Phase I
Eagle Conservation Plan

Chokecherry and Sierra Madre Wind Energy Project

June 2015

Power Company of Wyoming LLC

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ACRONYMS AND ABBREVIATIONS

ACP	Advanced Conservation Practice
ACM	applicant-committed measure
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BBCS	Bird and Bat Conservation Strategy
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
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
ECP Guidance	Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy, Version 2
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
mph	miles per hour
MW	megawatt
NEPA	National Environmental Policy Act
NREL	National Renewable Energy Laboratory
NTP	notice to proceed
OLE	Office of Law Enforcement
PCW	Power Company of Wyoming LLC
POD	plan of development
PTT	platform terminal transmitter
Ranch	The Overland Trail Ranch
REA	resource equivalency assessment
RFO	Rawlins Field Office
ROD	Record of Decision
ROW	right-of-way
RSZ	rotor swept zone
TOTCO	The Overland Trail Cattle Company LLC
UCI	upper credible interval
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USFWS Region 6 Guidance	Final Outline and Components of an Eagle Conservation Plan (ECP) for Wind Development: Recommendations from Region 6

USFWS Region 6 Recommendations	Region 6 Recommendations for Avoidance and Minimization of Impacts to Golden Eagles at Wind Energy Facilities, April 11, 2013
VSR	vertical scanning radar
WDA	wind development area
WGFD	Wyoming Game and Fish Department
WHMA	wildlife habitat management area
Wind Energy Guidelines	U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines
WTPD	white-tailed prairie dog

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1.0 Introduction and Purpose

This Eagle Conservation Plan is submitted in conjunction with Power Company of Wyoming LLC's (PCW) applications for Bald and Golden Eagle Protection Act (BGEPA) non-purposeful take permits covering activities at Phase I of the Chokecherry and Sierra Madre Wind Energy Project (CCSM Project). PCW has submitted applications 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.

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. The U.S. Fish and Wildlife Service's (USFWS) "Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy, Version 2," dated April 2013 (ECP Guidance) recommends that eagle take permit (ETP) applications include an Eagle Conservation Plan, or similar documentation, that details the impacts of the non-purposeful (i.e. incidental) take on affected eagle species and how these impacts will be avoided, minimized, and mitigated.[1] The Eagle Conservation Plan must further demonstrate that the project is consistent with the USFWS's goal of maintaining stable or increasing breeding populations of eagles. *See USFWS 2014.*

PCW has worked with USFWS personnel from the Mountain-Prairie Region Office, Lakewood, Colorado, and Wyoming Ecological Services Office, Cheyenne, Wyoming, since 2010 regarding the potential for the CCSM Project to affect migratory birds and eagles. In its April 2011 letter to the Bureau of Land Management (BLM) regarding the CCSM Project, in response to the requirements of Instruction Memorandum (IM) 2010-156, USFWS stated "…we have determined that developing an APP is an appropriate option to avoid and minimize the potential take of eagles …." provided that PCW incorporates appropriate conservation measures into the CCSM Project.[2] *See Appendix A.* Following completion of the Stage 1 initial site assessment under the Draft Eagle Conservation Plan Guidance, January 2011, PCW determined that the CCSM Project met the criteria for Category 2 – High to moderate risk to eagles with an opportunity to mitigate impacts. In accordance with USFWS's Draft Eagle Conservation Plan Guidance, January 2011, PCW prepared and submitted a voluntary, project-wide draft Eagle Conservation Plan dated August 14, 2012. USFWS reviewed the project-wide draft Eagle Conservation Plan and continued to provide technical assistance to PCW in its development of Phase I and this Phase I Eagle Conservation Plan (Phase I ECP).

[1] See section 2.4 for a detailed discussion of USFWS's 2013 ECP Guidance.
[2] The term Avian Protection Plan (APP) is used in BLM IM-2010-156. However, through its Eagle Conservation Plan Guidance, Wind Energy Guidelines, and other related documents USFWS has since indicated its preference for the terms Eagle Conservation Plan (ECP) and Bird and Bat Conservation Strategy (BBCS) to be used in the context of wind energy facilities.

As detailed in this Phase I ECP, PCW has worked in close coordination with USFWS using the extensive CCSM Project and Phase I data to avoid and minimize risks to eagles to the extent practicable such that any remaining take is unavoidable. This 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 this, PCW believes Phase I meets the standards in 50 C.F.R. §22.26 for issuance of ETPs for incidental take.

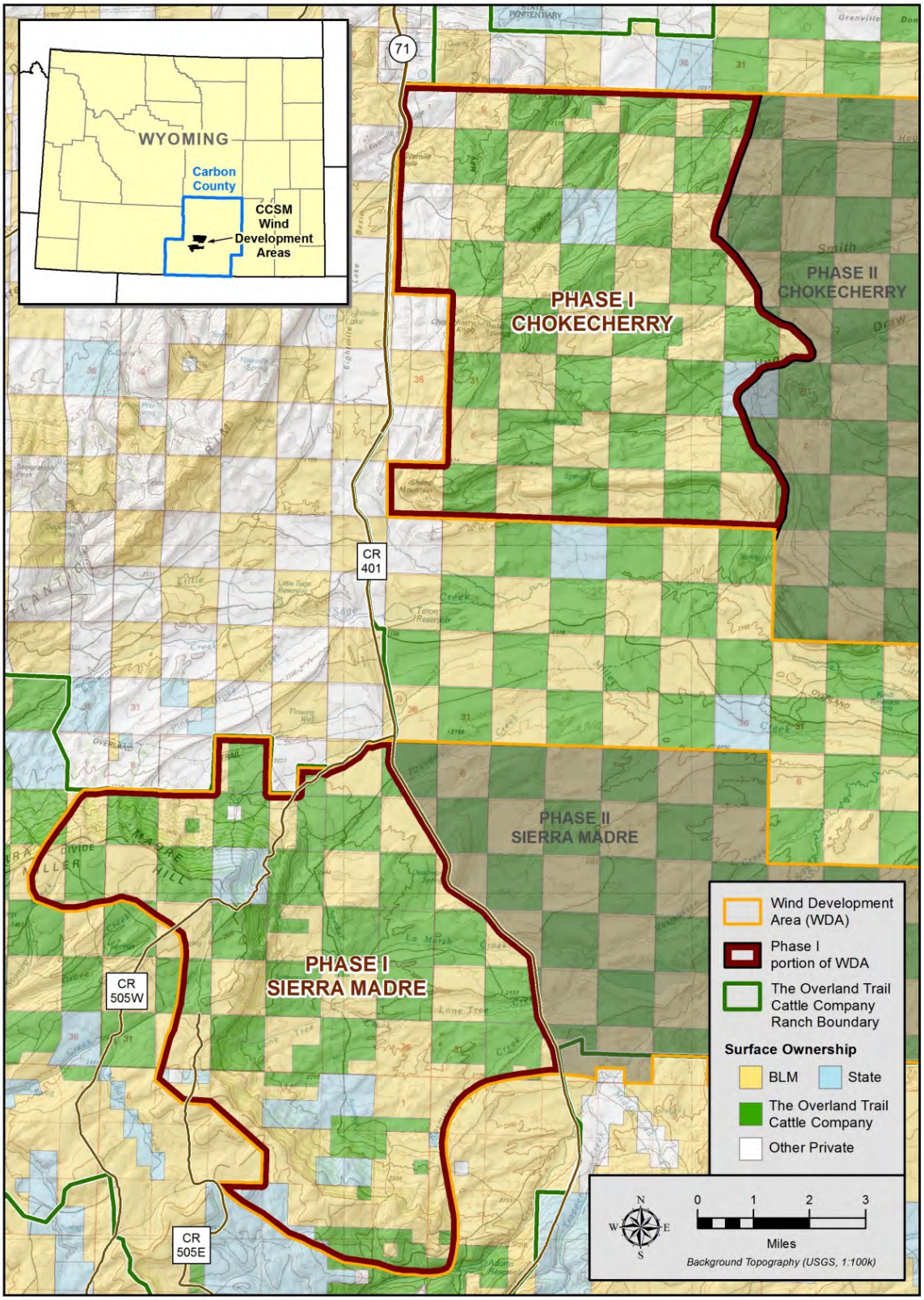

Figure 1.1. Phase I of the Chokecherry and Sierra Madre Wind Energy Project.

1.1 Purpose of the Phase I Eagle Conservation Plan

The purpose of this Phase I ECP is to document PCW's identification of potential risks to bald and golden eagles[3] and its reduction of those risks through implementation of conservation measures, experimental Advanced Conservation Practices (ACPs), and avoidance and minimization measures such that the remaining take is unavoidable. This Phase I ECP also describes the alternate sites, configurations, construction methods and operational practices evaluated by PCW and USFWS during the avoidance and minimization process. Further, this Phase I ECP documents the compensatory mitigation that will be provided for the remaining unavoidable take. This Phase I ECP builds on, refines, and replaces the previously prepared project-wide draft ECP. PCW prepared this Phase I ECP in accordance with USFWS's ECP Guidance and the "Final Outline and Components of an Eagle Conservation Plan (ECP) for Wind Development: Recommendations from Region 6" (USFWS Region 6 Guidance).[4,5]

PCW followed the process outlined in the ECP Guidance to plan Phase I. Consistent with the ECP Guidance, PCW initiated discussions with USFWS in 2010 regarding potential impacts to bald and golden eagles and has maintained communication with USFWS throughout the development process. In implementing the ECP Guidance, PCW worked closely with USFWS, Bureau of Land Management (BLM), Wyoming Game and Fish Department (WGFD), and other stakeholders. 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 applied to Phase I, as described in this Phase I ECP, avoid and minimize risks to bald and golden eagles to the extent practicable such that any remaining take is unavoidable. *See Chapter 6.0.* PCW's purpose and need in applying for ETPs is to comply with federal law and regulations regarding bald and golden eagles while engaging in the lawful activity of wind energy generation.

USFWS's consideration of PCW's applications for ETPs is a discretionary federal action that is subject to the National Environmental Policy Act (NEPA). USFWS has determined that preparation of an Environmental Impact Statement (EIS) is appropriate to comply with NEPA. 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

[3] *Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively.

[4] This Phase I ECP will serve to present the data and establish all avoidance, minimization, and mitigation measures that have been developed for Phase I. A Phase II ECP will be developed following the same criteria established in this document for Phase II of the CCSM Project. Much of the information presented in this Phase I ECP was collected as part of site characterization consistent with Stage 1 and Stage 2 of the ECP Guidance. As such, some information is applicable to both Phase I and Phase II of the CCSM Project.

[5] USFWS Region 6, commonly referred to as the Mountain-Prairie Region, oversees the management of USFWS trust resources in 8 states in the intermountain west and western Great Plains.

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.

1.2 Relationship with Other Related Documents and Processes

PCW's commitments set out in this Phase I ECP, 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 Final Environmental Impact Statement and Record of Decision for the CCSM Project, promote the conservation of bald and golden eagles as well as many other avian, wildlife, and fish species at or near Phase I. *See BLM 2012a; 2012b.* The following sections describe the other documents and permitting processes to which this ECP is related.

1.2.1 CCSM Project Background [6]

This ECP is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate ECP and will be evaluated by USFWS independently; 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 The Overland Trail Cattle Company LLC (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 mph) 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 megawatts (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 NEPA. BLM prepared a Final EIS (FEIS) and issued a Record of Decision (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*

[6] 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.

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.

1.2.2 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 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 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 will reopen an onsite 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 bald and golden eagles at the CCSM Project were analyzed in the BLM FEIS. The BLM FEIS identifies the potential impacts of fatalities caused by: (1) collisions with wind turbines or meteorological towers; (2) electrocution by above-ground power lines; (3) habitat loss and modification stemming from CCSM Project construction; and (4) displacement due to construction or operation of the CCSM Project. It 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, including an estimate of 46–64 golden eagle fatalities on an annual basis for a 1,000 wind turbine, 3,000 MW project with no specific eagle-related mitigation measures in place, and recognizes that this level of take would constitute a significant impact.[7] *See BLM 2012b at p. 4.14-26.* The BLM FEIS identifies that no significant impacts are expected for bald eagles. *See BLM 2012b at p. 4.14-22.* The BLM FEIS provides that BLM will not issue a Notice to Proceed (NTP) for the CCSM Project until PCW has developed an ECP and USFWS has issued a letter of concurrence for the Eagle Conservation Plan. *See BLM 2012b at p. 4.14-24.* However, the procedure for determining concurrence and issuing an NTP was detailed further in the Decision Record for EA1. *See "BLM's Supplemental Tiered NEPA Analysis."*

[7] "The eagle fatality estimate is based on pre-construction raptor use of the original Application Area (section 6.1.1), species composition of raptors observed during surveys, and raptor fatality estimates at other wind energy facilities in the western U.S., many of which did not develop plans to address eagle fatalities while designing and operating the projects." As discussed in chapter 7.0, the measures included in this Phase I ECP "to avoid and minimize eagle fatalities will likely result in observed eagle fatality rates below those originally predicted" by BLM. *See BLM 2012b at §4.14.2.4.*

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 defined 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 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, 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; see also BLM 2012a, App. C (outlining tiering procedures).* Thus, the ROD anticipated additional environmental review would be conducted by BLM.

