survey minutes were evenly distributed across all daylight hours and between sites within each season.

Migratory bird point count surveys were conducted for 20 minutes at each survey location. Migratory bird point count surveys were conducted in 200-meter radius plots strategically distributed across the two WDAs to maximize coverage for the purposes of identifying high use areas and potential migratory pathways. The protocols used for the migratory bird point count surveys are included in Appendix D. Data collected for each observation included species, number of individuals, distance from observer, flight behavior, and general demographics. Variables used to characterize migratory bird use in Phase I include number of species, number of individuals, number of flocks, species frequency (the percentage of 20-minute surveys on which a species was observed), occurrence frequency (percentage of surveys with at least one bird detection), and mean use (average number of individuals per 20-minute survey).

From April 2011 to March 2012, 753 individuals in 453 flocks representing 34 species were recorded during the 136 migratory bird point count surveys in the Phase I Development Area. There were no birds observed for 33 (24%) of those surveys. Across all seasons, mean observed migratory bird use was 5.6 individuals per 20-minute survey. Horned lark was the most commonly observed individual accounting for 401 individuals (53%) with a mean use of 2.9 individuals per 20-minute survey. Horned lark was also the most frequently encountered species with the species recorded during 85 surveys (63%). Following the horned lark, the most abundant species regularly recorded were Brewer's sparrow with 41 individuals recorded and vesper sparrow with 34 individuals recorded. More American crows were observed than Brewer's sparrows or vesper sparrows. However, all 55 American crow recorded were from two large flocks observed in October 2011 during fall migration. The number of migratory birds observed per survey in the Phase I Development Area remained relatively consistent throughout the spring, summer, and fall survey periods. However, use in winter months was much lower than that observed in the other three seasons with only 15 birds (12 horned larks, 2 common ravens, and 1 mountain bluebird) observed from December 1, 2011, through April 1, 2012. *See Table 4.6.*

Table 4.6. Migratory Birds Observations by Species, 2011-2012 Migratory Bird Surveys.

Species/Species Group	Spring 2011	Summer 2011	Fall 2011	Winter 2011-2012	Total
Corvids					
American Crow	0	0	55	0	**55**
Black-billed Magpie	3	0	2	0	**5**
Common Raven	9	0	3	2	**14**
Passerines					
American Goldfinch	0	2	2	0	**4**
American Robin	6	3	9	0	**18**
Brewer's Sparrow	23	14	4	0	**41**
Green-tailed Towhee	4	2	0	0	**6**
Horned Lark	131	61	197	12	**401**
Mountain Bluebird	2	6	5	1	**14**
Rock Wren	4	3	2	0	**9**
Sagebrush Sparrow	20	8	2	0	**30**
Sage Thrasher	15	3	1	0	**19**
Song Sparrow (*Melospiza melodia*)	3	1	0	0	**4**
Tree Swallow (*Tachycineta bicolor*)	1	4	0	0	**5**
Vesper Sparrow	24	9	1	0	**34**
Violet-green Swallow (*Tachycineta thalassina*)	3	1	0	0	**4**
Western Meadowlark	9	7	8	0	**24**
Other Passerines[1]	16	24	16	0	**56**
Non-Eagle Raptors, Owls, and Allies					
American Kestrel	1	1	3	0	**5**
Northern Harrier	1	0	0	0	**1**
Red-tailed Hawk	1	0	0	0	**1**
Other Birds					

Species/Species Group	Spring 2011	Summer 2011	Fall 2011	Winter 2011-2012	Total
Northern Flicker	2	0	0	0	**2**
Rufous Hummingbird (*Selasphorus rufus*)	0	1	0	0	**1**
Total	**278**	**150**	**310**	**15**	**753**

Notes:

1. Other passerines include unknown passerines that could not be identified to species level, as well as species that were observed fewer than 4 times during surveys, e.g. western kingbird (*Tyrannus verticalis*), Brewer's blackbird, dark-eyed junco, brown-headed cowbird (*Molothrus ater*), and savannah sparrow (*Passerculus sandwichensis*). Appendix B lists all passerine species that have been observed across the CCSM Project Site, including Phase I.

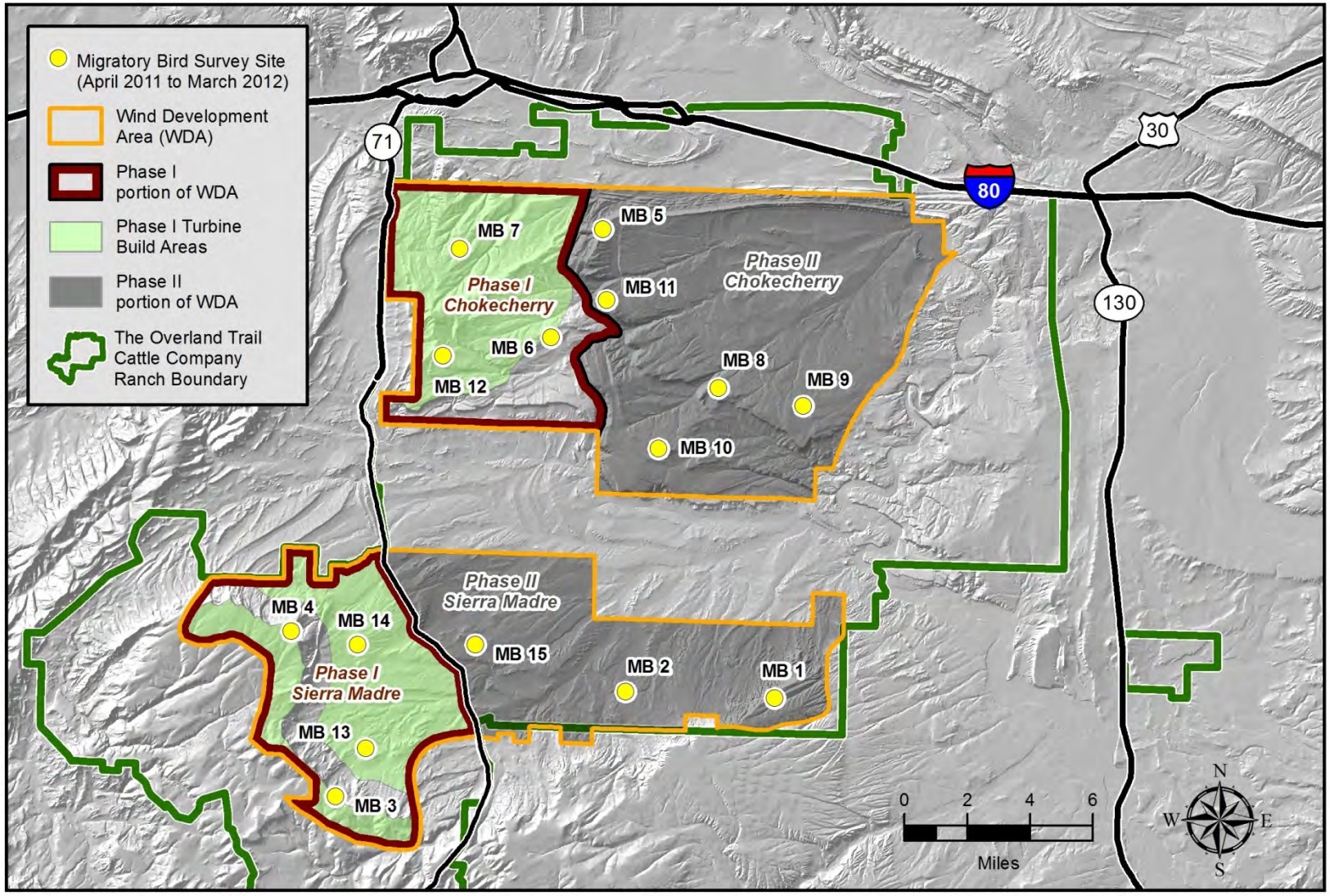


Figure 4.17. Migratory Bird Survey Locations, April 2011-March 2012.

Avian Radar Surveys

A DeTect Merlin avian radar system was used to map bird and bat use across the CCSM Project Site to identify bird and bat use areas. The radar was installed in March 2011 and operated through the end of March 2013 at nine different locations across the CCSM Project Site covering 100% of the Phase I wind turbine locations. *See Figure 4.18.* The radar is a trailer-mounted system with a 200-watt horizontal solid-state S-band radar and a 10-kilowatt vertically operating X-band open array radar. The horizontal scanning radar (HSR) has a range of up to 7.4 kilometers (4.6 miles) for raptors and other large targets in a 360-degree pattern around the unit. The HSR is able to record how targets use topographic features within the CCSM Project Site by collecting accurate location data for each target as it moves through the radar scanning area. The vertical scanning radar (VSR) has a 24-degree beam width and detects flight paths up to 3 kilometers (2 miles) or more for raptors and other large targets above the unit. The HSR does not collect altitudinal data for biological targets; however, the elevation of targets may be collected if they pass through the footprint of the VSR. These data are critical for determining the relative percentage of targets passing through the RSZ versus those flying above and below the RSZ. The radar ran continuously, collecting data for movements of birds and bats throughout the day and night. The relative numbers of birds and bats passing through the scanning area, as well as the relative size of each target, can be derived from the radar data.

Between March 2011 and March 2013, the radar collected more than 5,000 hours of data on birds and bats that crossed through the scanning radius of the HSR and/or VSR, whether they were individual targets, small flocks, or broad-front migratory movements. However, two primary factors limit the use of this avian radar data. First, radar technology cannot detect avian use when it occurs in close proximity to topographic relief that reflects the radar signature. Therefore, avian use can only be detected and recorded when there is a minimal amount of backscatter from the radar. For this reason, many of the topographic features commonly associated with raptor use (ridgelines, cliffs, etc.) cannot be mapped using the avian radar system. Second, current avian radar technology is unable to distinguish between different avian and bat species. Data for each target identified by the radar is recorded as a series of more than 60 variables based on different measures of recorded pixel size and shape. These variables can differ greatly within species and even for a single individual; therefore, it is not possible to definitively determine species from the dataset recorded by the radar system. Targets could be grouped based upon their relative size, but this can be problematic as well due to variance in individuals and overlap in variable values between species.

While the radar dataset has limitations, it was essential in the analysis of broad-front migratory bird movements across the CCSM Project Site, including Phase I. The data collected by the radar and analyzed by DeTect for the CCSM Project Site, including Phase I, consistently demonstrated that the highest average number of targets per hour occurred at night during the spring, summer and fall seasons. This is consistent with expected migratory pulses passing through the area. *See Appendix G.* Radar data collected throughout the survey period also show that the mean and median height of these biological targets are well above the rotor height of the wind turbines indicating that the majority of the

targets are not at risk of collision, as demonstrated by Figure 4.19.[21] *See Appendix G.* In fact, avian radar data from 2011-2012 demonstrate that 93% of targets were above rotor height during that period. *See Figure 4.20 through Figure 4.23.* Data also demonstrate that during migration events, migratory bird and bat species generally pass over the CCSM Project Site indicating that the area is not used as a stopover location. Data from the radar for the CCSM Project was analyzed by DeTect in two reports that are summarized below by season. *See Appendix G.* For purposes of comparison, the activity levels calculated from the avian radar survey data are reported in number of targets (birds or bats) within a 1-kilometer front per hour (targets per hour). Targets per hour are further reported by the time of day using the following defined periods:

- **Dawn** – 30 minutes before sunrise to 30 minutes after sunrise
- **Day** – 30 minutes after sunrise to 30 minutes before sunset
- **Dusk** – 30 minutes before sunset to 30 minutes after sunset
- **Night** – 30 minutes after sunset to 30 minutes before sunrise

Spring Season Radar Summary

Results from the spring season radar surveys (April 1 to June 30) were generally consistent across 2011 and 2012. *See Table 4.7.* The highest activity levels occurred during mid- to late April and late May to early June, primarily at night. The highest number of targets detected by the VSR both years was during the night, averaging 86.7 targets per hour in 2011 and 86.3 targets per hour in 2012. In 2011, the activity levels during the dawn, day and dusk periods remained relatively consistent, ranging from 15.6 to 20.8 targets per hour. However, the 2012 radar surveys showed a greater contrast in diurnal activity levels, with an average of 7.4 targets per hour at dawn, 26 targets per hour during the day, and 35.6 targets per hour at dusk.

The average mean target height during the spring season was highest at night for both 2011 and 2012 (432 meters [1,420 feet] in 2011 and 451 meters [1,480 feet] in 2012), with the lowest average mean target height occurring at dawn in 2011 (315 meters [1,030 feet]) and during the day in 2012 (407 meters [1,340 feet]). Target direction recorded by the HSR shows the bulk of targets recorded moving in a northwesterly direction during the dawn, dusk and night periods in 2011 and during dawn and night periods in 2012. The daytime period in 2011 and dusk period in 2012 showed no specific directional trend. Targets during the daytime period in 2012 generally moved in a northeasterly direction.

[21] The top rotor height for the Phase I wind turbines is 117 to 160 meters (383 to 525 feet). *See Figure 3.3 & Table 3.1.*

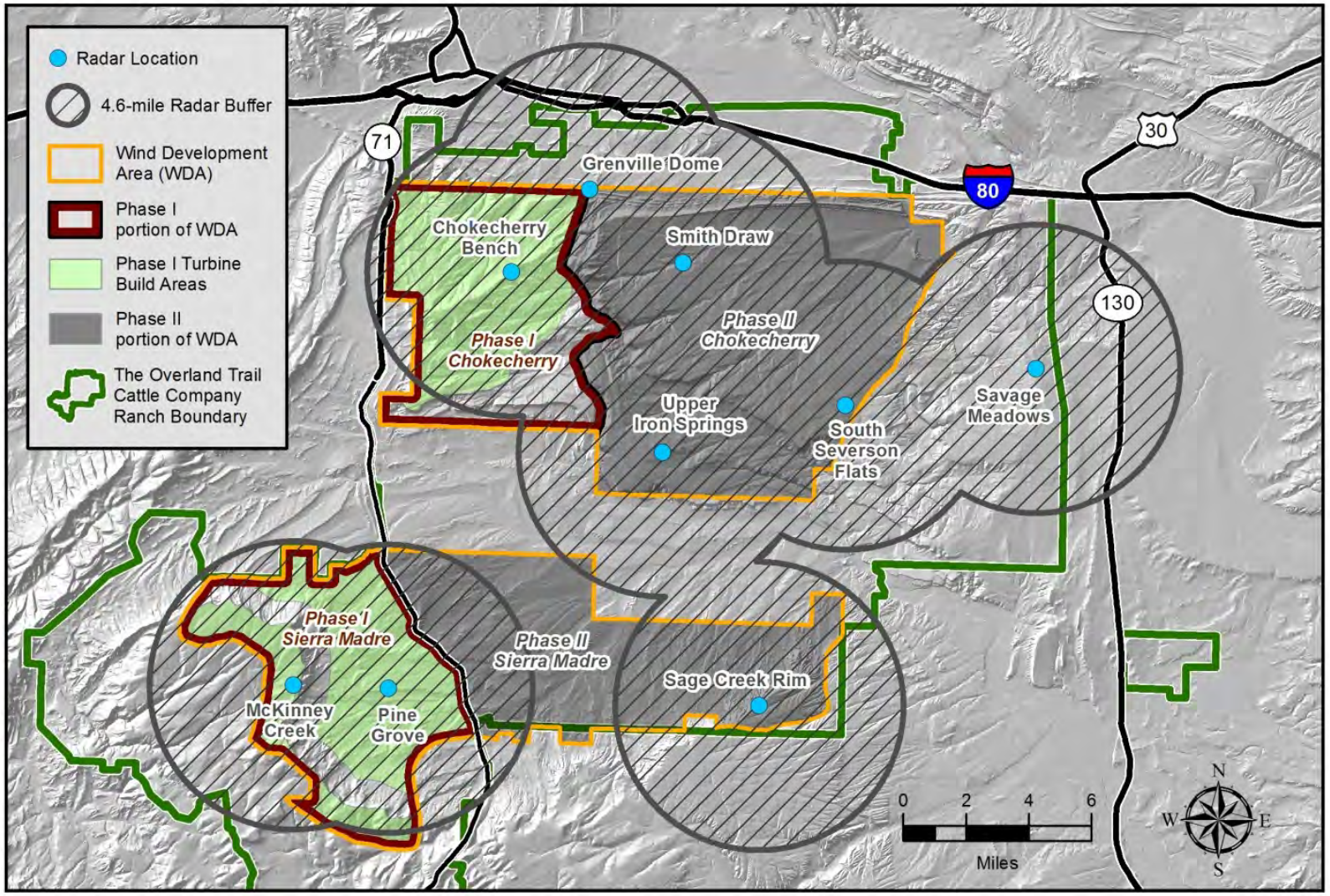
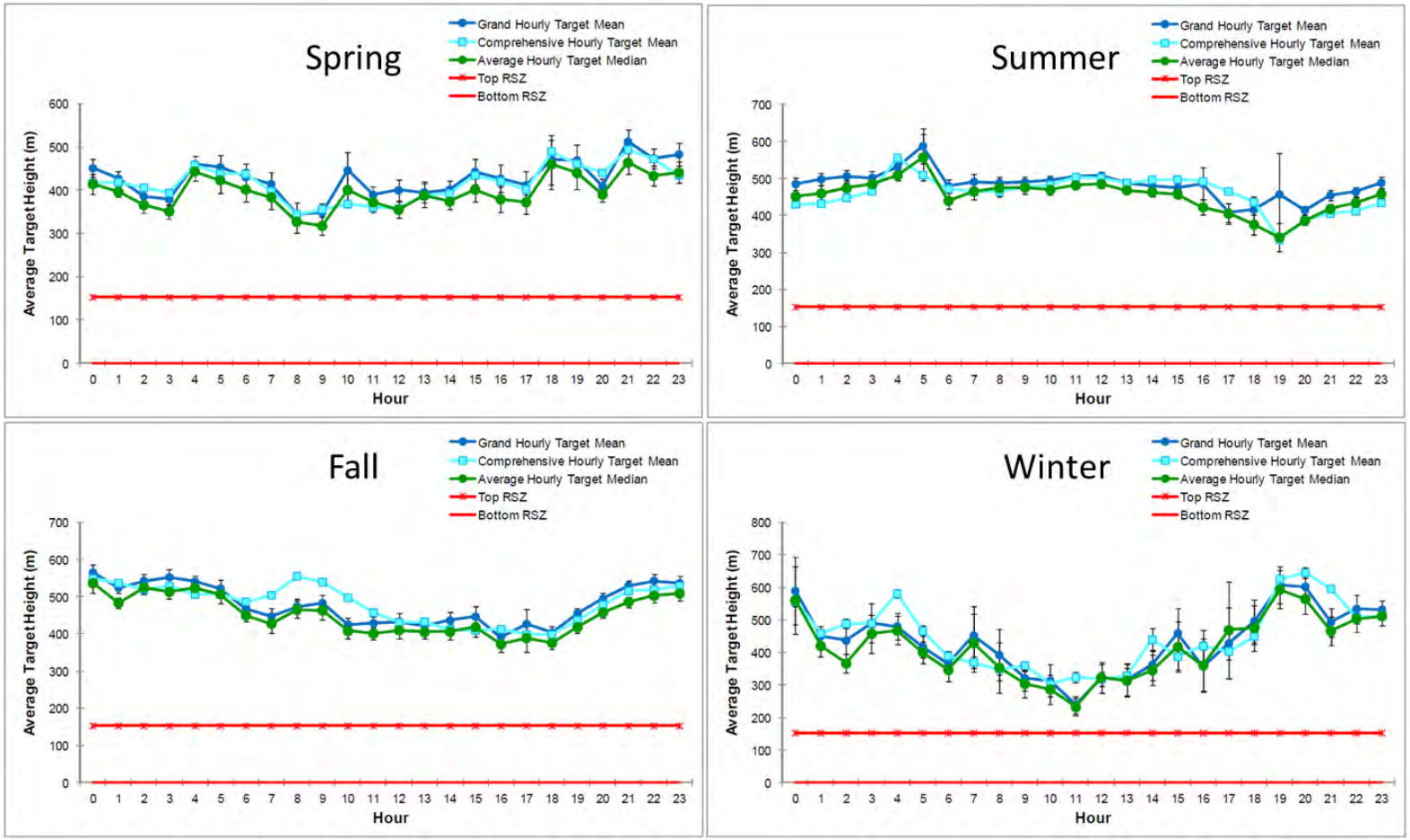


Figure 4.18. Avian Radar Locations, March 2011 to March 2013.



Notes:

1. Error bars represent one standard error for each hour.
2. Red lines represent the area between the ground and the maximum height of the rotor above the ground
3. Top RSZ shown on figure is 154.2 meters [500 feet].

Figure 4.19. Mean and Median Hourly Target Height by Season.

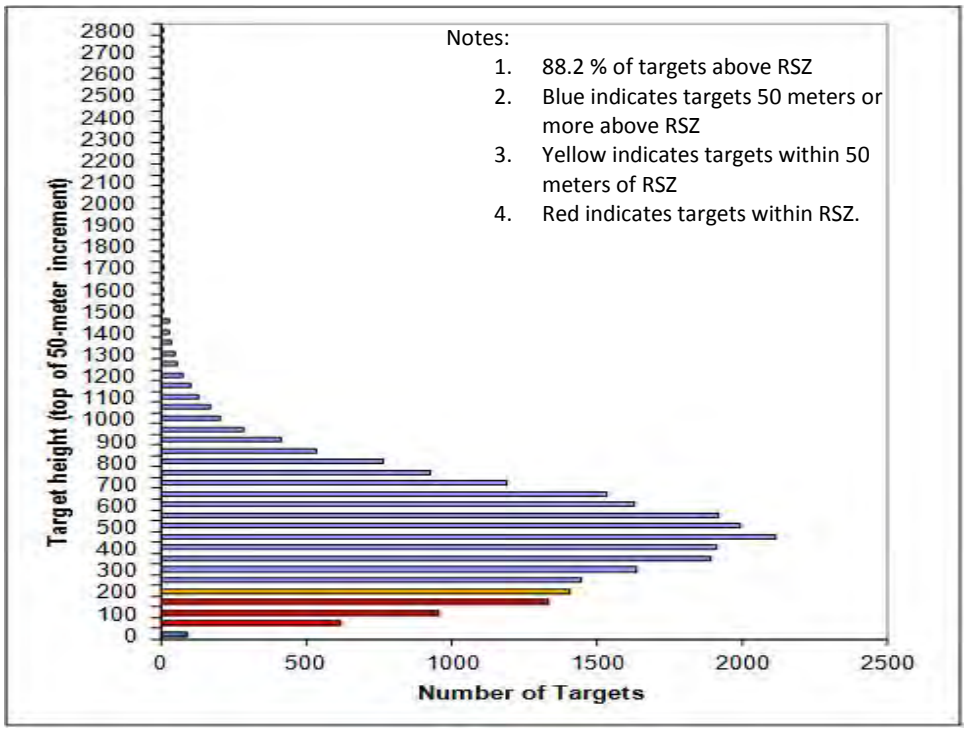


Figure 4.20. Target Height in 50-meter Increments, Spring 2011.