The BLM ROD also recognizes that USFWS has jurisdiction with respect to bald and golden eagles; therefore, the BLM ROD requires action by USFWS before BLM will issue a NTP with construction of the CCSM Project. *See BLM 2012a at pp. 3-1 & 3-4.* The BLM ROD states that "[t]he BLM will work with USFWS and PCW at the specific plan of development stages of this project to identify [ ] practicable measures [to avoid and minimize take]." *See BLM 2012a at p. ES-2.* As explained in the BLM ROD, PCW is to provide ECPs 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, BLM will incorporate the measures outlined in the ECP "into subsequent NEPA analyses and ROW grants." *See BLM 2012a at pp. ES-2 & 1-2.* The ROD further provides that, "[s]hould PCW decide to apply for an eagle take permit, USFWS will thoroughly evaluate potential impacts of eagle take in NEPA documents." *See BLM 2012a at p. 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 ECPs. 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 eagle 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 APPs and ECPs." *See BLM 2012a at p. 3-1.* However, the procedure for determining concurrence and issuing ROW grants and NTP was detailed further in the Decision Record for EA1. *See "BLM's Supplemental Tiered NEPA Analysis."*

BLM's Supplemental Tiered NEPA Analysis

PCW's 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 four 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 2014b.* EA2 addresses PCW's site-specific POD for Phase I Wind Turbine Development, including 500 wind turbines or 1,500 MW. EA2 is currently being developed by BLM with a Decision Record anticipated in fall of 2015. USFWS is acting as a cooperating agency 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 2014b.* 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 2014b.* Specific to eagles, the Decision Record states that, "[t]urbine construction will not be allowed before USFWS makes its decision regarding an ETP." *See BLM 2014b.*

USFWS Compliance with NEPA

The issuance of a programmatic ETP is a major federal action that triggers the requirements of NEPA. Accordingly, parallel to BLM's preparation of the EAs for Phase I of the CCSM Project, USFWS is preparing an EIS to analyze the potential impacts to eagles and to evaluate potential issuance of ETPs for

Phase I. 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 this Phase I ECP as well as consider and incorporate where appropriate other relevant information sources, including BLM's FEIS. In addition, USFWS is a cooperating agency on the two EAs being prepared by BLM. *See "BLM's Supplemental Tiered NEPA Analysis."*

Section 7 Consultation

The Endangered Species Act (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 alternatives 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. Implementation of the conservation measures for proposed and candidate species identified in the BO to reduce potential adverse impacts are discretionary. The BO incorporates the applicant-committed measures (ACMs).

Bald and golden eagles are not threatened or endangered species and are therefore not protected under the ESA and are not included in the section 7 consultation process.[8] However, in order to issue an ETP, 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).*

Bird and Bat Conservation Strategy

PCW will submit a Bird and Bat Conservation Strategy (BBCS) for Phase I to USFWS, following the "U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines" (Wind Energy Guidelines) and recommendations from USFWS's "Region 6, Outline for a Bird and Bat Conservation Strategy: Wind Energy Projects." *See PCW 2015a; USFWS 2012a.*

1.2.3 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. These permits 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

[8] While bald and golden eagles are not protected under the ESA, bald and golden eagles are protected under the federal laws described in chapter 2.0.

enforce such modifications. Although they are distinct processes with 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 require PCW to comply with all applicable laws, regulations, standards, and 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 application with the Department of Environmental Quality, Industrial Siting Division for the required permit. 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 ISC issued the permit on September 12, 2014, and it requires PCW to comply with all applicable federal permits. Moreover, should BLM or USFWS require modifications to the CCSM Project, the applicable statute and the ISC rules and regulations provide the mechanisms and processes for addressing the required modifications. 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 affording an opportunity for 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[9] 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.

1.3 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.

1.3.1 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 farm 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

[9] 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).

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 objective 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 National Renewable Energy Laboratory (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.

1.3.2 Environmental Commitment

PCW's approach to development of the CCSM Project is novel because it maintained the flexibility that enabled the company to significantly redesign the Project from what was first 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 applications of the stages identified in the ECP Guidance, 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 eagles. *See Section 6.1.* The resulting final wind turbine configuration has avoided or minimized risks to eagles from Phase I such that any remaining take is unavoidable despite application of ACPs, consistent with the ECP Guidance and the provisions of the BGEPA.

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 is committed to building the CCSM Project in an environmentally responsible manner. Responsible development includes taking measures, such as those documented in this Phase I ECP to avoid, minimize, and mitigate the CCSM Project's impact to wildlife populations, including eagles, 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 eagles and other avian and non-avian species.

2.0 Regulatory Framework

There is a comprehensive and complex existing legal framework to protect bald and golden eagles. This includes statutes in the United States Code (U.S.C.), federal regulations, the ECP Guidance, and the Wind Energy Guidelines. Brief summaries of the components of this legal framework are set out below.

2.1 Migratory Bird Treaty Act[10]

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. The statute's language is clear that 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 states, "Unless 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 Act] 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.*

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)*.

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.*

2.2 Bald and Golden Eagle Protection Act[11] and Eagle Take Permits

Under the authority of the Bald and Golden Eagle Protection Act (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

[10]Drawn from USFWS 2012a at p. 2.
[11]Drawn from USFWS 2012a at p. 2 through 3.

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).*

In 2009, USFWS promulgated a final rule on two new permit regulations that, for the first time, specifically authorize the non-purposeful (i.e. incidental) take of eagles and eagle nests in a variety of situations under BGEPA. *See 50 C.F.R. §§ 22.26 & 22.27*. The permits authorize limited, incidental take of bald and golden eagles, authorizing individuals, companies, government agencies (including tribal governments), and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities such as operating utilities and airports.

In 2013, USFWS issued a final rule to extend the maximum term for programmatic take permits under BGEPA to 30 years, subject to a recurring five-year review process throughout the permit life. *See 78 Fed. Reg. 73,704 (December 9, 2013)*. The change is designed to facilitate responsible development of renewable energy and other projects that operate for multiple decades, and to provide certainty for project proponents, all while continuing to conserve eagles. The new rule went into effect January 8, 2014.

USFWS's permit program allows for two kinds of non-purposeful take permits for protected eagles: the standard permit and the programmatic permit. The standard permit authorizes the limited take of eagles resulting from a one-time and otherwise lawful activity where the take cannot be practically avoided (*e.g.*, construction of a housing development).[12] *See 50 C.F.R. § 22.26(a)(1)*. The standard permit is subject to numerous conditions, including a limitation on the amount of authorized take that is based on a total authorized nationwide take of eagles, and other permit applicants' requests that may take precedence (*e.g.*, Native American religious use requests).

The programmatic permit authorizes non-purposeful eagle take associated with operations at a facility (*e.g.*, operation of a wind energy facility)[13] where take of eagles is unavoidable even though ACPs are being implemented. *See 50 C.F.R. § 22.26(a)(2).* Programmatic take means take that is recurring, is not caused solely by indirect effects, and that occurs over the long term or in a location or locations that cannot be specifically identified. A key feature of the programmatic take permit is the implementation of ACPs at the facility. An "advanced conservation practice" is defined as: "scientifically supportable

[12]See 74 Fed. Reg. at 46,842 for the example of a housing development's qualification for a standard permit.
[13]See 74 Fed. Reg, at 46,842 for the example of a wind development's qualification for a programmatic permit.

measures that are approved by USFWS and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable." *See 50 C.F.R. § 22.3.* In general, ACPs would be determined by the permit applicant and USFWS on a case-by-case basis. However, as discussed in the ECP Guidance, at this time there are no proven ACPs for wind energy projects; therefore, all ACPs for wind energy are considered experimental. *See USFWS 2013a.*

2.3 U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines[14]

USFWS's main approach to reducing impacts to migratory birds from wind energy facilities is the use of the voluntary Wind Energy Guidelines. *See USFWS 2012a*. These 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 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 Wind Energy Guidelines form the best practical approach for conserving species of concern. The 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. The 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 birds of prey; prairie grouse and sage-grouse; and listed, proposed, or candidate endangered and threatened species.

The 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 the 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

[14]Drawn from USFWS2012a at vi and vii.

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 Wind Energy Guidelines also provide Best Management Practices (BMPs) for site development, construction, retrofitting, repowering, and decommissioning.

The Wind Energy Guidelines include a Communications Protocol which provides guidance to both developers and USFWS personnel regarding appropriate communication and documentation. Adherence to the Wind Energy Guidelines is voluntary and does not relieve any individual, company, or agency of the responsibility to comply with laws and regulations. However, if a violation occurs, USFWS will consider a developer's documented efforts to communicate with the Service and adhere to the Wind Energy Guidelines in its enforcement decision.

USFWS recommends that a BBCS be prepared in accordance with the Wind Energy Guidelines. USFWS has informed PCW that a 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*.

2.4 U.S. Fish and Wildlife Service Eagle Conservation Plan Guidance[15]

USFWS, in April 2013, released the ECP Guidance to provide direction to USFWS employees and industry during wind energy facility planning. *See USFWS 2013a*. The ECP Guidance outlines the type of analysis and science that should be considered in a robust permit application to provide flexibility to the wind energy industry while protecting bald and golden eagles. *See USFWS 2013a*.

The ECP Guidance describes a process for wind energy developers to use in collecting and analyzing information that could lead to a programmatic permit under BGEPA to authorize incidental take of eagles at wind energy facilities. While acknowledging that all wind projects within the eagles' geographic range pose some risk to eagles, the purpose of using the process in preparing an ECP is to assess that risk and assess how siting, design, and operational modifications can mitigate that risk to the extent practicable.

The ECP Guidance is intended to provide "specific in-depth guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities." The ECP Guidance calls for scientifically rigorous surveys, monitoring, assessment, and research designs proportionate to the

[15] Drawn from USFWS 2013a at xxii-xiii.

risk to eagles. According to the ECP Guidance, an ECP should: (a) document early pre-construction assessments to identify important eagle use areas; (b) document a commitment to avoiding, minimizing, and/or mitigating for potential adverse effects to eagles; and (c) document procedures to monitor for impacts to eagles during construction and operation.

USFWS recommends that ECPs be developed in five stages. Each stage builds on the prior stage, such that together the process is a progressive, increasingly intensive look at likely effects of the development and operation of a particular site and configuration on eagles. The ECP Guidance recommends that at the end of each of the first four stages, project proponents determine which of the following categories the project, as planned, falls into: (1) high risk to eagles, little opportunity to minimize effects; (2) high or moderate risk to eagles, but with an opportunity to minimize effects; or (3) minimal risk to eagles.

The five-stage approach for developing an eagle conservation plan is described in the ECP Guidance, as follows:

- Stage 1 – At the landscape level, identify potential wind facility locations with manageable risk to eagles.

- Stage 2 – Obtain site-specific data to predict eagle fatality rates and disturbance take at wind facility sites that pass Stage 1 assessment. Investigate other aspects of eagle use to consider assessing distribution of occupied nests in the project area, migration, areas of seasonal concentration, and intensity of use across the project footprint.

- Stage 3 – As part of pre-construction monitoring and assessment, estimate the fatality rate of eagles for the facility evaluated in Stage 2, excluding possible additions of conservation measures and advanced conservation practices (ACPs). Consider possible disturbance effects.

- Stage 4 – As part of the pre-construction assessment, identify and evaluate conservation measures and ACPs that might avoid or minimize fatalities and disturbance effects identified in Stage 3. When necessary, identify compensatory mitigation to reduce predicted take to a no-net-loss standard.