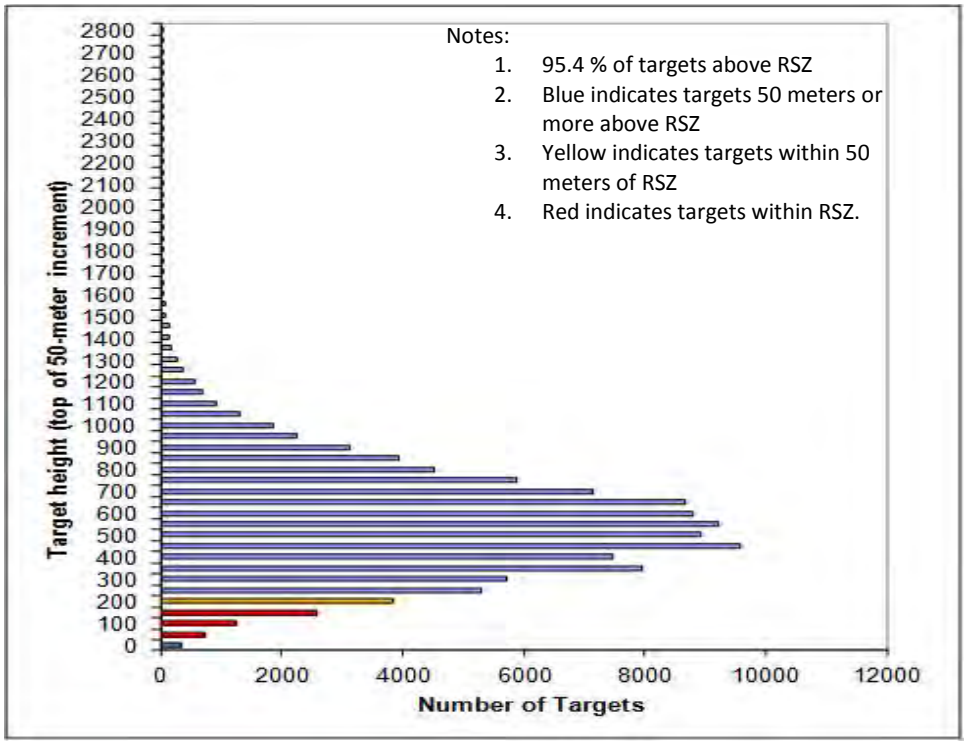


Figure 4.21. Target Height in 50-meter Increments, Summer 2011.

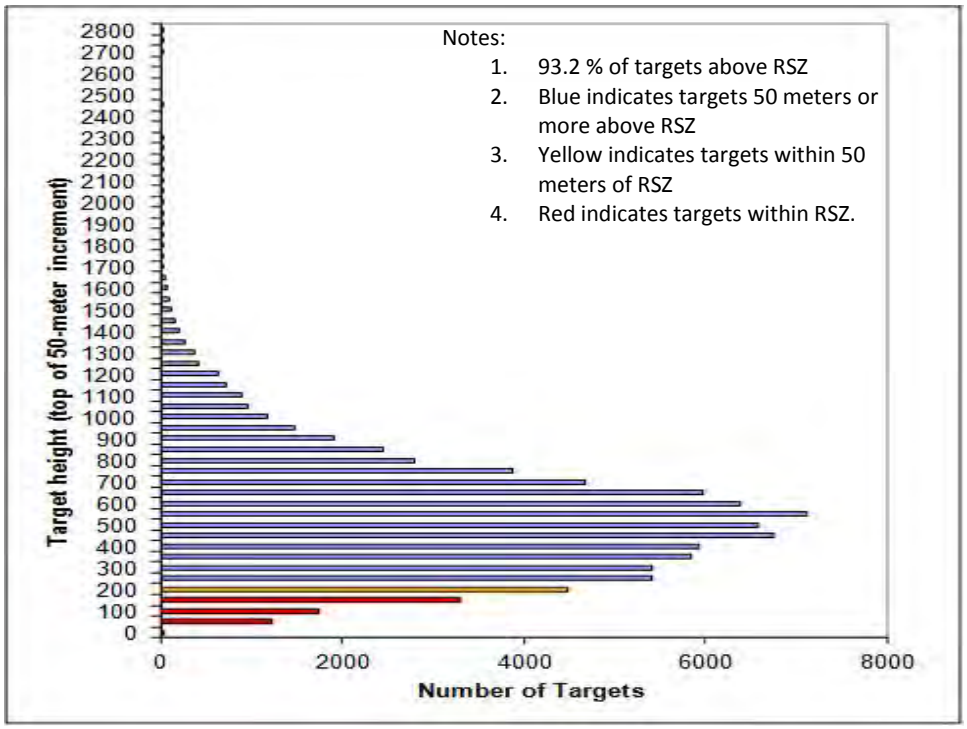


Figure 4.22. Target Height in 50-meter Increments, Fall 2011.

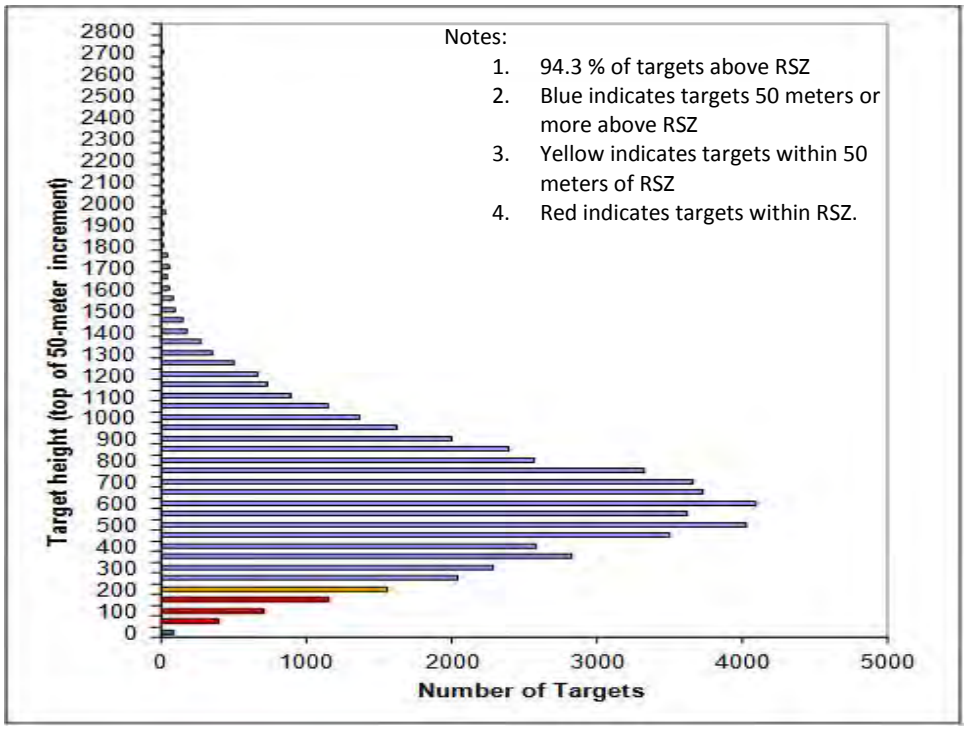


Figure 4.23. Target Height in 50-meter Increments, Winter 2011-2012.

Summer Season Radar Summary

During the summer season (July 1 to August 15), the highest number of targets detected by the VSR was during the night, averaging 233.2 targets per hour in 2011 and 298.5 targets per hour in 2012. *See Table 4.7.* Dawn and dusk target counts were significantly lower with a mean of 53.4 (dawn) and 37.6 (dusk) targets per hour in 2011 and 64.0 (dawn) and 60.3 (dusk) targets per hour in 2012. The highest activity levels occurred from the end of July to mid-August in 2011. In 2012 the highest activity level occurred in early July and from the end of July through mid-August.

In 2011 and 2012, the average mean target height during the summer season was highest at dawn (692 meters [2,270 feet] in 2011 and 587 meters [1,930 feet] in 2012) and was lowest at dusk (437 meters [1,430 feet] in 2011 and 355 meters [1,160 feet] in 2012). Hourly average target heights and mean target heights remained relatively consistent throughout the summer season in both years. Target direction recorded by the HSR showed a consistent southeasterly movement throughout the summer season in both years.

Fall Season Radar Summary

Similar to the spring and summer seasons, the highest number of targets detected in the fall (August 15 to November 14) was during the night, averaging 148.1 targets per hour in 2011 and 117.1 targets per hour in 2012. The average number of targets during the dawn and day periods remained relatively consistent (77.3 [dawn] and 83.8 [day] targets per hour in 2011 and 67.7 [dawn] and 57.2 [day] targets per hour in 2012), with dusk being the lowest activity period at 52.2 targets per hour in 2011 and 29.2 targets per hour in 2012. *See Table 4.7.* In both years, the majority of the activity occurred between mid-August and early-October, which is consistent with the end of fall southerly migratory movements. After early-October, the average number of targets per hour dropped substantially.

The average mean target height was highest at dawn (592 meters [1,940 feet] in 2011 and 526 meters [1,730 feet] in 2012). However, there was little variation in target height for all day and night periods combined; the average mean target height ranged between 461 meters (1,510 feet) and 592 meters (1,940 feet) in 2011 and between 428 meters (1,400 feet) and 526 meters (1,730 feet) in 2012. Hourly average target heights also remained relatively consistent throughout the fall season in both years. Target direction recorded by the HSR were consistent between 2011 and 2012, showing southeasterly movement throughout the dawn, dusk, and night periods, while daytime movements shifted to a more easterly direction.

Winter Season Radar Summary

Radar data collected during the winter season (November 16 – March 31) in 2011-2012 and 2012-2013 demonstrates that overall bird use in the CCSM Project Site is extremely low during winter. *See Table 4.7.* Patterns of low use begin in mid-October at the end of seasonal migration and remain low through early to mid-March when spring migration activities begin. *See Appendix G*. Similar to other seasons, activity during winter months was highest during the nighttime period but was 94-99% lower than the use observed in other seasons. Dawn to dusk mean target rates ranged from 2.8 to 3.5 targets per hour in 2011-2012 and from 0.6 to 1.6 targets per hour in 2012-2013.

The average mean target height during the winter season was highest during nighttime in 2011-2012 (486 meters [1,590 feet]) and the dusk period in 2012-2013 (362 meters [1,190 feet]). The average mean target height was lowest during the day (220 meters [720 feet] in 2011-2012 and 255 meters [837 feet] in 2012-2013). Target direction recorded by the HSR showed a tendency towards northerly and easterly movements throughout all hours in both years. However, strong directional movement patterns were not as evident during winter months.

Table 4.7. Average Targets per Hour and Target Height Summary.

Season	Targets Per Hour (targets/km/hr)				Average Target Height (meters)			
	Dawn	Day	Dusk	Night	Dawn	Day	Dusk	Night
Spring 2011	15.6	20.8	18.8	86.7	315.3	417.8	416.6	432.2
Summer 2011	53.4	139.1	37.6	233.2	691.7	530.7	436.5	551.7
Fall 2011	77.3	83.8	52.2	148.1	592.2	461.0	478.1	567.4
Winter 2011-2012	3.5	2.8	2.9	5.6	442.0	274.8	366.9	524.8
Spring 2012	7.4	26.0	35.6	86.3	421.0	407.0	408.2	450.6
Summer 2012	64.0	83.8	60.3	298.5	586.9	479.8	354.9	484.7
Fall 2012	67.7	57.2	29.2	117.1	434.1	427.8	444.8	525.7
Winter 2012-2013	1.6	1.2	0.6	2.8	312.8	221.1	286.1	437.8

Breeding Bird Density Surveys

Breeding bird density surveys were completed at 15 survey grids across the CCSM Project Site, with 9 of the survey grids located within the Phase I Development Area. *See Figure 4.24.* Each survey grid consisted on 16 sampling points for a total of 240 point counts across the CCSM Project Site, with 144 of these point counts occurring within the Phase I Development Area. Breeding bird density surveys were conducted following the grid survey protocols published by the Rocky Mountain Bird Observatory. *See Hanni et al. 2010.* Survey locations were selected using a generalized random tessellation stratified design to ensure spatially balanced sampling stratified within each WDA and across major vegetation and habitat types within the CCSM Project Site. Breeding bird density surveys were conducted at each survey grid between June 7 and June 30, 2011, all within five hours of sunrise. *See Appendix D.*

Each survey grid consisted of 16 point count locations arranged in a 4 x 4 grid, with 250 meter spacing between points. Surveys were initiated within 30 minutes of sunrise and were completed within approximately 4 hours. Surveys were completed at each of the 16 points within a survey grid for six minutes. Data collected at each point included species, number of individuals, distance from observer, flight behavior, and general demographics. Variables used to characterize breeding bird use in Phase I include number of species, number of individuals, number of flocks, species frequency (the percentage of surveys on which a species was observed), occurrence frequency (percentage of surveys with at least one bird detection), and mean use (average number of individuals per survey). Vegetation and general habitat data were also collected for each point count location to assist in the analysis of breeding bird habitats. Observations of species of concern were recorded if those species were detected during travel between the 16 point count locations in each survey grid. *See Table 1.1.*

Each of the 9 survey grids within the Phase I Development Area consisted of 16 sampling locations for a total of 144 individual point counts. For all Phase I breeding bird point counts combined, 1,118 individuals representing more than 50 species were recorded. The most common species, based on total number of individuals recorded and frequency of detection, was horned lark (219 individuals, 100% occurrence on the 9 grids, and 88% occurrence on the 144 sampling points). Following horned lark, Brewer's sparrow (152 individuals, 100% grid occurrence, 77% sampling point occurrence), vesper sparrow (148 individuals, 89% grid occurrence, 77% sampling point occurrence), green-tailed towhee (76 individuals, 89% grid occurrence, 48% sampling point occurrence), and sage thrasher (71 individuals, 67% grid occurrence, 51% sampling point occurrence) were the next most common species. These five species combined accounted for 666 individuals or 60% of all detections in the Phase I Development Area. *See Appendix D*. *See Table 4.8.*

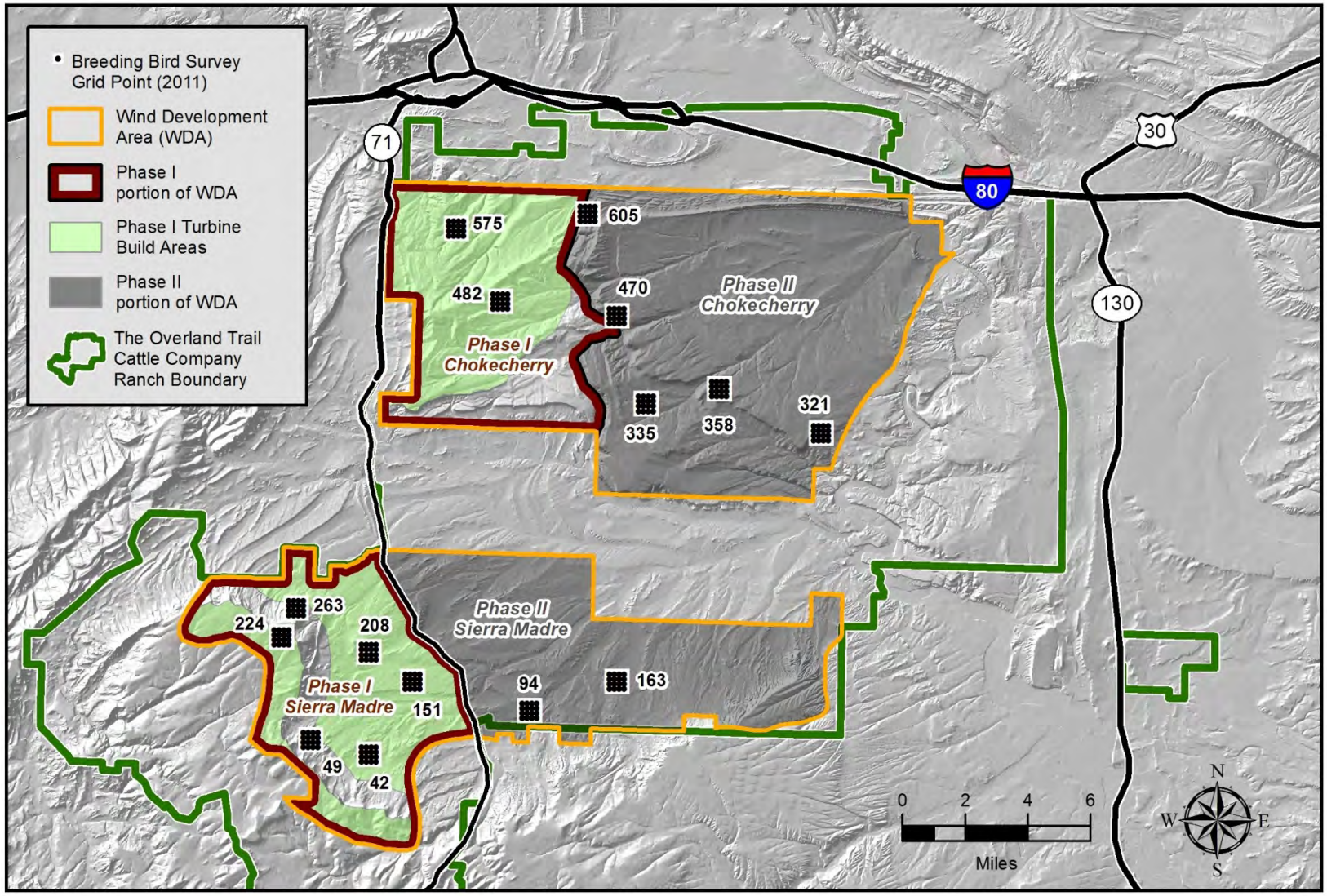


Figure 4.24. Breeding Bird Grid Survey Locations.

Table 4.8. Phase I Observations, Breeding Bird Density Surveys.

Species/Species Group	Number Observed
Corvids	
Common Raven	28
Passerines	
American Goldfinch	14
American Robin	30
Brewer's Sparrow	152
Brown-headed Cowbird	27
Chipping Sparrow	13
Common yellowthroat (*Geothlypis trichas*)	4
Dusky Flycatcher (*Empidonax oberholseri*)	11
Green-tailed Towhee	76
Horned Lark	219
House Wren	22
MacGillivray's Warbler (*Geothlypis tolmiei*)	15
Mountain Bluebird	13
Orange-crowned Warbler (*Oreothlypis celata*)	9
Red-winged Blackbird (*Agelaius phoeniceus*)	7
Rock Wren	50
Sage Sparrow	41
Sage Thrasher	71
Savannah Sparrow	7
Say's phoebe (*Sayornis saya*)	4
Tree swallow	4
Vesper Sparrow	148

Species/Species Group	Number Observed
Warbling Vireo (*Vireo gilvus*)	21
Western Meadowlark	11
Yellow Warbler (*Setophaga petechia*)	12
Other Passerines[1]	47
Non-eagle Raptors, Owls, and Allies	
American Kestrel	1
Northern Harrier	2
Red-tailed Hawk	7
Waterfowl, Waterbirds, and Wading Birds	
Common Merganser (*Mergus merganser*)	2
Killdeer	5
Sora (*Porzana carolina*)	9
Wilson's Snipe (*Gallinago delicata*)	4
Other Birds	
Broad-tailed Hummingbird (*Selasphorus platycercus*)	4
Common Nighthawk	15
Common Poorwill (*Phalaenoptilus nuttallii*)	1
Mourning Dove	5
Northern Flicker	7
Total	**1,118**

Notes:

1. Other passerines include unknown passerines that could not be identified to species level, as well as species that were observed fewer than 4 times during surveys, e.g. ruby-crowned kinglet *(Regulus calendula*), western wood-peewee (*Contopus sordidulus*), lark sparrow (*Chondestes grammacus*), and yellow-rumped warbler (*Setophaga coronata*). Appendix B lists all passerine species that have been observed across the CCSM Project Site, including Phase I.

Waterbird/ Waterfowl Surveys

Waterbird/waterfowl surveys were conducted in 2011 during spring (April 26–May 4), summer (August 23–24), and fall (October 20–21) at each of the four major reservoirs (Kindt, Rasmussen, Sage Creek, and Teton) near the CCSM Project Site. *See Figure 3.7 & Figure 3.8. See Appendix D.* Waterbird/ waterfowl surveys were conducted to provide a baseline for waterbird/ waterfowl species and to assess their spatiotemporal abundance in the CCSM Project Site. Surveys were conducted using spotting scopes to maximize coverage from an optimal number of viewing locations, as well as to facilitate species identification. In addition, care was taken not to double-count individuals if more than one location was necessary to survey a reservoir. Along with standard survey information (e.g., date, location, observer, time, weather conditions), species-specific data collected included species, age, sex, and number of individuals.