- Permit Decision – Determine if regulatory requirements for issuance of a permit have been met.

- Stage 5 – During post-construction monitoring, document mean annual eagle fatality rate and effects of disturbance. Determine if initial conservation measures are working and should be continued, and if additional conservation measures might reduce observed fatalities. Monitor effectiveness of compensatory mitigation. Ideally, assess use of area by eagles for comparison to pre- construction levels.

Although project proponents are not required to use the recommended procedures described in the ECP Guidance, PCW has chosen to follow the recommended procedures for this Phase I ECP. Because data collection and siting decisions for the CCSM Project began prior to the issuance of the ECP Guidance, PCW has coordinated closely with USFWS to ensure adherence with the ECP Guidance.

The ECP Guidance interprets and clarifies the permit requirements in the regulations at 50 C.F.R. §§ 22.26 & 22.27, and it does not impose any binding requirements beyond those specified in the regulations for programmatic take permits. Programmatic take permits will authorize limited, incidental mortality and disturbance of eagles at wind facilities, and provide effective offsetting conservation measures that meet regulatory requirements. To comply with the permit regulations, conservation measures must avoid and minimize take of eagles to the extent practicable, and, for programmatic permits necessary to authorize ongoing take of eagles, ACPs must be implemented such that any remaining take is unavoidable. Further, for eagle populations that cannot sustain additional mortality, any remaining take must be offset through compensatory mitigation such that the net effect on the eagle population is, at a minimum, no change.

Under the ECP Guidance, compensatory mitigation for eagle takes will be calculated on the basis of a Resource Equivalency Assessment (REA), which estimates the number of "eagle-years" lost as a result of the wind energy project. *See USFWS 2013a, App. G*. The REA then assesses the number of "eagle-years" that could be "generated" through offsite mitigation, and in particular, the retrofit of utility power poles with eagle protection systems. A project proponent can either contract for the retrofits directly, or pay an amount of money into a USFWS-approved project or a USFWS-established BGEPA mitigation account.

3.0 Project Description and Environmental Setting

This ECP is limited in scope to Phase I of the CCSM Project. Phase II of the CCSM Project will have a separate ECP and will be evaluated by USFWS independently; 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.

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 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. There will be no wind turbines sited outside the WDAs.

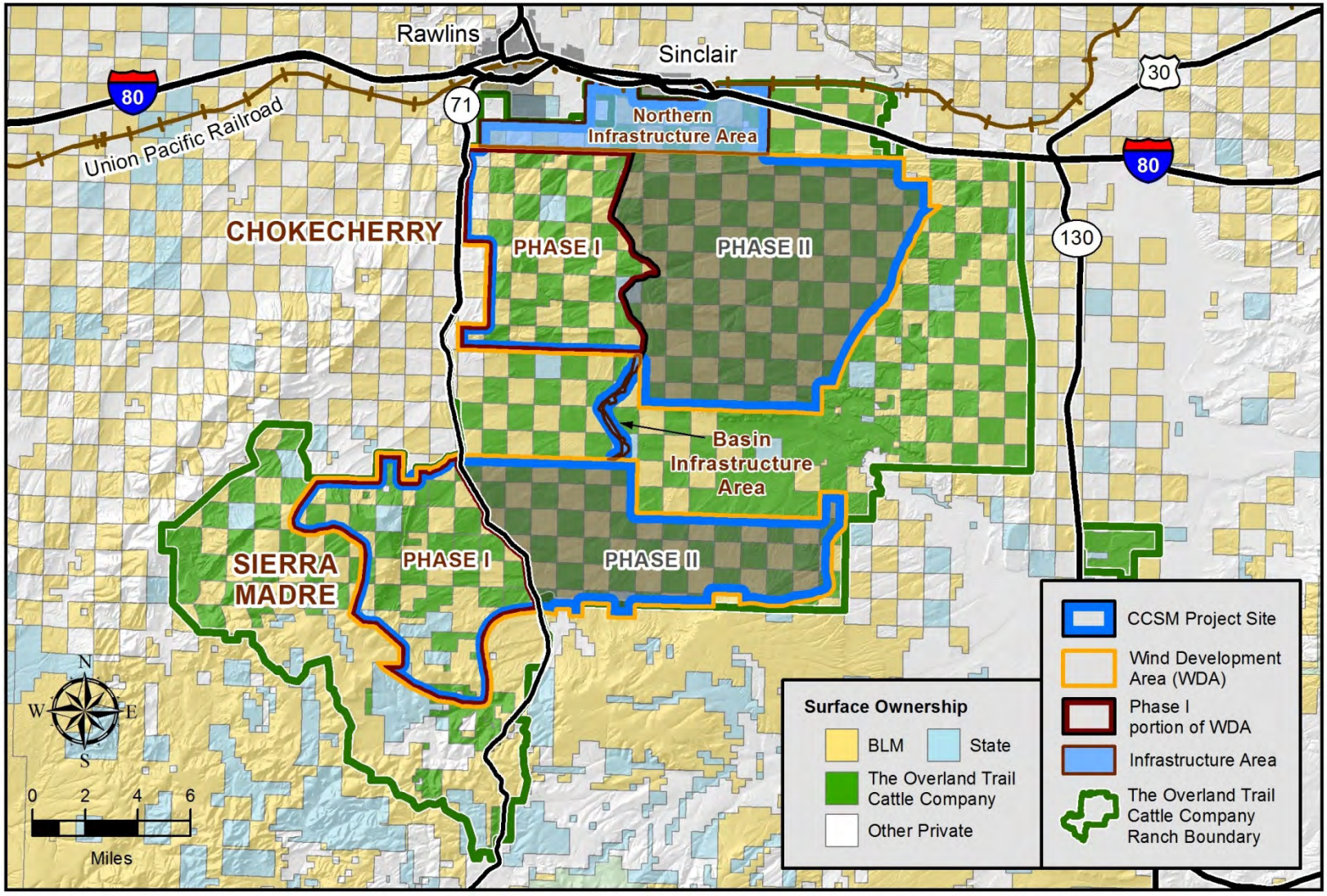

Figure 3.1. CCSM Project Overview.

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 has prepared and filed with BLM site-specific PODs for each component of Phase I. *See PCW 2014b; 2014c; 2014d; 2015b*. These components 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, and 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).
- **The Phase I Wind Turbine Development.** 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 Phase I of the WDAs in which wind turbines will be constructed are referred to as Turbine Build Areas.

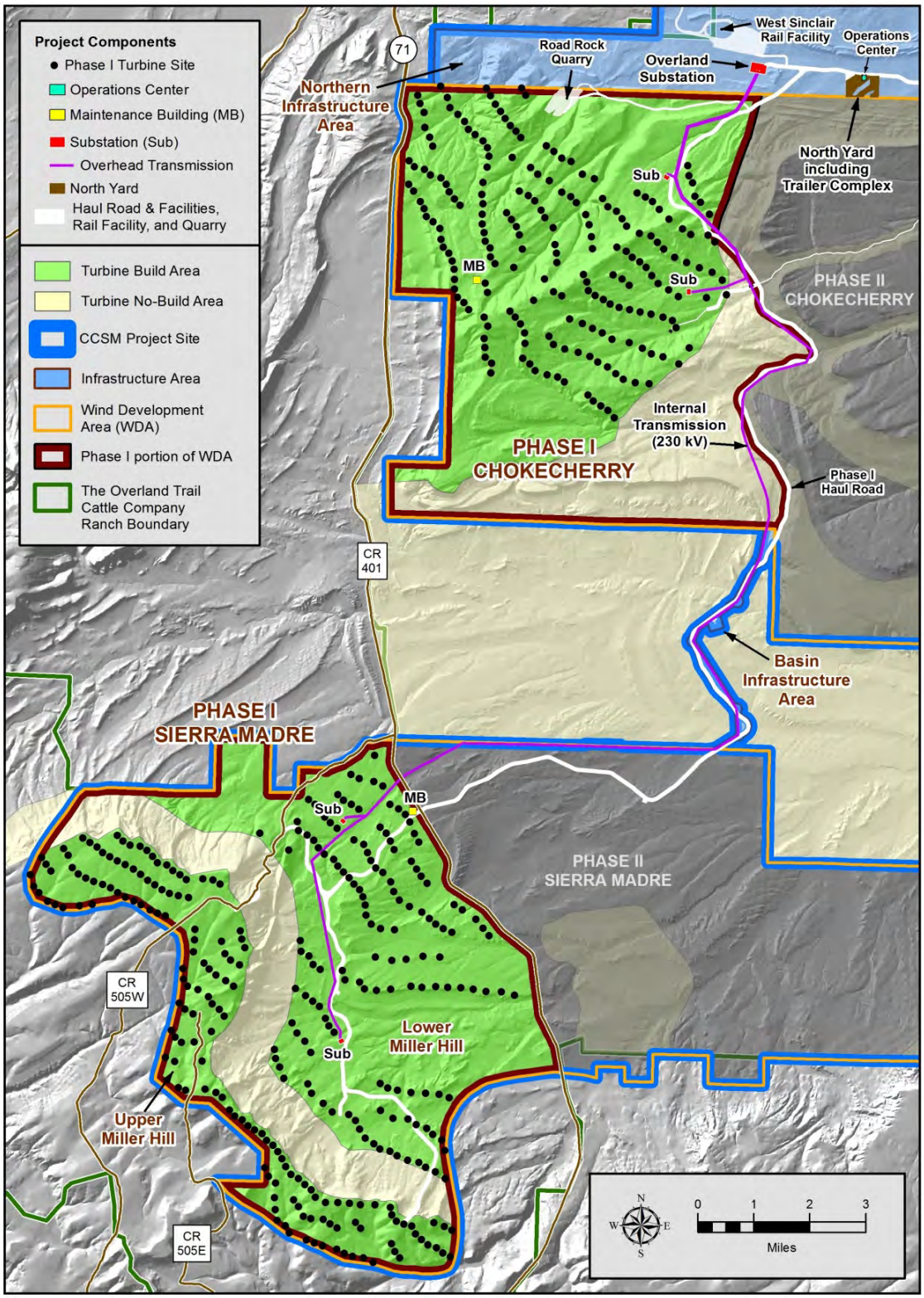

Figure 3.2. Phase I Layout.

3.1.1 Design

The Phase I Wind Turbine Development layout was developed in coordination with BLM and USFWS using detailed site-specific information. The layout was designed to meet the CCSM Project and Phase I goals and objectives while complying with the ROD and guidance from USFWS 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, USFWS's ECP Guidance and Wind Energy Guidelines recommend extensive measures including collecting site-specific eagle survey data and the application of avoidance and minimization measures. *See USFWS 2012a; 2013a.* In compliance with the ROD and the USFWS 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.

In many cases the Phase I wind turbine layout and infrastructure design went through numerous iterations of each step. This process is described in more detail in chapter 6.0 of this Phase I ECP. Figure 3.2 shows the Phase I wind turbine layout resulting from the design process, including PCW's consultation with USFWS as described in this Phase I ECP.

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 meet 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 ECP. Subject to these specifications, PCW will select the most appropriate model(s) for Phase I.

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). While these dimensions represent the largest wind turbine dimensions under consideration, towers 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). 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).

3.1.3 Surface Disturbance

Phase I surface disturbance includes initial surface disturbance, long-term surface disturbance, and activity areas.[16] 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, e.g. locations for personnel to walk holding taglines that stabilize wind turbine component during lifts. Table 3.1 shows the estimated initial and long-term surface disturbance, as well as activity areas for Phase I by site-specific POD and cumulatively.

Table 3.1. 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**

[16] Initial surface disturbance is defined as the total area of surface disturbance and includes both the areas that would be reclaimed and the long-term surface disturbance. The initial surface disturbance would be reclaimed following construction in accordance with the Master Reclamation Plan, included in the BLM ROD, and the site-specific reclamation plan, included within the Phase I Wind Turbine Development site-specific POD. *See BLM 2012b, App. B at App. E; PCW 2015b at App. L*. Long-term surface disturbance is defined as areas that would be reclaimed in accordance with these plans following decommissioning. Activity areas are areas where activities may occur that do not require ground disturbance (would not be cleared or graded); thick vegetation higher than one foot may be trimmed to allow for safe vehicle access and minimize fire potential.

3.1.4 Schedule

Phase I construction is expected to begin in 2016 and be complete by 2020 as shown in Table 3.2. The Phase I schedule is designed to first open the site to road and rail access, then establish the onsite 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 3.2. 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 ECP, 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 in relation to Phase I. These boundaries are relevant as 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, mostly 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 6.0 and shown in Figure 3.2. Table 3.3 shows the total acreage and land ownership within the Phase I Development Area.

Table 3.3. 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 3.1 and are further broken down by land ownership in Table 3.4.

Table 3.4. 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 6.0. This section focuses on those elements of the environmental setting most relevant to eagles. The environmental setting for other resources, such as air quality, soils, noxious and invasive weeds, range resources, cultural resources, paleontological resources, visual resources and socio-economics 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 eagles. 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 eagles and their prey. 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 described above, 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 3.3.*

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 3.3.*

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 within Phase II of the CCSM Project Site.

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 Kindt, Rasmussen, Sage Creek, and Teton Reservoirs, are interspersed throughout this arid landscape outside of Phase I.

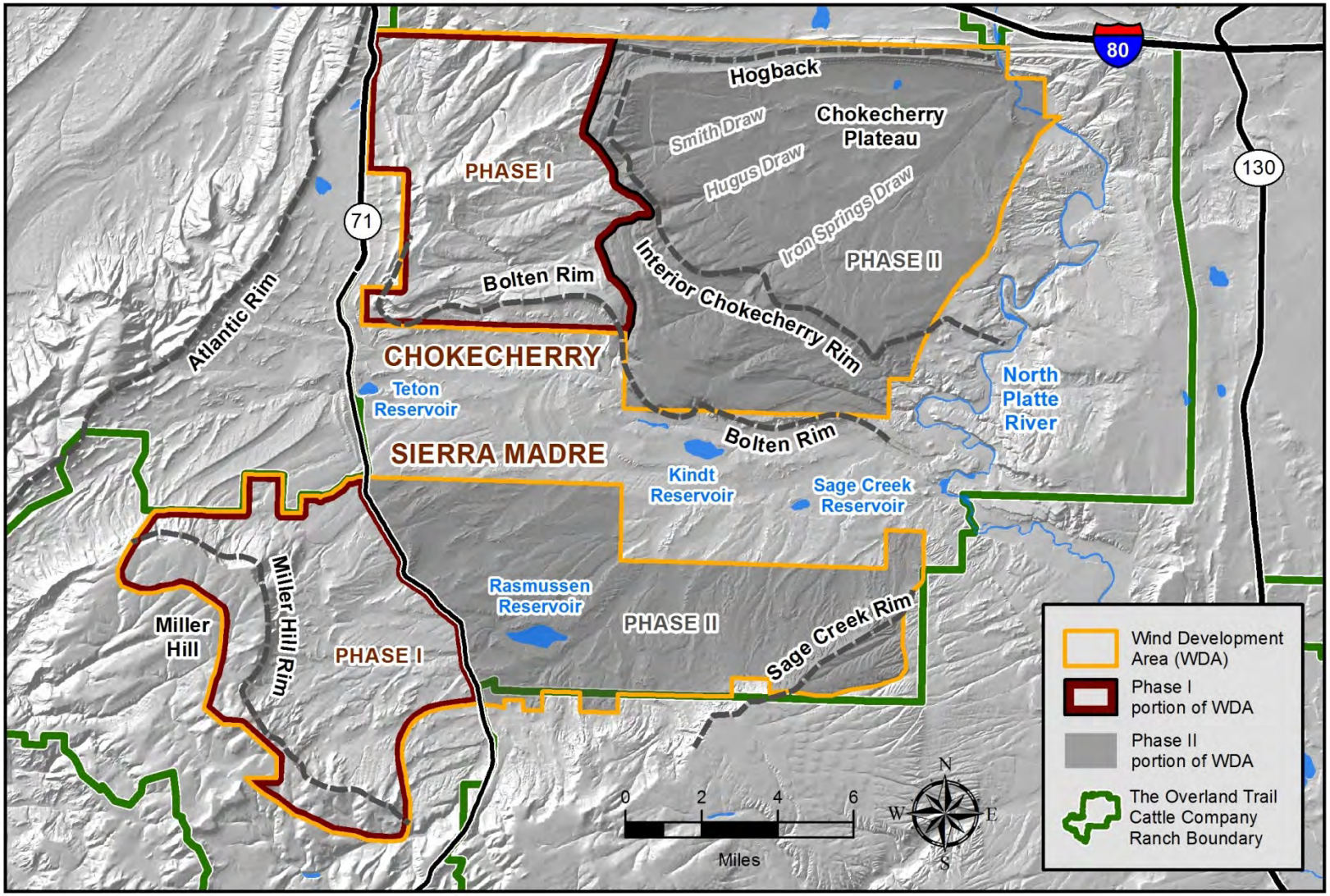

Figure 3.3. CCSM Project Physiographic Features.

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 3.4 & Figure 3.5.*

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 3.5 summarizes the vegetation community distribution within 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; 2014c; 2014d; 2015b*.

Table 3.5. 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; 2014c; 2014d; 2015b*.

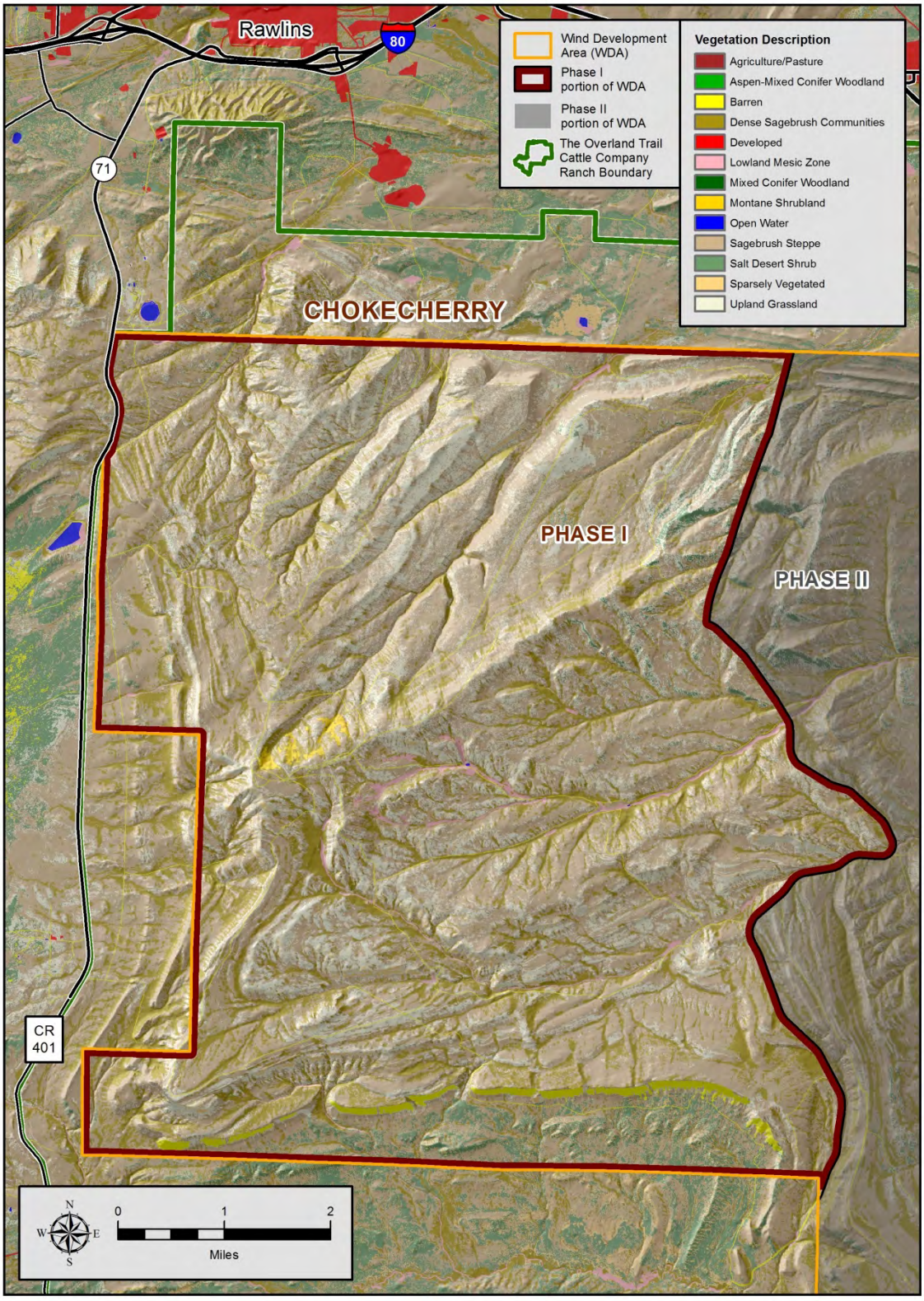

Figure 3.4. Phase I Chokecherry WDA Vegetation Cover.

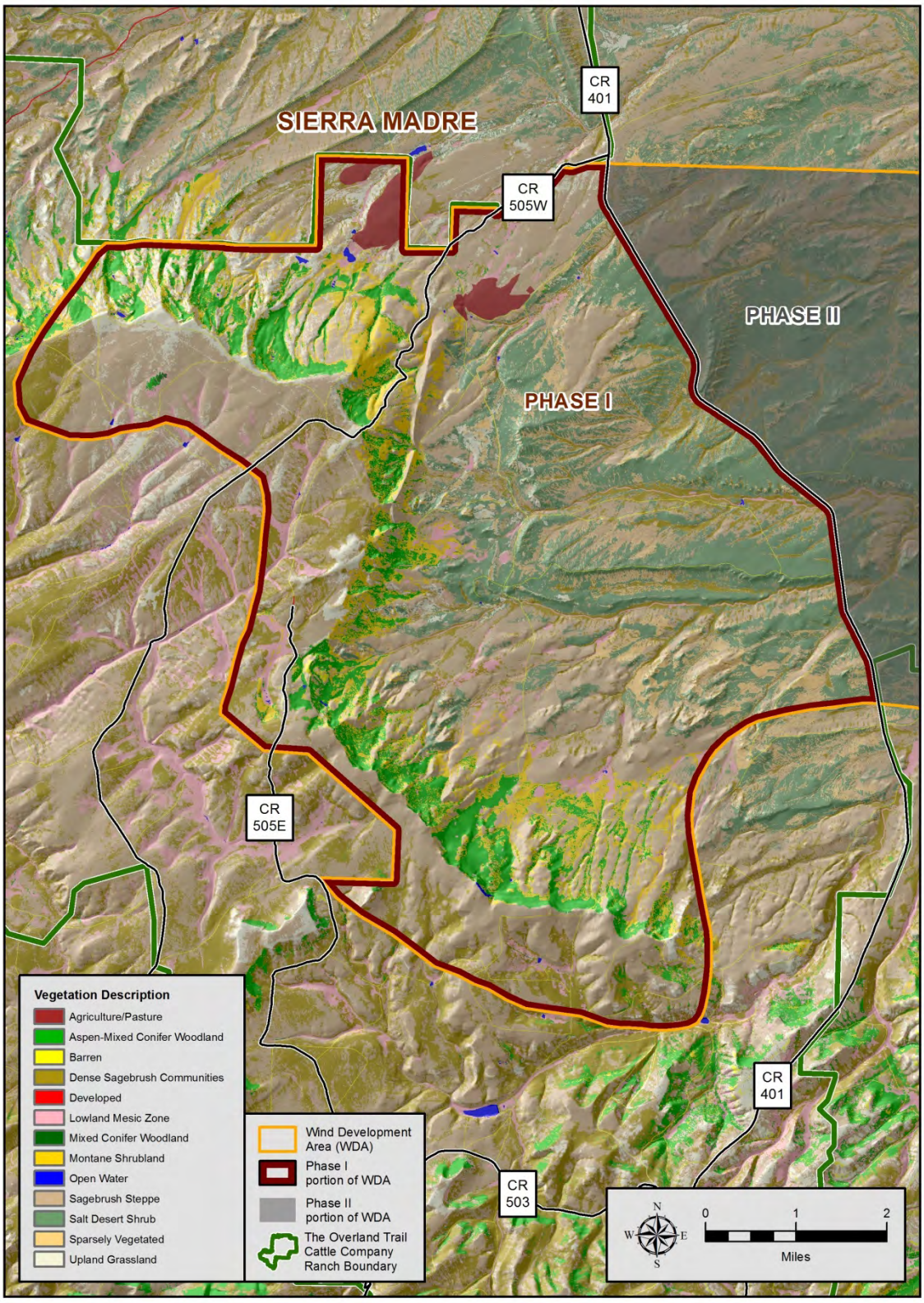

Figure 3.5. Phase I Sierra Madre WDA Vegetation Cover.