Spring waterbird/ waterfowl surveys resulted in a total count of 1,417 individuals representing 35 species. American coot (*Fulica americana*) was the most abundant species accounting for 364 individuals (26% of total count). Lesser and greater scaup (*Scaup* sp.), western and Clark's grebes (*Aechmophorus* sp.), and eared grebe (*Podiceps nigricollis*) were the next most abundant species with 351, 209, and 113 individuals, respectively. Collectively, the above four species accounted for 1,037 individuals or 73% of all birds detected. More species and individuals were counted at Kindt Reservoir (25 species, 808 individuals) than the other three reservoirs. The fewest species and number of individuals (12 species, 165 individuals) were recorded at Sage Creek Reservoir during spring surveys. *See Appendix D*. *See Table 4.9.*

During summer waterbird/ waterfowl surveys, 1,708 individuals representing 29 species were recorded. Redhead duck (*Aythya americana*) had the highest number of individuals (815) accounting for 48% of all birds detected during summer surveys. Lesser scaup (*Aythya affinis*), mallard (*Anas platyrhynchos*), and American coot were the next most abundant species with 157, 149, and 99 individuals, respectively. Collectively, the above four species accounted for 1,221 individuals or 71% of all birds detected. The highest number of individuals (920) was recorded at Rasmussen Reservoir, where 89% (780 individuals) were redheads. Nearly all of the season's redheads (780 of 815) were recorded at Rasmussen Reservoir. Despite the high number of birds recorded at Rasmussen Reservoir, biologists recorded the fewest number of species (12) at that location. *See Appendix D*. *See Table 4.9.*

Waterbird/ waterfowl surveys during fall, including fall migration, recorded 11,473 individuals representing 29 species. Similar to spring waterbird/ waterfowl surveys, American coot accounted for a majority of the individuals during fall surveys (8,024, 70% of total individuals). A total of 1,692 American wigeon (*Anas americana*) were also recorded. Combined, American coot and American wigeon accounted for 9,716 individuals (85% of all individuals). More individuals (8,773) and species (22) were recorded at Kindt Reservoir during fall surveys than at other reservoirs. Of the 8,024 American coots and 1,692 American wigeons recorded at all reservoirs combined, the survey at Kindt Reservoir accounted for 5,810 coots (66%) and 1,690 wigeons (99%). *See Appendix D*. *See Table 4.9.*

Table 4.9. Waterbird/ Waterfowl Survey Summary Data.

Species	Spring 2011	Summer 2011	Fall 2011	Total Observations
Aechmophorus sp.	71	---	---	**71**
American Avocet (*Recurvirostra americana*)	8	25	8	**41**
American Coot	364	99	8,024	**8,487**
American White Pelican	6	24	---	**30**
American Wigeon	6	11	1,692	**1,709**
Black-crowned Night-Heron	---	7	---	**7**
Blue-winged Teal (*Anas discors*)	---	20	---	**20**
Bufflehead (*Bucephala albeola*)	10	---	3	**13**
Calidris sp.	3	---	---	**3**
California Gull (*Larus californicus*)	2	2	---	**4**
Canada Goose (*Branta canadensis*)	5	28	43	**76**
Canvasback (*Aythya valisineria*)	4	---	6	**10**
Cinnamon Teal (*Anas cyanoptera*)	3	---	---	**3**
Clark's Grebe (*Aechmophorus clarkii*)	1	---	---	**1**
Common Loon (*Gavia immer*)	5	2	2	**9**
Common Merganser	74	17	70	**161**
Double-crested Cormorant (*Phalacrocorax auritus*)	6	11	---	**17**
Eared Grebe (*Podiceps nigricollis*)	113	50	110	**273**
Gadwall (*Anas strepera*)	32	36	577	**645**
Great Blue Heron (*Ardea herodias*)	---	2	---	**2**
Greater Scaup (*Aythya marila*)	4	---	---	**4**
Greater Yellowlegs (*Tringa melanoleuca*)	2	---	4	**6**

Species	Spring 2011	Summer 2011	Fall 2011	Total Observations
Green-winged Teal (*Anas crecca*)	14	68	87	**169**
Herring Gull (*Larus argentatus*)	---	3	3	**6**
Hooded Merganser (*Lophodytes cucullatus*)	---	---	3	**3**
Horned Grebe (*Podiceps auritus*)	1	---	34	**35**
Killdeer	22	10	---	**32**
Least Sandpiper (*Calidris minutilla*)	1	---	---	**1**
Lesser Scaup	103	157	24	**284**
Lesser Yellowlegs (*Tringa flavipes*)	1	---	---	**1**
Long-billed Dowitcher (*Limnodromus scolopaceus*)	---	---	4	**4**
Mallard	6	149	152	**307**
Marbled Godwit (*Limosa fedoa*)	8	---	---	**8**
Northern Pintail (*Anas acuta*)	3	10	57	**70**
Northern Shoveler (*Anas clypeata*)	8	---	13	**21**
Pectoral Sandpiper (*Calidris melanotos*)	---	---	1	**1**
Pied-billed Grebe (*Podilymbus podiceps*)	1	10	9	**20**
Redhead	85	815	359	**1,259**
Ring-billed Gull (*Larus delawarensis*)	2	6	28	**36**
Ring-necked Duck (*Aythya collaris*)	26	---	84	**110**
Ruddy Duck (*Oxyura jamaicensis*)	9	9	34	**52**
Scaup sp.	244	---	---	**244**
Snowy Egret (*Egretta thula*)	---	1	---	**1**
Spotted Sandpiper (*Actitis macularius*)	---	4	---	**4**

Species	Spring 2011	Summer 2011	Fall 2011	Total Observations
Surf Scoter (*Melanitta perspicillata*)	---	---	6	**6**
Unknown dabbling duck	---	47	---	**47**
Unknown gull	---	14	---	**14**
Western Grebe (*Aechmophorus occidentalis*)	137	67	33	**237**
White-faced Ibis (*Plegadis chihi*)	3	---	---	**3**
White-winged Scoter (*Melanitta fusca*)	---	---	3	**3**
Willet (*Tringa semipalmata*)	21	1	---	**22**
Wilson's Phalarope (*Phalaropus tricolor*)	3	3	---	**6**
Total Observations	**1,417**	**1,708**	**11,473**	**14,598**
Total Number of Species	**35**	**29**	**29**	**52**

Acoustic Bat Surveys

Similar to 2008 acoustic bat surveys, AnaBat detection systems manufactured by Titley Electronics were used for acoustic bat surveys conducted on the CCSM Project Site during 2011 and 2012. *See Section 4.3.1.* For acoustic bat surveys conducted on the CCSM Project Site in 2011 and 2012, a standard index of bat activity was generated by counting the number of bat passes per detector-night at each survey location. *See Hayes 1997; Kunz et al. 2007.* All bat passes were categorized through assessment of both qualitative (e.g., shape) and quantitative (e.g., characteristic frequency) qualities as demonstrated by Weller and Baldwin (2012). Bat passes were classified as pertaining to low (≤25 kHz), mid (~30-40 kHz), and high (≥40 kHz) frequency groups. Further refinement in the dataset in 2011 and 2012 was intended to provide more differentiation as to what species may be represented in the low frequency group. The low frequency category in the 2008 dataset may also have included some bat species with a characteristic frequency around 30 kHz, such as long-eared myotis, fringed myotis, Townsend's big-eared bat, and pallid bat. *See Griscom et al. 2012; Keinath undated.* Diagnostic call sequences in the datasets were labeled only for hoary bats as that species has a unique call pattern easily distinguished from other bat species.

The 2011 and 2012 acoustic bat surveys were coupled with radar surveys. Acoustic bat monitoring was completed from June 15 to October 20, 2011, and June 27 to August 29, 2012, at five locations co-located with the radar system (Chokecherry Bench, Smith Draw, Upper Iron Springs, McKinney Creek, and Pine Grove) to characterize nightly bat activity. *See Figure 4.18.* Collectively, sites were surveyed for 95 detector-nights in 2011 and 62 detector-nights in 2012. In total, 185 and 134 bat passes were

recorded in 2011 and 2012, respectively, for an average of 2.0 bat passes/detector-night across years, similar to the 1.9 bat passes/detector-night observed in 2008. *See Section 4.3.1. See Appendix E.*

Activity levels were variable during the 2011 and 2012 survey periods. There was an increase in the number of bat passes on July 24, 2011, (26 total bat passes) and over the nights of July 11, 2012, (17 bat passes) and July 12, 2012 (15 bat passes). These peaks in activity are similar in timing to a spike in activity noted in the 2008 survey data on July 27. *See Section 4.3.1.*

In 2011, activity levels decreased in mid-August and remained low from September 23 to October 20 averaging less than 1 bat pass/detector-night. This low activity is similar to that reported for the September to October period in 2008. *See Section 4.3.1.* The 2011 surveys recorded more mid- and high-frequency bat passes (156; 84% of all bat passes) than low-frequency (29; 16%) bat passes. Hoary bat comprised 4% of all bat passes and was identified on four nights (July 30 and August 12-14). Surveys in 2012 had a similar trend with mid- and high-frequency bat passes accounting for 115 (86%) of the 134 total bat passes. Ten bat passes were attributable to hoary bat (7% of all bat passes) evenly spaced across seven nights between July 26 and August 29, 2012.

4.4.2 Field Study and Impact Prediction Questions

As detailed above, in compliance with Tier 3 of the USFWS Wind energy Guideline and Tier 2 of the WGFC Wind Energy Recommendations, PCW conducted additional site-specific field studies for the CCSM Project Site, including Phase I, since the 2008-2009 site characterization process described in section 4.3. These additional field studies were designed in coordination with USFWS, BLM, and WGFD to assess the potential risk of the CCSM Project, including Phase I, to migratory bird and bat species and to inform appropriate measures to avoid and minimize that risk. PCW's response to the field study and impact prediction questions and its risk assessment are based on the analysis conducted during the site evaluation and site characterization processes, as well as the field study data currently available for the CCSM Project, including Phase I.

USFWS Wind Energy Guidelines

1. *Do field studies indicate that species of concern are present on or likely to use the proposed site?*

   Based on existing data and pre-construction surveys for the CCSM Project, PCW identified 22 migratory bird and 9 bat species of concern that have the potential to occur on the CCSM Project Site, including Phase I. *See Table 1.1 & Table 1.2.* These species include migratory bird and bat species listed on the BLM Wyoming Sensitive Species Policy and List or included in the Wyoming SWAP as SGCN. *See BLM 2012b; PCW 2014a at App. S*; *WGFD 2010*.

2. *Do field studies indicate the potential for significant adverse impacts on affected population of species of habitat fragmentation concern?*

   Consistent with the findings from site characterization and site evaluation studies, sagebrush obligate species (sagebrush sparrow, sage thrasher, loggerhead shrike, and Brewer's sparrow) are potential species of habitat fragmentation concern for Phase I. No other species of habitat fragmentation concern have been identified in the CCSM Project Site, including Phase I. The site-specific data collected during field studies indicate that Brewer's sparrow, sagebrush sparrow, and sage thrasher are among the most common migratory bird species within Phase I. This is a result of the availability of sagebrush steppe habitat in Phase I as well as the availability of this habitat throughout southern Wyoming.