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 3.6 & Figure 3.7.* 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 irrigation 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; 2014c; 2014d; 2015b*.

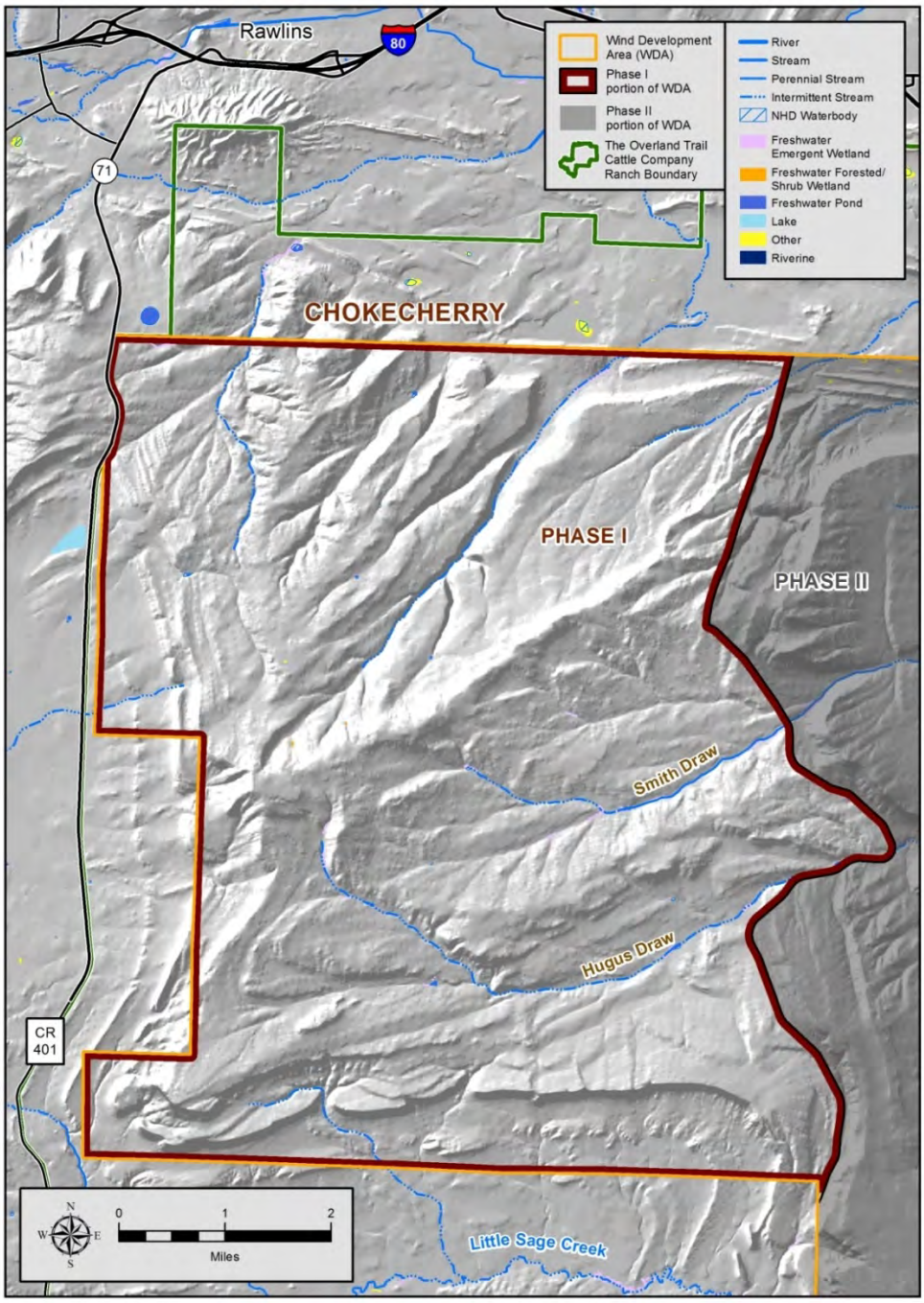

Figure 3.6. Phase I Chokecherry WDA Water Features.[17]

[17] 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.

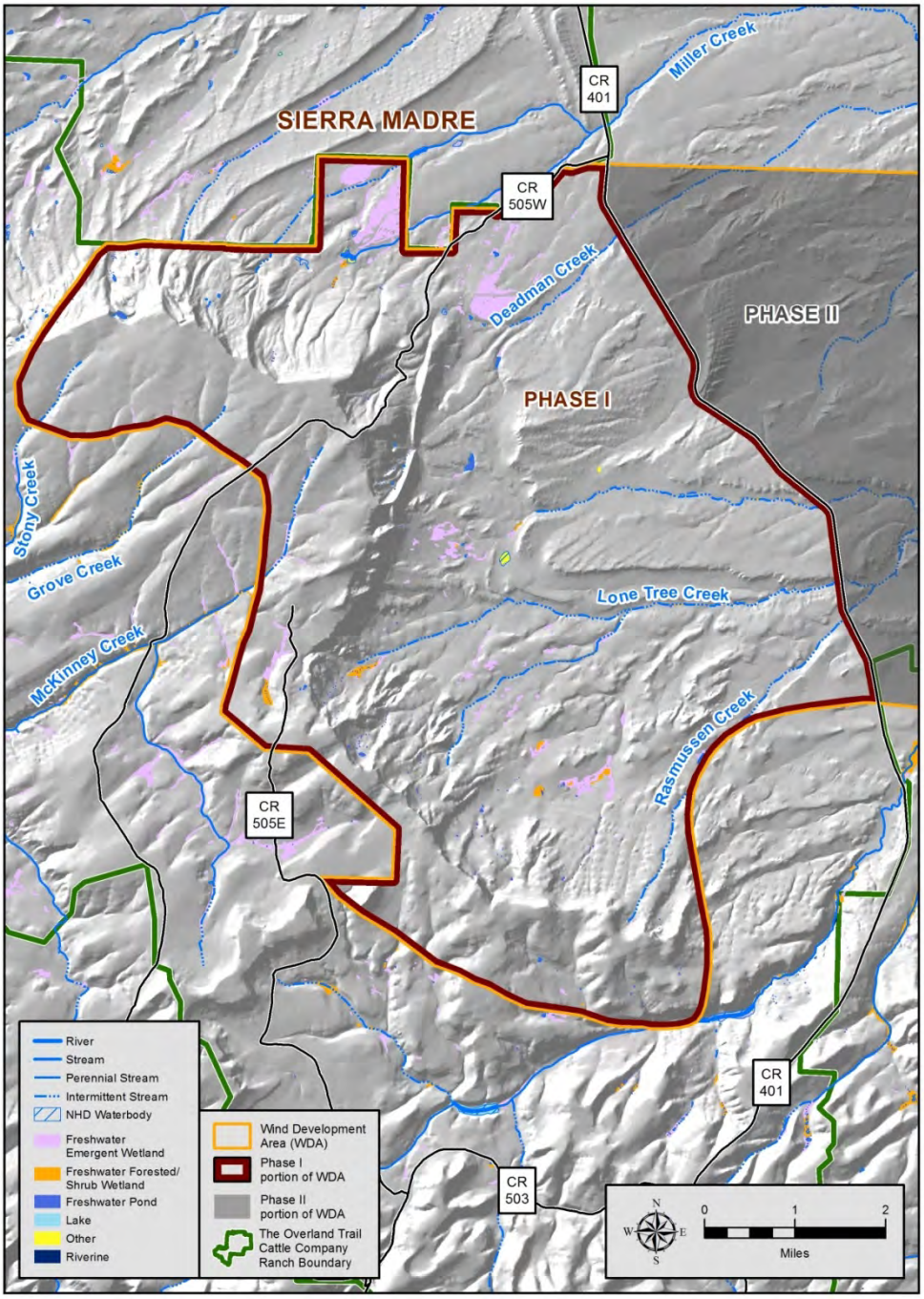

Figure 3.7. Phase I Sierra Madre WDA Water Features.[18]

[18] 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.

3.3.5 Prey Base Species

Primary big game species available on the Ranch that may provide foraging opportunities for eagles include mule deer *(Odocoileus hemionus)*, elk *(Cervus canadensis)*, and pronghorn *(Antilocapra americana)*. Primary small game species on the Ranch that may be suitable as prey include white-tailed prairie dogs (*Cynomys leucurus*), greater sage-grouse (*Centrocercus urophasianus*), white-tailed jackrabbit (*Lepus townsendii*) and cottontail rabbit *(Sylvilagus* spp*.).* In addition, near reservoirs, waterfowl and waterbirds such as American coot (*Fulica americana*), American wigeon (*Anas americana*), Scaup (*Aythya* spp.), *Aechmophorus* grebes (i.e., western and Clark's), eared grebe (*Podiceps nigricollis*), redhead (*Aythya americana*), lesser scaup (*Aythya affinis*), and mallard (*Anas platyrhynchos*) may provide seasonal foraging opportunities. *See Chapter 5.0.*

Additional detail on wildlife species, including sensitive species, within Phase I can be found in the site-specific plans of development for Phase I of the CCSM Project. *See PCW 2014b; 2014c; 2014d; 2015b*. Prey base is also discussed in detail in chapter 5.0 of this Phase I ECP.

4.0 Initial Site Assessment (ECP Guidance Stage 1)

In compliance with Stage 1 of the ECP Guidance, PCW has completed the initial site assessment for Phase I and categorized the risk to eagles. Stage 1 of the ECP Guidance combines Tiers 1 and 2 from the Wind Energy Guidelines, and it recommends that project proponents evaluate the broad geographic area to assess the relative importance of various areas to resident breeding and non-breeding eagles, and to migrant and wintering eagles. In Stage 1, the project proponent gathers existing information from publicly available databases and other sources and uses those data to refine potential project siting, balancing suitability for development with potential risk to eagles. Following completion of Stage 1, the project proponent makes an initial site categorization based on mortality risk to eagles.

4.1 Site Assessment

The goal of a Stage 1 initial site assessment is to determine whether a potential wind energy project site is located within areas known or likely to be used by eagles and, if so, to begin to assess the spatiotemporal extent and type of eagle use the site receives or is likely to receive. ECP Guidance Appendix B: Stage 1 – Site Assessment sets out a series of questions to be considered to help place the project site or alternate sites into an appropriate risk category. PCW selected the original site for wind energy development in 2006, approximately seven years prior to the April 2013 release of the ECP Guidance. While the ECP Guidance was not available at the time of site selection, had it been in place, PCW's response to each of the questions in Appendix B of the ECP Guidance for the CCSM Project, including Phase I, would have been as follows:

1. Does existing or historical information indicate that eagles or eagle habitat (including breeding, migration, dispersal, and wintering habitats) may be present within the geographic region under development consideration?

   At the time of site selection, based on direct observations by PCW and BLM personnel, eagles were known to use the area. In addition, BLM's Rawlins Field Office records on raptor nesting activity showed historical eagle use of the area.

2. Within a prospective project site, are there areas of habitat known to be or potentially valuable to eagles that would be destroyed or degraded due to the project?

   Insufficient information existed to determine whether development of the CCSM Project, including Phase I, would potentially destroy or degrade areas of habitat either known to be or potentially valuable to eagles.

3. Are there important eagle use areas or migration concentration sites documented or thought to occur in the project area?

   In 2006, important eagle use areas documented or thought to occur within the CCSM Project Site, including Phase I, consisted of known eagle nest locations identified by BLM. Best available information in 2006 did not document or indicate eagle migration corridors, communal roost locations, or important foraging areas within the CCSM Project Site, including Phase I. *See BLM 2004*.

4. Does existing or historical information indicate that habitat supporting abundant prey for eagles may be present within the geographic region under development consideration (acknowledging, wherever appropriate, that population levels of some prey species such as black-tailed jackrabbits (*Lepus californicus*) cycle dramatically [Gross *et al.* 1974] such that they are abundant and attract eagles only in certain years [e.g., Craig *et al.* 1984])?

   Existing and historical information indicated that habitat supporting prey species was present in the geographical region under consideration for development. *See BLM 2004*.

5. For a given prospective site, is there potential for significant adverse impacts to eagles based on answers to above questions and considering the design of the proposed project?

   In 2006 insufficient information existed, including information concerning potential impacts to eagles from wind energy development, to determine if there was the potential for significant adverse impacts to eagles based on the design of the proposed project.

In 2006, PCW's potential wind development site included the entire 320,000-acre Ranch owned and operated by PCW's affiliate. PCW did not possess the required property rights to consider or evaluate land located outside of the Ranch boundary for wind energy development. Within the boundaries of the Ranch, however, PCW evaluated a number of different project design layouts using different land and development scenarios. These alternate project designs and development scenarios are detailed in section 6.1.

4.2 Risk Assessment Following Stage 1

The ECP Guidance recommends the project proponent make an initial site categorization upon conclusion of Stage 1 site assessment based upon mortality risk to eagles. The risk categories identified in the ECP Guidance are:

Category 1 – High risk to eagles, potential to avoid or mitigate impacts is low

Category 2 – High or moderate risk to eagles, opportunity to mitigate impacts

Category 3 – Minimal risk to eagles

In 2006, following completion of the Stage 1 site assessment PCW would have classified the CCSM Project Site, including Phase I, as Category 2. In its April 2011 concurrence letter to BLM, USFWS stated "…we have determined that developing an APP is an appropriate option to avoid and minimize the potential take of eagles …" *See Appendix A.* These statements are consistent with a Category 2 classification of high to moderate risk to eagles but with opportunities to mitigate impacts.

5.0 Site-specific Surveys and Assessments (ECP Guidance Stage 2)

Stage 2 of the ECP Guidance aligns with Tier 3 of the Wind Energy Guidelines and addresses site-specific surveys and assessments. During Stage 2, the project developer collects quantitative data through scientifically rigorous surveys designed to assess the potential risk of the proposed project to eagles. Consistent with the ECP Guidance, PCW initiated discussions with USFWS regarding potential impacts to bald and golden eagles early in the development of the CCSM Project and conducted site-specific, scientifically rigorous surveys designed to assess the potential risk of the proposed project to eagles.

5.1 Surveys and Methodology

This section describes the site-specific surveys and assessments that were conducted, including general methodologies. Subsequent sections present the results of the surveys.

To assess the potential risk of the proposed project to eagles, since 2008, PCW has conducted numerous surveys. *See Table 5.1*. These surveys include:

1. Eagle use surveys designed to characterize eagle use and identify important eagle use areas including those related to nesting activity, migration, foraging, and roosting;
2. Eagle nest surveys designed to characterize the local area nesting population; and
3. Prey base surveys to identify significant prey resources and potential foraging areas.

In addition, PCW conducted migratory bird surveys, breeding bird surveys, and deployed an avian radar system to further characterize how avian species use the CCSM Project Site, including Phase I.

To understand the potential impacts of the CCSM Project, including Phase I, on eagles, PCW and BLM collected eagle and other wildlife survey data from June 2008 to June 2009 to characterize species composition and relative abundance and to provide information concerning nesting, migration and home ranges within the WDAs. After collecting this data, in 2010, PCW initiated discussions with USFWS, BLM, and WGFD in order to begin developing an ECP 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, fatality predictions, and siting efforts (Stages 3 and 4 of the ECP Guidance). Therefore, USFWS and BLM recommended that PCW conduct additional surveys to identify high avian use areas, particularly for eagles, and requested that PCW develop survey protocols to assess site-specific risk within the WDAs. USFWS emphasized the importance of identifying high eagle 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.

Table 5.1. CCSM Project Eagle-related Surveys.

Survey	Date
Eagle Use Surveys	
Fixed-point Bird Use Surveys	June 2008 - June 2009 April 2011 - April 2012
Long-watch Raptor Use and Migration Surveys	April 2011 - July 2012
800-meter Raptor Count Surveys	August 2012 - August 2013
Avian Radar Surveys	March 2011 - March 2013
Communal Roost Location Surveys	November 2011- March 2012 November - December 2012 February 2013
Eagle Nest Surveys	
Raptor Nest Surveys and Productivity Monitoring	May 2008 May - July 2011 April - July 2012 April - July 2013 April - July 2014
Prey-base Surveys	
Prey-base Surveys	April 2011 - August 2013
White-tailed Prairie Dog Surveys	August 2012 May - August 2013
Waterbird/Waterfowl Surveys	April, August, October 2011
Greater Sage-grouse Lek Counts	April of 2010, 2011, 2012, 2013, 2014 and 2015
Greater Sage-grouse Telemetry Monitoring	2010 - present
Other Prey Species	2008, 2012 - 2014
Other	
Breeding Bird Density[1]	June 2011
Migratory Bird[1]	April 2011 - July 2012

Notes:

1. Breeding bird density and migratory bird surveys and their results are described in detail in the BBCS. *See PCW 2015a.* No additional information regarding these surveys in included in this Phase I ECP, as the survey results do not provide information that is relevant to eagle use or assessing eagle risk.

In December 2010, PCW circulated draft survey protocols to 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 B*. PCW provided the March 2011 survey protocols to USFWS and received USFWS's concurrence with and endorsement of the protocols.[19] 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, waterbird/waterfowl surveys, and other prey-base surveys.

In April 2012, working with USFWS, PCW identified an additional long-watch raptor survey protocol and new locations to refine important eagle use areas, identify additional eagle use areas, and inform the implementation of appropriate avoidance and minimization approaches to reduce risks to eagles. *See Appendix B.* Surveys were conducted under the additional protocol between April 2012 and July 2012. During this period, PCW also completed eagle nest surveys and monitoring, conducted additional eagle prey base assessments, and continued avian radar surveys. The 2011 and 2012 protocols were implemented to provide site-specific data to identify important eagle use areas including those related to nesting activity, migration, foraging, and roosting as well as to provide the data necessary to complete the Stage 2 risk assessment of the CCSM Project Site. The data collected from these comprehensive surveys were used to substantially redesign the CCSM Project and identify the final wind turbine layout for Phase I. *See Chapter 6.0*.

During implementation of the 2011 and 2012 protocols, PCW worked closely with USFWS to identify additional data collection and surveys necessary to complete fatality estimates using USFWS's fatality model as part of Stage 3 of the ECP Guidance. During a meeting on July 24, 2012, USFWS recommended that raptor survey protocols for the CCSM Project be revised from long-watch raptor surveys to focus on 800-meter radius surveys to collect data that would be compatible with USFWS's predictive eagle fatality model. PCW revised its survey protocols according to USFWS guidance, 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 eagle use areas and inform avoidance and minimization measures. *See Appendix B*. Surveys continued at the 60 point locations through the end of August 2013.

[19] 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 USFWS's approval of the monitoring protocols and APP/ECP development approach in an email stating "[a]s discussed previously, the Service is entirely on-board with the proposed monitoring protocols . . . ."

5.1.1 Eagle Use Surveys

In compliance with Stage 2 of the ECP Guidance, PCW has conducted extensive eagle use surveys across the CCSM Project Site, including Phase I. Eagle use surveys are designed to identify important eagle use areas and to inform Phase I avoidance and minimization measures. USFWS defines important eagle use areas as an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles. Because migration corridors and migration stopover sites provide important foraging areas for eagles during migration, USFWS includes these areas within the definition of important eagle use areas in the ECP Guidance.

Site Characterization

PCW completed baseline wildlife surveys, including for raptors and other avian species in 2008 and 2009 for the purpose of estimating impacts of the CCSM Project on wildlife and to assist with siting wind turbines to minimize impacts to wildlife resources. *See Appendix C*. 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 6.0.*

These pre-construction surveys were initiated in June 2008 and concluded in June 2009. Nineteen points were selected in representative habitats and topography for fixed-point bird use surveys. *See Figure 5.1*. BLM decided that the 19 survey points were representative of the habitats and topography of the original CCSM Project configuration. *See BLM 2011b; 2012.* The fixed-point bird 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). 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 eagle use within the boundaries of the Original Proposed Action (also referred to as the Study Area), which included portions of Phase I. *See Figure 5.1. See Section 6.1.2*. These data help inform site characterization completed as part of Stage 2 of the ECP Guidance.

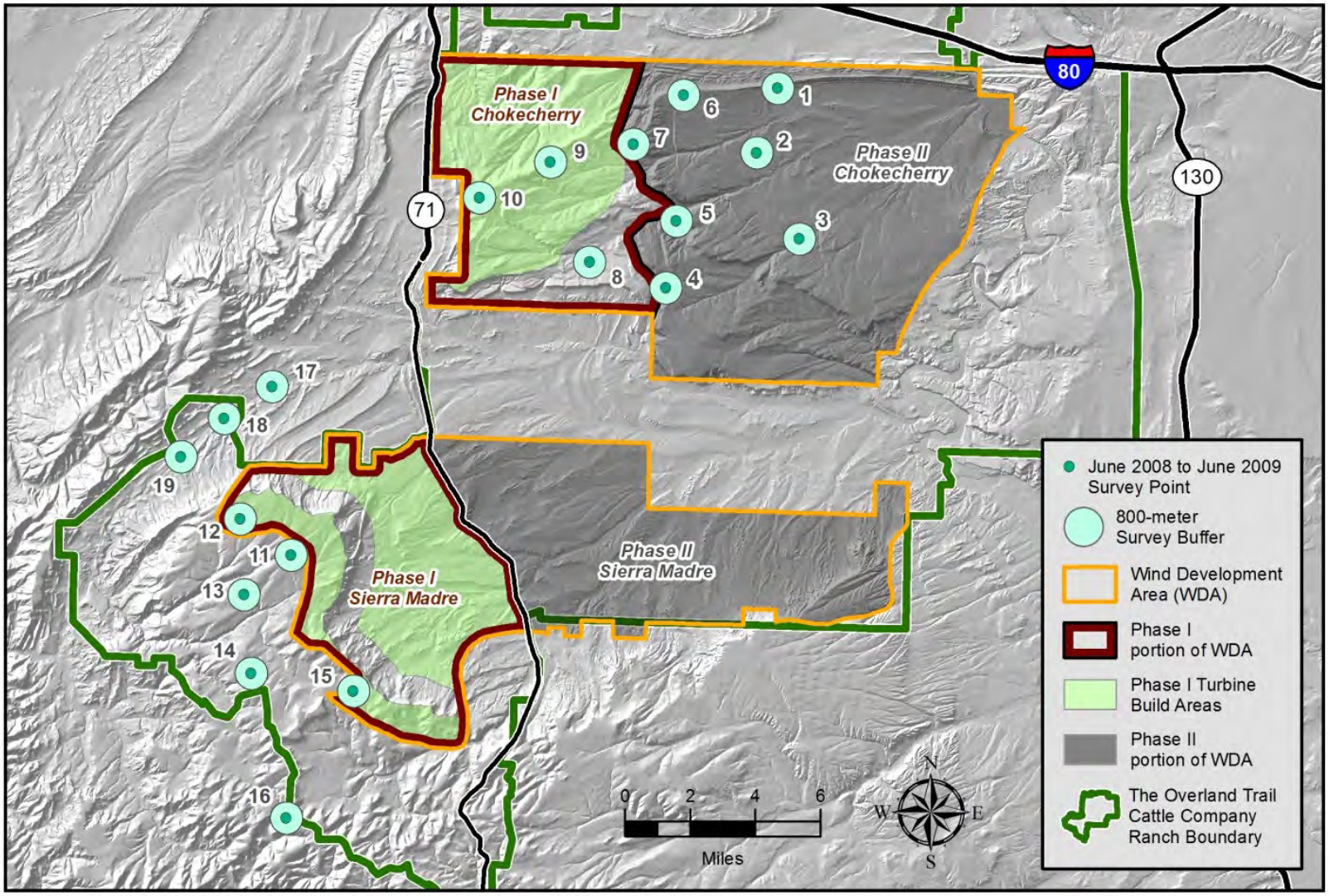

Figure 5.1. Avian Use Survey Locations, June 2008 to June 2009.

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 5.2. See Appendix B & C*. 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 site, 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 two WDAs to maximize coverage for the purposes of identifying high use areas and potential migratory pathways and other eagle use areas while maintaining observer confidence in species identification.