   Localized risks may be present to some individual sagebrush obligates from Phase I, generally due to surface disturbance and human presence; however, it is anticipated these impacts would be temporary, primarily during construction, and surrounding areas would generally be available for use by these species. Further, Phase I has been designed to minimize overall surface disturbance. This will reduce long-term fragmentation of habitats used by sagebrush obligates resulting in lower risks to the species. Finally, the availability of sagebrush habitats in southern Wyoming and the abundance of these species throughout the area make it very unlikely that the risk of adverse impacts would occur at a population level. These findings are consistent with the site characterization findings and the analyses presented in the BLM FEIS that concluded there would be no significant impacts to sagebrush obligate species from the CCSM Project. *See Section 4.3.2. See BLM 202b at p. 4.14-25.*

3. *What is the distribution, relative abundance, behavior, and site use of species of concern identified in Tiers 1 or 2, and to what extent do these factors expose these species to risk from the proposed wind energy project?*

   Patterns of abundance and site use of the potential migratory bird species of concern identified in Table 1.1 are evaluated in Table 4.10. Generally, while localized risk from Phase I may be present for these migratory bird species, the risk has been avoided and minimized through the Phase I design process and the application of the measures identified in chapter 5.0. The risks to the potential migratory bird species of concern described in Table 4.10 are also characteristic of the potential risk to other migratory bird species that might occur in Phase I of the CCSM Project; however, due to the large number of other migratory bird species, only the potential species of concern are addressed individually. *See Appendix B.*

   Overall bat use of Phase I is low; therefore, risks to the bat species listed in Table 1.2 from Phase I are anticipated to be low. While the species in Table 1.2 may use Phase I for migration or foraging, most are not commonly present. Consistent with the site evaluation for Phase I and BLM's FEIS, there is a low risk to the three BLM sensitive bat species (long-eared myotis, fringed myotis, and Townsend's big-eared bat) due to their limited occurrence in Phase I. *See Section*

4.2.2. Further, Hoary bats are also known to be uncommon in Phase I and risks to the species are expected to be low due to their low occurrence on site (only 7% of all bat detections [217 of 3,021 total bat passes] within the CCSM Project Site were attributed to the species). It is likely that little brown bat, big brown bat, and silver-haired bat would have the greatest risk for impacts resulting from Phase I because they have the highest probability of occurrence and are known to be at risk for collision with wind turbines. *See BLM 2012b at p. 4.14-17*. However, the avoidance, minimization, and conservation measures described in chapter 5.0 will avoid and minimize these risks to the extent practicable.

Table 4.10. Potential Risk to Migratory Bird and Bat Species of Concern.

Species Group	Common Name	Phase I Occurrence	Assessment of Risk
Passerines	Brewer's Sparrow	Common across Phase I and southern Wyoming in sagebrush habitats.	Localized risk associated with habitat fragmentation and possible collision with wind turbines. Site evaluation and characterization found that impacts would not be significant.
	Lark Bunting	Rare in Phase I. Phase I is on edge of species range and does not provide suitable habitat.	Very low risk. Species and its habitats are uncommon in Phase I.
	Loggerhead Shrike	Uncommon in Phase I.	Localized risk from habitat fragmentation and collision with wind turbines. Site evaluation and characterization found that impacts would not be significant.
	Sagebrush Sparrow	Common across Phase I and southern Wyoming in sagebrush habitats.	Localized risk associated with habitat fragmentation and possible collision with wind turbines. Site evaluation and characterization found that impacts would not be significant.
	Sage Thrasher	Common across Phase I and southern Wyoming in sagebrush habitats.	Localized risk associated with habitat fragmentation and possible collision with wind turbines. Site evaluation and characterization found that impacts would not be significant.

Species Group	Common Name	Phase I Occurrence	Assessment of Risk
Raptors	Burrowing Owl	Uncommon in Phase I. Limited occurrence in white-tailed prairie dog colonies.	Low potential for risk to migrating individuals. Low potential for collision with wind turbines.
	Ferruginous Hawk	Uncommon in Phase I. No occupied nests in more than 5 years of monitoring.	Low potential for risk to migrating individuals or non-breeding individuals that infrequently visit Phase I.
	Merlin	Uncommon in Phase I. No occupied nests in more than 5 years of monitoring.	Low potential for risk to migrating individuals that infrequently visit Phase I.
	Northern Goshawk	Uncommon in Phase I. No occupied nests in more than 5 years of monitoring. Very limited suitable habitat within 5 miles of the CCSM Project.	Low potential for risk to migrating individuals that infrequently visit Phase I.
	Peregrine Falcon	Uncommon in Phase I. Suitable nesting habitat does not occur.	Low potential for risk to migrating individuals that infrequently visit Phase I.
	Prairie Falcon	Common in Phase I. Nesting locations known in both Chokecherry and Sierra Madre WDAs.	Risk to species is associated with potential collision with wind turbines during migration and foraging. No Phase I wind turbines are located within suitable nesting habitat.
	Swainson's Hawk	Common in Phase I. Nesting locations known in the vicinity of the CCSM Project Site.	Risk to species is associated with potential collision with wind turbines during migration and foraging. No Phase I wind turbines are located within suitable nesting habitat.
Waterbirds/ Waterfowl	Black-crowned Night-heron	Uncommon in Phase I.	Low risk for impacts. Habitats used by black-crowned night are not common in Phase I.
	Canvasback	Uncommon in Phase I. Generally occur in proximity to reservoirs during spring and fall migration periods.	Low risk for impacts. Low potential for collision during migration because wind turbines are not located near reservoirs.

Species Group	Common Name	Phase I Occurrence	Assessment of Risk
	Clark's Grebe	Uncommon in Phase I. Generally occur in proximity to reservoirs during spring and fall migration periods.	Low risk for impacts. Low potential for collision during migration because wind turbines are not located near reservoirs.
	Lesser Scaup	Uncommon in Phase I. Generally occur in proximity to reservoirs during spring and fall migration periods.	Low risk for impacts. Low potential for collision during migration because Phase I wind turbines are not located near reservoirs.
	Long-billed Curlew	Uncommon in Phase I. Several individuals have been observed in grassland habitats in the central basin between the WDAs.	Low risk for impacts. Minimal risk to individuals because of lack of suitable grassland habitat and infrequent use of Phase I.
	Mountain Plover	Uncommon in Phase I. Several individuals have been observed in upland grassland and barren habitats in the Phase I.	Low potential for risk to this ground-based species. Some potential for collision with wind turbines as individuals migrate to and from Phase I. Risk highest in saltbush communities upland grasslands in Lower Miller Hill within the Phase I portion of the Sierra Madre WDA.
	Northern Pintail	Uncommon in Phase I. Generally occur in proximity to reservoirs during spring and fall migration periods.	Low risk for impacts. Low potential for collision during migration because Phase I wind turbines are not located near reservoirs.
	Redhead	Seasonally common in proximity to reservoirs during spring and fall migration periods.	Low risk for impacts. Low potential for collision during migration because Phase I wind turbines are not located near reservoirs.
	Sandhill Crane	Uncommon in Phase I. Only one individual seen in the Sierra Madre WDA near wetland habitat.	Low risk for impacts. Phase I is not a known breeding or migration area for the species and habitat availability is limited.

Species Group	Common Name	Phase I Occurrence	Assessment of Risk
	White-faced Ibis	Uncommon in Phase I. Generally occur in proximity to reservoirs.	Low risk for impacts. Low potential for collision because Phase I wind turbines are not located near reservoirs.

4. *What are the potential risks of adverse impacts of the proposed wind energy project to individuals and local populations of species of concern and their habitats? (In the case of rare or endangered species, what are the possible impacts to such species and their habitats?)*

   There are no known occurrences of threatened or endangered migratory bird or bat species in the CCSM Project Site, including Phase I, or in the surrounding areas. In addition, no rare migratory bird or bat species of concern were identified during Phase I site-specific survey efforts. As such, no impacts will occur to rare, threatened, or endangered species or their habitats. It is also unlikely that any population level impacts would occur to any species of concern because the species most commonly observed in Phase I are ubiquitous in Phase I, the CCSM Project Site, the Ranch, the state of Wyoming, and in surrounding states.

   Assuming that fatalities would be proportional to species-specific abundance of non-corvids observed as part of migratory bird point counts in Phase I, horned lark would make up approximately 60% of all fatalities. Sagebrush obligates (sagebrush sparrow, Brewer's sparrow, sage thrasher, loggerhead shrike) would make up 14% of all fatalities with sagebrush sparrow and Brewer's sparrow being most impacted among the four species in this guild. As described in sections 4.2.2 and 4.3.2, analyses completed as part of the site evaluation and characterization process found that impacts to sagebrush obligates are not expected to be significant. Vesper sparrow (5% of expected fatalities), western meadowlark (4%), and American robin (3%) make up the remainder of the species most likely to be impacted; none of which are species of concern. The remaining 15% of fatalities would be expected to be associated with the species using Phase I in proportion to their abundance. For non-eagle raptors, it is expected that fatalities would most commonly be associated with American kestrel, red-tailed hawk, and prairie falcon.

   The potential impacts to migratory birds and bats from the CCSM Project, including Phase I, were analyzed in the BLM FEIS. The BLM FEIS identifies direct impacts consisting of fatalities and loss of habitat, as well as indirect impacts associated with habitat loss, modification, and displacement. *See BLM 2012b at pp.4.14-15 & 4.14-18.* Impacts to migratory birds and bats were estimated in BLM's FEIS based on pre-construction bird and bat use of the original Application Area and fatality estimates at other wind energy facilities in the western U.S., assuming there is a linear relationship between observed pre-construction use and post-construction mortality on a per MW basis.

The impacts estimated in BLM's FEIS are for the CCSM Project as a whole. BLM recognizes that "[t]he magnitude of these impacts depends upon the number of wind turbines and other infrastructure constructed for each alternative and the amount of direct and indirect habitat lost due to construction and operation of the project." *See BLM 2012b at p. 4.14-18.* Given that Phase I consists of half the wind turbines and a subset of the total disturbance for the CCSM Project, the impacts from Phase I will be substantially less than those estimated in the FEIS. Further, the BLM fatality estimates are based on pre-construction bird and bat use of the original Application Area and fatality estimates at other wind energy facilities in the western U.S., many of which did not develop avian and bat protection plans or other avoidance, minimization and mitigation measures to reduce mortalities while designing and operating the projects. *See Section 5.1.1*.

Predicting avian risk from pre-construction point count data is difficult and can result in estimates of mortality that do not match post-construction monitoring results. It has been well documented that there is little or no relationship between pre-construction avian survey results and the actual mortality risk resulting from wind projects. *See Ferrer et al. 2012; Erickson et al. 2014*. Rather, levels of project risk are associated with site-specific characteristics around wind turbines and associated infrastructure. *See Ferrer et al. 2012*. Given the limitations of the existing fatality estimation methods to account for the substantial redesign of the CCSM Project and the micrositing process, PCW has not updated the migratory bird and bat fatality estimates for the CCSM Project or Phase I and has instead focused its efforts on avoiding and minimizing impacts to migratory birds and bats to the extent practicable, as described in chapter 5.0, and the development of a robust post-construction monitoring program to evaluate impacts and monitor conservation measure effectiveness, as described in chapter 6.0. As discussed in chapter 5.0, the measures included in this Phase I BBCS to avoid and minimize impacts to migratory birds and bats will likely result in observed impacts below those originally predicted by BLM. *See BLM 2012b at pp. 4.14-16 & 4.14-22.*

5. *How can developers mitigate identified significant adverse impacts?*

Using the site-specific data for the CCSM Project, the USFWS Wind Energy Guidelines, and the WGFC Wind Energy Recommendations, PCW has worked cooperatively with USFWS, BLM, and WGFD to develop and apply appropriate avoidance, minimization, and mitigation measures to the CCSM Project, including Phase I, as described in chapter 5.0. These measures are designed to avoid and minimize impacts to migratory birds and bats from the CCSM Project, including Phase I, to the extent practicable.