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 eagle observations that were made within 800 meters of the long-watch raptor survey locations were used to inform the prior distribution used in the USFWS Eagle Fatality model. *See Chapter 7.0.* In addition, the data collected through the long-watch raptor surveys was used to develop a utilization distribution for the CCSM Project Site to identify areas of high eagle use for the purposes of micrositing wind turbines and other CCSM Project facilities in order to avoid and minimize impacts to eagles to the extent practicable. Further, the results associated with the long-watch raptor surveys were used to identify Turbine No-Build Areas in which wind turbines would not be constructed to avoid impacts to eagles. *See Chapter 6.0*. A summary of the data from these surveys is provided in section 5.2.1.

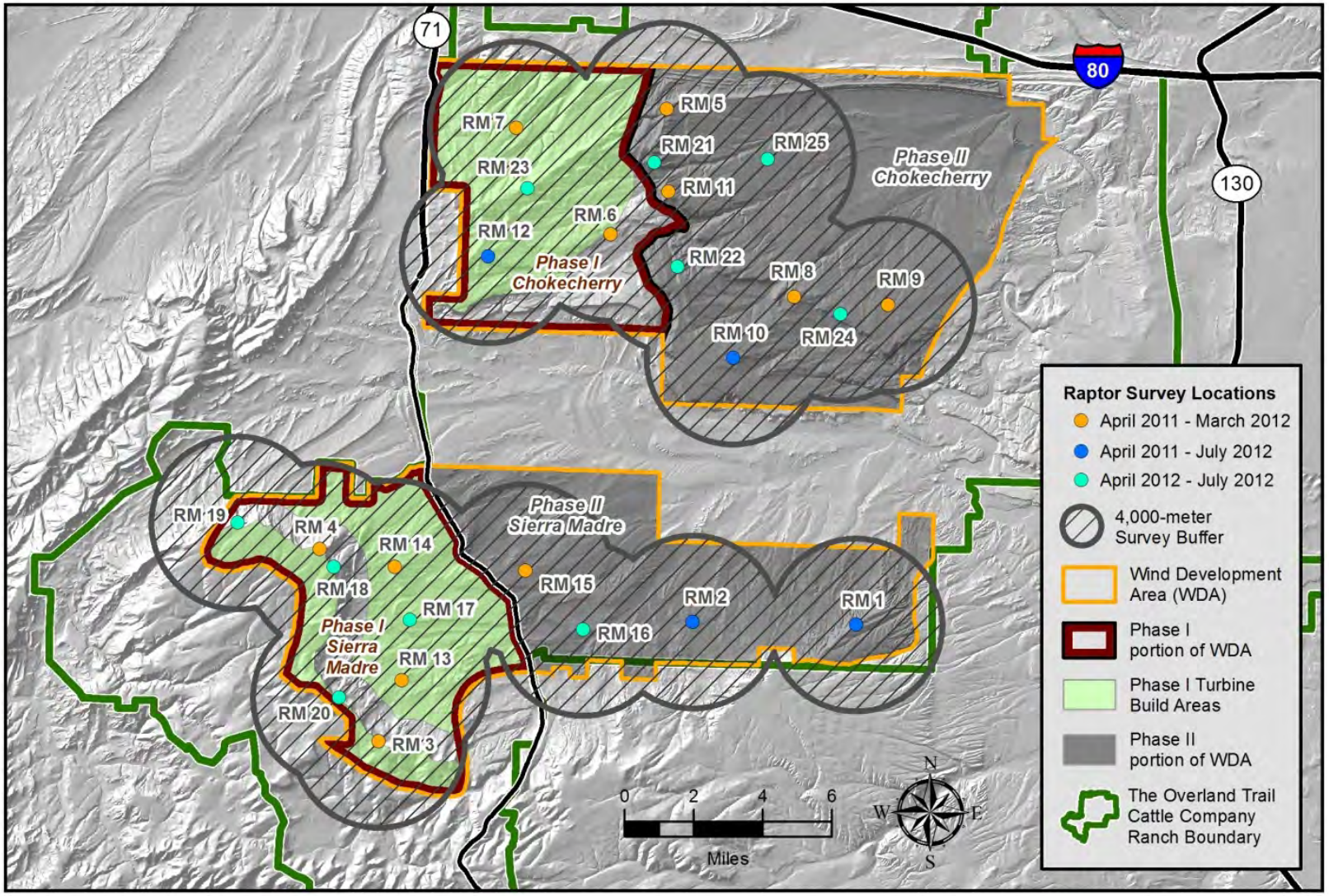

Figure 5.2. Long-watch Raptor Survey Locations, April 2011 to July 2012.

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 5.3*. 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 5.4. See Appendix B & C*. In compliance with USFWS recommendations, 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 in a manner that is consistent with the recommendations made by USFWS, 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 detected on 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. As recommended in the ECP Guidance, these 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.

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), or 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. Data from the 800-meter raptor count surveys were used to further identify high eagle use areas for the purpose of micrositing Phase I to avoid and minimize impacts to eagles and other raptors to the extent practicable. A summary of the data from the Phase I 800-meter raptor count surveys is provided in section 5.2.1. In addition, eagle flight minute data collected during the August 2012 to August 2013, 800-meter raptor count surveys for Phase I was used as input for USFWS's eagle fatality model in order to generate fatality estimates as required in Stage 3 of the ECP Guidance. *See Chapter 7.0.*

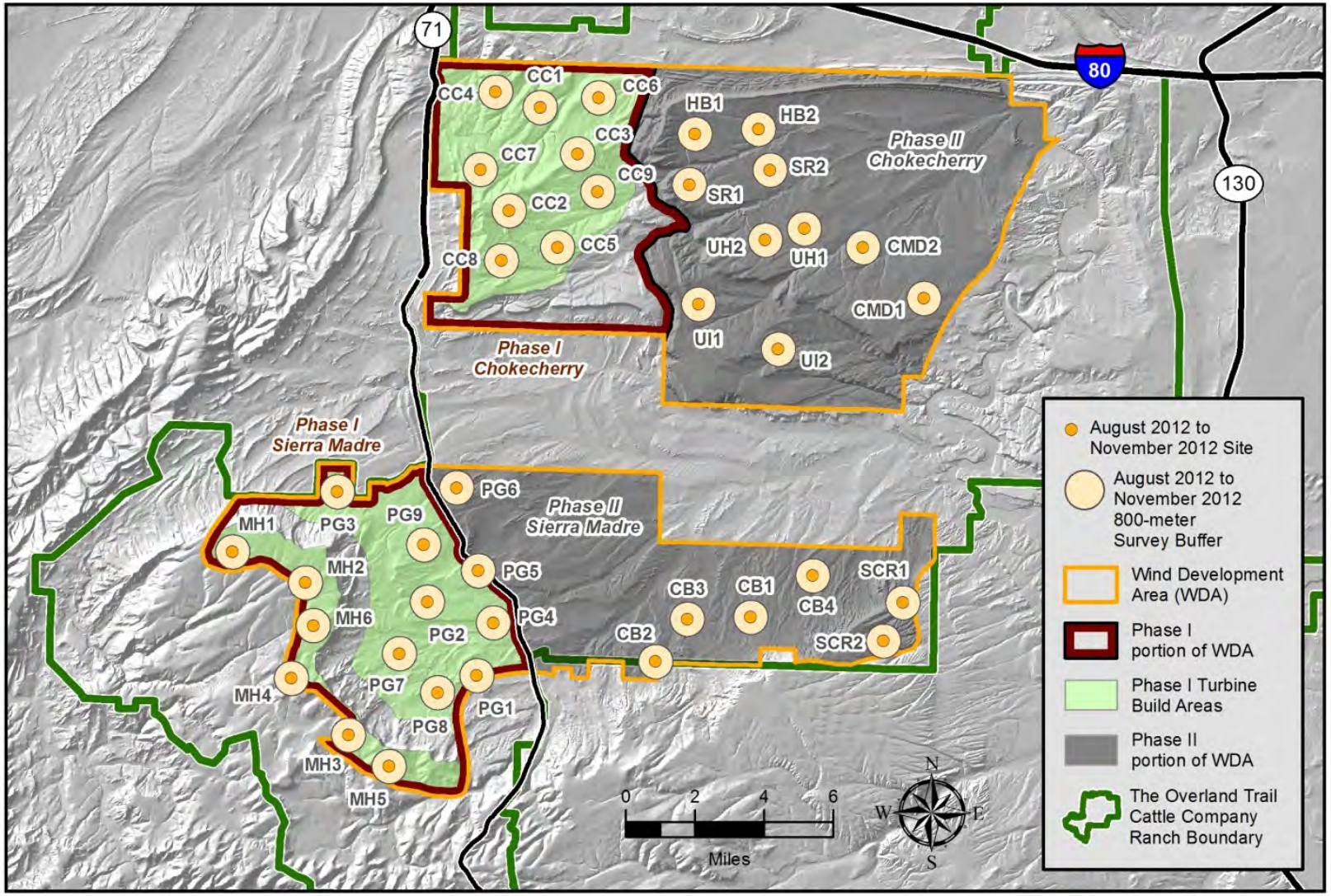

Figure 5.3. 800-meter Raptor Count Locations, August 2012 to November 2012.

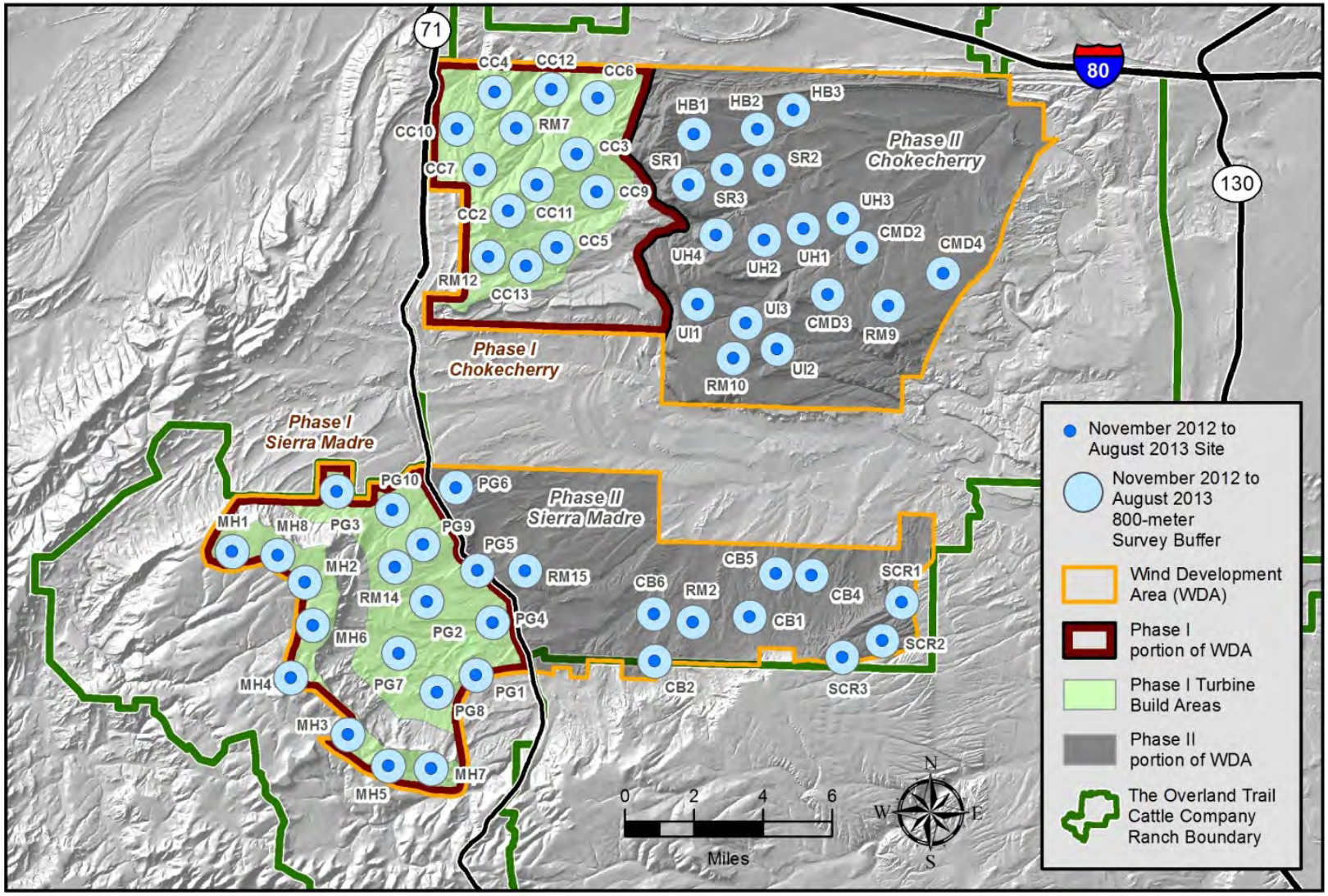

Figure 5.4. 800-meter Raptor Count Locations, November 2012 to August 2013.