6. *Are there studies that should be initiated at this stage that would be continued in post-construction?*

   PCW has coordinated with USFWS, BLM and WGFD to identify appropriate post-construction monitoring for migratory birds and bats to evaluate impacts and monitor conservation measure effectiveness. The migratory bird and bat post-construction monitoring program for Phase I is described in chapter 6.0 of this Phase I BBCS.

WGFC Wind Energy Recommendations

1. *Does pre-construction monitoring indicate that SGCN are present on or likely to use the proposed site?*

   Based on existing data and pre-construction surveys for the CCSM Project, PCW identified 22 migratory bird and 9 bat species of concern that have the potential to occur on the CCSM Project Site, including Phase I. *See Table 1.1 & Table 1.2.* These species include migratory bird and bat species listed on the BLM Wyoming Sensitive Species Policy and List or included in the Wyoming SWAP as SGCN. *See BLM 2012b; PCW 2014a at App. S*; *WGFD 2010*. See response to questions 1 through 4 above under USFWS Wind Energy Guidelines.

2. *Does monitoring indicate the potential for adverse impacts on the wildlife species or habitat?*

   The potential impacts to migratory birds and bats from the CCSM Project, including Phase I, were analyzed in the BLM FEIS. The BLM FEIS identifies direct impacts consisting of fatalities and loss of habitat, as well as indirect impacts associated with habitat loss, modification, and displacement. *See BLM 2012b at pp. 4.14-15 & 4.14-18.* See response to questions 1 through 4 above under USFWS Wind Energy Guidelines.

3. *If adverse impacts are predicted to a species or habitat, can these impacts be avoided (preferable) or mitigated?*

   PCW has developed measures to avoid and minimize impacts to migratory birds and bats from the CCSM Project, including Phase I, to the extent practicable, as described in chapter 5.0. See response to question 5 above under USFWS Wind Energy Guidelines.

4. *Is monitoring needed for construction and post-construction?*

   The migratory bird and bat post-construction monitoring program for Phase I is described in chapter 6.0 of this Phase I BBCS. See response to question 6 above under USFWS Wind Energy Guidelines.

4.4.3 Field Study and Impact Prediction Risk Assessment

This Phase I field study and impact prediction risk assessment is the culmination of data collected and analyses completed in accordance with the tiered process set forth in the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations. As such, it reflects data collected and analyzed since 2006 resulting in a thorough evaluation of potential risks to migratory bird and bat species from Phase I. The results of these risk assessments informed the development and application of the avoidance, minimization, and conservation measures presented in chapter 5.0 and the post-construction monitoring program described in chapter 6.0 of this Phase I BBCS.

The field study and impact prediction questions concluded that there are no threatened or endangered migratory birds or bat species present on the CCSM Project Site. However, it was determined that migratory bird or bat species of concern may be present and that these species may be adversely affected by Phase I. *See Appendix B.* The majority of these impacts are likely to be localized. Risks to migratory birds and bats from Phase I include collision with operating wind turbines, collision with project-area vehicle traffic, loss of habitat associated with ground disturbance, and behavioral avoidance by some species during construction and operation of Phase I. Due to differences in patterns of use and potential risks from Phase I, separate risk assessments have been completed for non-eagle raptors, other migratory birds, and bats.

Migratory Birds

Impacts to non-raptor migratory birds are expected to be seasonal during spring, summer, and fall months when migratory birds regularly use habitats within Phase I. Species-specific risk to migratory birds was evaluated using data for non-corvid migratory birds because impacts to larger corvids (common raven, black-billed magpie, American crow) from Phase I are assumed to be very low due to a high-level of avoidance. *See Sterner et al. 2007; Devereux et al. 2008*. Assuming that risk to other migratory bird species is proportional to observed species abundance, horned lark would be most at risk from Phase I (60% of occurrences). Based on Phase I survey data, sagebrush obligates (sagebrush sparrow, Brewer's sparrow, sage thrasher, loggerhead shrike) would also be at risk (14% of all occurrences) with risks to sagebrush sparrow and Brewer's sparrow being most prevalent. However, as described earlier, detailed analyses completed for the BLM FEIS found that impacts to sagebrush obligates are not expected to be significant. *See BLM 2012b at p. 4.14-25.* The remainder of the migratory bird species most likely to be at risk from Phase I include common species such as vesper sparrow (5% of occurrences), western meadowlark (4%), and American robin (3%). During winter months (November to March), very few impacts are expected due to the low migratory bird activity on site.

Non-eagle Raptors

Risks to non-eagle raptors are anticipated be significantly less than those to other migratory birds due to their relatively low abundance on-site. Further, non-eagle raptors use different habitats and have different patterns of use than other migratory birds. Risks to non-eagle raptors from Phase I are expected to be seasonal and similar to migratory birds are anticipated to be roughly proportional to the abundance of each species observed during Phase I surveys. Risks to non-eagle raptors are expected during spring, summer, and fall months when non-eagle raptors regularly use habitats in Phase I. During winter months, non-eagle raptor use is extremely low indicating a low overall risk.

Data collected across Phase I indicate that American kestrel, red-tailed hawk, and prairie falcon are at the greatest risk for impact. While Northern harrier was among the most abundant non-eagle raptor observed in Phase I, the species nests on the ground and forages by flying very close to the ground. Therefore, risks to northern harrier are expected to be less than risks to red-tailed hawk, American kestrel, and prairie falcon. American kestrel, red-tailed hawk, and prairie falcon species are known to nest and forage in Phase I portions of both the Chokecherry and Sierra Madre WDAs. The combination of their resident nesting status and foraging behavior is expected to increase their risk when compared to other non-eagle raptors species that are not as common or have more specific habitat requirements. However, red-tailed hawks and American kestrels are known to be more tolerant of human presence and disturbance than some raptor species indicating they may be less at risk of disturbance from human activities. *See Chace and Walsh 2006.*

Bats

Impacts to bats are anticipated to be seasonal. As described in the BLM FEIS, it is expected that risk to bats are greatest during late summer and early fall during migration and foraging activities. *See BLM 2012b at p. 4.14-16.* In Phase I, there is no risk to bats from late fall through early spring because of the lack of bat activity during this winter period. Based on the evaluation of the Phase I data, there is low risk to the three BLM sensitive bat species (long-eared myotis, fringed myotis, and Townsend's big-eared bat) due to the fact that they have never been documented among the 2,285 bat fatalities recorded from 21 wind energy facilities in the western United States. *See BLM 2012b.* Further, risks to the hoary bats are expected to be low as they are known to be uncommon in the CCSM Project Site (only 7% of all bat detections were attributed to the hoary bats). It is likely silver-haired bat would have the greatest risk for impacts from Phase I because they are likely to occur in the CCSM Project Site and are known to be at risk for collision with wind turbines in the western United States. *See BLM 2012b at p. 4.14-17.* Little brown bat and big brown bat may also be at risk for impacts because they are known to infrequently collide with wind turbines in the United States and are likely to occur in the CCSM Project Site. *See Appendix D.* However, because ground level bat activity measured using passive acoustic monitoring on the CCSM Project Site is relatively low and the flight heights of any potential migrating bats or avian species recorded by the avian radar are well above the rotor swept zone, impacts to bat species are expected to be minimal for the CCSM Project, including Phase I.

Overall Risk Assessment

Throughout the development of the CCSM Project, PCW has worked cooperatively with USFWS, BLM and WGFD to evaluate risks to migratory birds and bats, collecting progressively more detailed site-specific data using state-of-the-art surveys. PCW has shared the data collected during the CCSM Project and Phase I field studies with USFWS, BLM, and WGFD to facilitate the development of appropriate measures to avoid and minimize impacts to migratory birds and bats from Phase I. Consistent with the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations, PCW has evaluated the detailed site-specific data collected for the CCSM Project and has determined that development Phase I is appropriate based on the extensive avoidance, minimization and mitigation measures incorporated into Phase I and the robust post-construction monitoring proposed for the site. *See Chapters 5.0 & 6.0.*

The BLM FEIS analyzes the potential impacts of the CCSM Project on migratory birds and bats based on the original Application Area. *See BLM 2012a.* Since publication of the BLM FEIS, PCW has continued to work cooperatively with USFWS, BLM, and WGFD to use the migratory bird and bat data to substantially redesign the CCSM Project and to microsite Phase I to avoid and minimize impacts, including identifying over 105,000 acres of the Ranch as wind turbine avoidance areas and proposing extensive conservation measures for areas that would be developed. *See Chapter 5.0.* As a result of this continued collaboration, the additional data collection, the substantial project redesign, and the measures described in chapter 5.0 to avoid and minimize risk, PCW has determined that advancement of Phase I is appropriate.

Chapter 5.0 of this Phase I BBCS describes the extensive avoidance, minimization and conservation measures PCW has developed for Phase I in cooperation with USFWS, BLM, and WGFD. Chapter 6.0 of this Phase I BBCS describes the post-construction monitoring program developed by PCW to evaluate impacts to migratory birds and bats, as well as to evaluate the effectiveness of the Phase I conservation measures.

5.0 Measures to Avoid and Minimize Risk

The USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations provide standard BMPs for wind energy projects and recommend early and ongoing coordination with agency personnel to develop additional site-specific avoidance, minimization, and conservation measures. *See USFWS 2012a; WGFC 2010.* As recommended by USFWS and WGFC, PCW has coordinated extensively with USFWS, BLM, and WGFD to finalize the Phase I wind turbine layout and to develop site-specific measures for migratory birds, bats, and other wildlife species based on the data collected for the CCSM Project, including Phase I. *See Chapter 4.0.*

PCW used the best available scientific data, including the extensive data collected for Phase I, to develop the avoidance and minimizations measures that were incorporated into the Phase I wind turbine layout. This chapter outlines the avoidance and minimization process that PCW implemented during the Phase I siting consistent with USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations, including considering alternative locations for reducing migratory bird and bat risk and adjusting the Phase I wind turbine layout using site-specific avian and bat use data.

The following sections describe the substantial redesign that PCW has completed since first applying for two Type-II Wind Energy Project Area Grants for wind energy site testing and monitoring, submitting a POD for the CCSM Project to BLM, and applying for a Type-III Wind Energy Development Grant. *See Section 1.3.2.* PCW's iterative design and siting approach resulted in a substantial reconfiguration of the CCSM Project including several revisions of the wind turbine layout for Phase I. These are exactly the type of actions contemplated and recommended by Tier 3 of the USFWS Wind Energy Guidelines and Tier 2 of the WGFC Wind Energy Recommendations. The evolution of the CCSM Project and Phase I described in this chapter illustrates: (1) PCW's attention to the early determination of potential environmental risks at the landscape scale; (2) PCW's evaluation of potential environmental risks based on site-specific data; and (3) PCW's adjustment of the Phase I design using that site-specific data.

The measures identified in this chapter include the BMPs identified in the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations; avoidance and minimization measures identified in the BLM's CCSM Project ROD; additional conservation measures designed to avoid and minimize impacts to migratory bird and bat species as well as other wildlife; and other site-specific measures based on pre-construction migratory bird and bat risk assessments. *See Chapter 4.0.* These BMPs and other measures address the recommendations contained in the USFWS Wind Energy Guidelines and WGFC Wind Energy Recommendations.

As contemplated in the USFWS Wind energy Guidelines and WGFC Wind Energy Recommendations, the Phase I BMPs and conservation measures will be implemented based on site-specific characteristics, monitoring data, and results of post-construction monitoring efforts. Collectively, these measures avoid or minimize, to the extent practicable, direct and indirect impacts to migratory bird and bat species including potential collisions and fatalities; disturbance, displacement, and behavioral changes; and

habitat loss, degradation, and fragmentation. The conservation measures contained in the following sections also offset or compensate for habitat-related impacts and other impacts to migratory bird and bat species that may occur.

5.1 Phase I Risk Avoidance and Minimization Process

This BBCS is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate BBCS; however, portions of this section describe the CCSM Project as a whole to provide context for the migratory bird and bat risk avoidance and minimization effort.

PCW has used the site-specific data collected as part of the pre-construction migratory bird and bat risk assessment process along with recommendations from USFWS, BLM, and WGFD in re-designing the CCSM Project and developing the final wind turbine layout for Phase I. Phase I avoids and minimizes risks to migratory birds and bats consistent with the USFWS Wind Energy Guidelines, the WGFC Wind Energy Recommendations, and the BLM ROD. The Phase I wind turbine layout - when combined with the best management practices, conservation measures, monitoring, and adaptive management described in this Phase I BBCS - avoids and minimizes risks to migratory birds and bats to the extent practicable.

5.1.1 Wind Energy Site Testing and Monitoring Application Area

PCW has an easement from TOTCO for wind development on the privately owned sections of the Ranch; however, PCW must also obtain the proper authorizations for wind development on the interspersed federal land. *See Chapter 1.0.* In November of 2006, PCW applied to BLM for two ROW grants for wind energy site testing and monitoring on federal land (Type-II Wind Energy Project Area Grants) in two areas of the Ranch. *See BLM 2008b.* The northern area was identified as Chokecherry and the southern area was identified as Sierra Madre. BLM approved the Chokecherry Wind Energy Project Area Grant on June 11, 2007, and the Sierra Madre Wind Energy Project Area Grant on June 15, 2007, covering the Wind Energy Site Testing and Monitoring Application Area (Application Area) in which wind energy development was proposed. The Application Area, located almost entirely within the Ranch, encompassed 169,500 acres. PCW installed its first meteorological (or "met") towers for monitoring and measuring wind speed, direction and behavior in June 2007, with additional met tower installations shortly thereafter. The data from these met towers were used to generate a site-specific wind map of the Application Area and inform the wind turbine layout for PCW's original Proposed Action. *See Figure 5.1.*

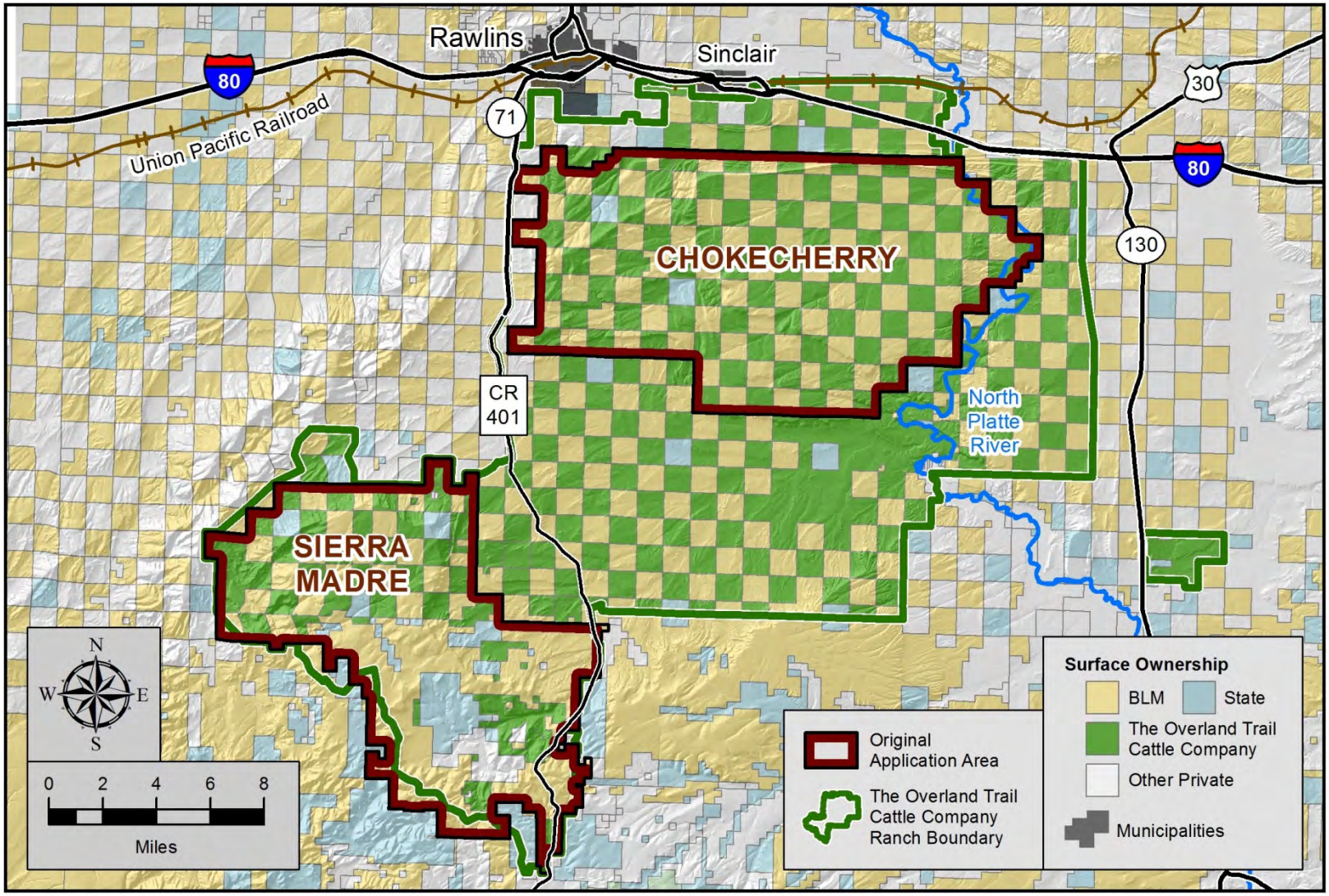


Figure 5.1. Wind Energy Site Testing and Monitoring Application Area – June 2007.

5.1.2 Original Proposed Action

To develop a wind energy generation project on BLM-administered federal land, a Type-III Wind Energy Development Grant is needed from BLM. *See BLM 2008b.* In January 2008, PCW applied for a Type-III Wind Energy Development Grant, which would authorize PCW to construct, operate, maintain and decommission the CCSM Project on BLM-administered land within the Application Area.

In support of its application for a Type-III Wind Energy Development Grant, PCW submitted a POD to BLM in March 2009, which included a proposed wind turbine layout for the CCSM Project (Original Proposed Action). The Original Proposed Action was based on siting the CCSM Project wind turbines to take advantage of the Ranch's best wind resources as verified from the wind data collected since 2007. The Original Proposed Action had 675 wind turbines in Chokecherry and 325 in Sierra Madre, with no wind turbines on Sage Creek Rim or in Lower Miller Hill or the Sage Creek Basin. Wind turbines were planned throughout the full extent of Upper Miller Hill including within the Red Rim-Grizzly WHMA, and along the hogback feature in the north portion of Chokecherry. *See Figure 3.4 & Figure 5.2.*

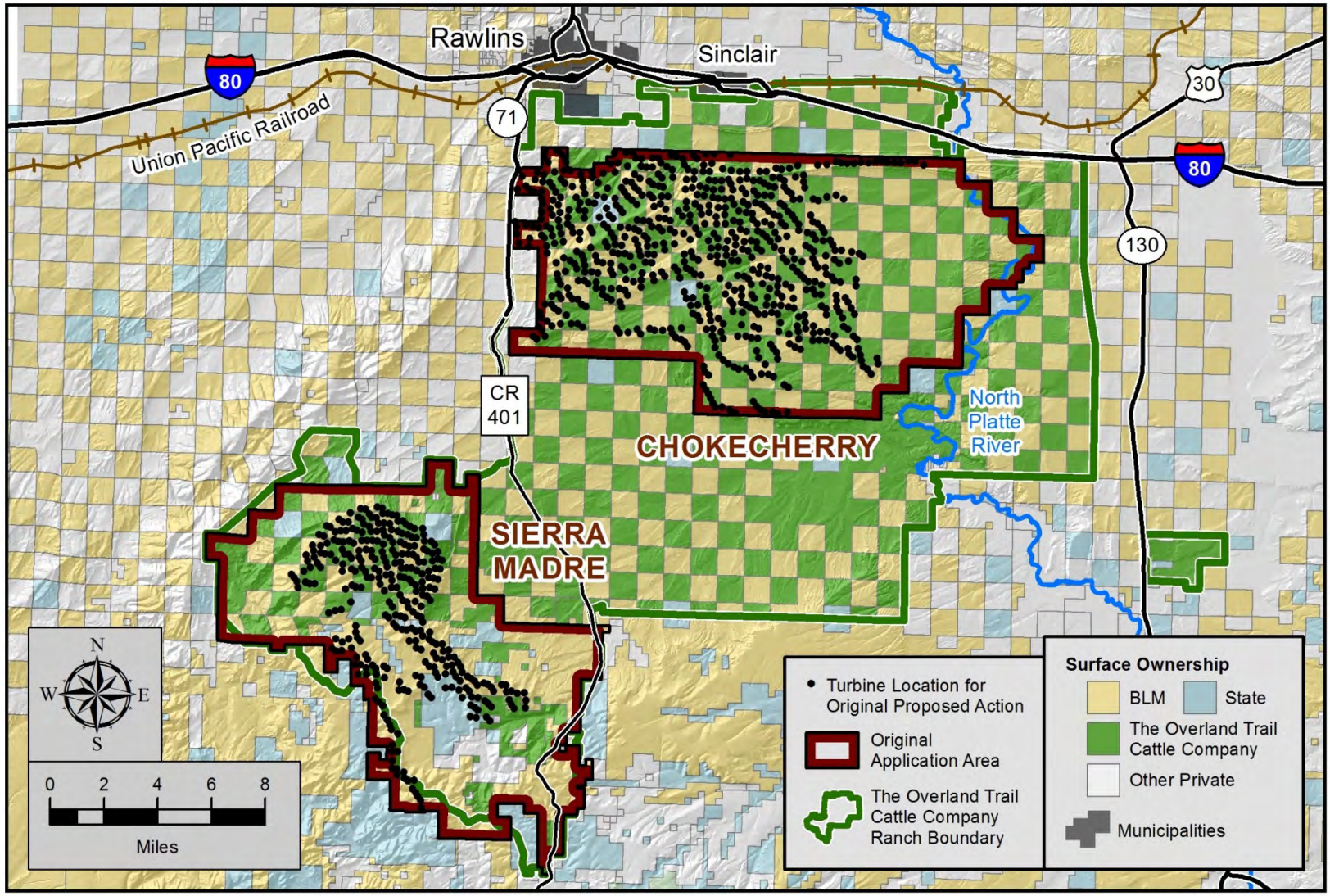


Figure 5.2. Original Proposed Action in Plan of Development – March 2009.

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