Avian Radar Surveys

A DeTect Merlin avian radar system was used to map avian use across the CCSM Project Site to identify eagle flight paths and 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 5.5.* The radar is a trailer-mounted system with a 200-watt horizontal solid-state S-band radar and a 10-kilowatt (kW) 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 rotor swept zone (RSZ) versus those flying above and below the RSZ. The radar ran continuously, collecting data for movements of birds throughout the day and night. The relative numbers of birds passing through the scanning area, as well as the relative size of each target, can be derived from the radar data. The results of the avian radar system surveys are discussed in section 5.2.1.

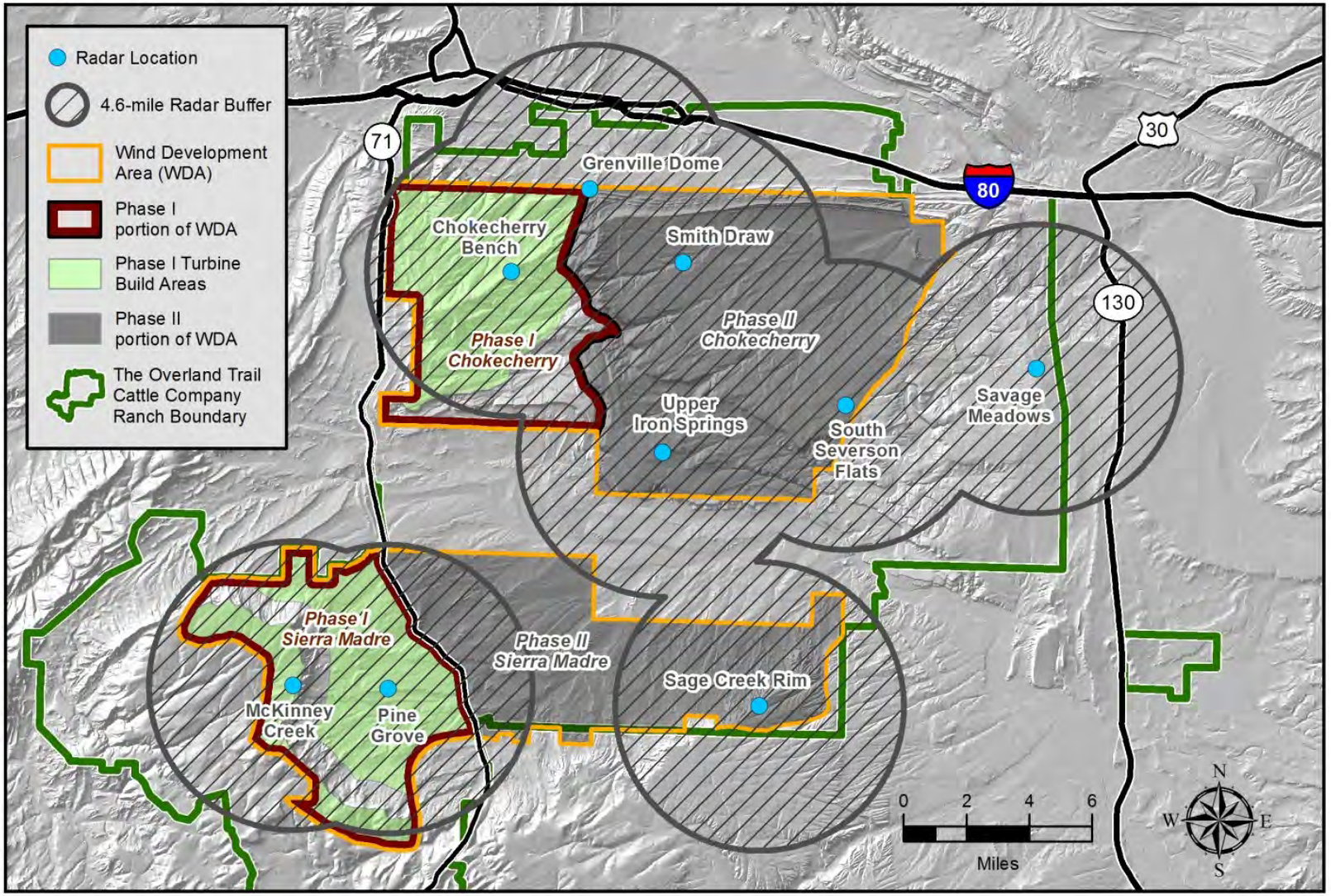

Figure 5.5. Avian Radar Locations, March 2011 to March 2013.

5.1.2 Eagle Nest Surveys

Understanding use of eagle 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 6.0.* For purposes of evaluating nest status, this Phase I ECP uses the following definitions from the ECP Guidance:

- **Occupied Nest.** An occupied nest is "a nest used for breeding in the current year by a pair of eagles. 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 eagles to occupy a nest yet never lay eggs; such nests are considered occupied." *See USFWS 2013a*.
- **Unoccupied Nest.** Unoccupied nests are "those nests not selected by raptors for use in the current nesting season." *See USFWS 2013a*.

BLM has collected information on nests within the Rawlins Field Office (RFO), including the CCSM Project Site and Phase I, 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*. Helicopter-based aerial nest surveys have been completed by PCW within the CCSM Project Site, including Phase I, for five years (2008, 2011, 2012, 2013 and 2014). *See Appendix D*. In May of 2008, PCW completed the aerial nest surveys specific to the CCSM Project to identify raptor nests 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*. These surveys were conducted by helicopter between May 14 and 30, 2008. 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.

In April and May of 2011, 2012, 2013 and 2014, additional aerial nest surveys were completed across 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 5.6. See Appendix D.* An 8-kilometer-wide (5-mile-wide) buffer was determined to be appropriate for the CCSM Project in coordination with USFWS and BLM using the ECP Guidance and calculated inter-nest distances in the CCSM Project vicinity. *See Appendix D.*

Location, nesting substrate, condition, and nesting status were recorded for each observed nest. For nests that were determined to be occupied, 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. Results of the 2011, 2012, 2013 and 2014 aerial nest surveys are discussed in section 5.2.2.

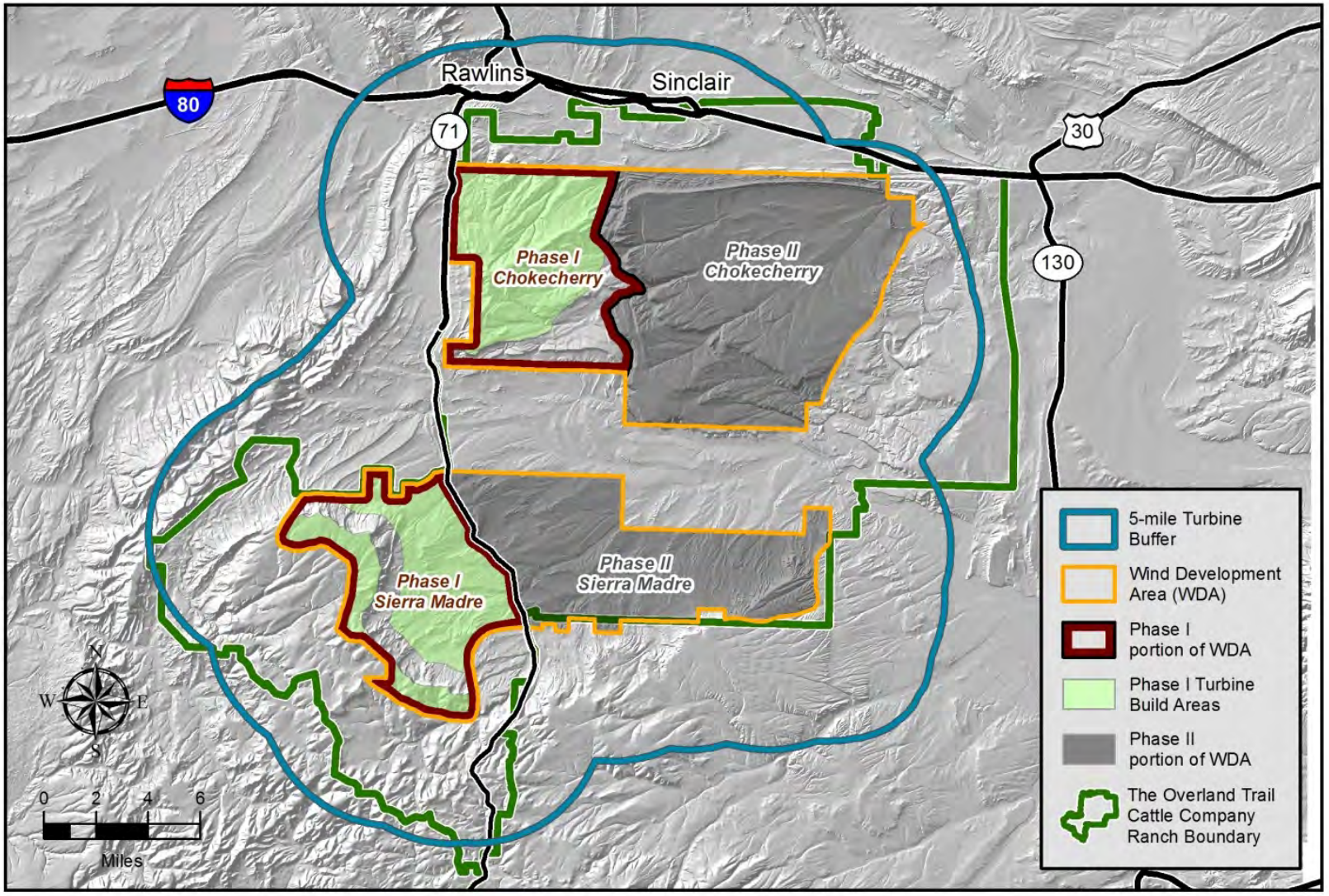

Figure 5.6. Aerial Nest Survey Area, 2011 through 2014.

5.1.3 Communal Roost Location Surveys

Surveys to identify potential eagle communal roost locations were completed between November 2011 and March 2012, and November 2012 and March 2013 as part of winter eagle and avian use surveys. In addition, two aerial surveys were completed in February 2013 to survey areas most likely to have communal roost habitats including cottonwood riparian habitats along the North Platte River, forested habitats with trees of sufficient size to provide roost opportunities adjacent to Miller Hill, and cliff faces and rock outcrops throughout the CCSM Project Site. *See Appendix E*.

5.1.4 Prey Base Surveys

Prey base surveys and evaluations were conducted throughout the Ranch from April 2011 to April 2014. *See Appendix F*. These evaluations were conducted to identify areas containing prey densities sufficient for eagle and large raptor foraging activities. Areas evaluated included prairie dog colonies, areas with high rabbit or ground squirrel activity, greater sage-grouse use areas, waterbird/waterfowl use of reservoirs, and livestock and ungulate calving grounds and winter range. Section 5.2.4 describes the results of these surveys.

White-tailed Prairie Dog (WTPD)

In August 2012, PCW conducted reconnaissance level surveys at 27 sites within polygons identified in a 2010 WTPD study to update the data and assess the accuracy of the study. *See Smith 2010.* Reconnaissance level surveys consisted of locating burrows, determining current or historical use (recent diggings, old or recent scat), recording presence of any small mammals in the area, and measuring burrow entrance diameters to aid in species identification. A total of 74, 1,000-meter long and 6-meter wide transects were surveyed for small mammal burrows in August 2012 within the polygons established in the 2010 study using the methods described in McDonald *et al.* (2011) and Biggins *et al.* (1993). All burrows encountered during the surveys were recorded and categorized according to condition, activity level, and species. *See Appendix F.*

Based on the results of the 2012 reconnaissance surveys, PCW completed full-scale WTPD surveys within Phase I between May and August 2013. Survey protocols for the 2013 Phase I WTPD survey were consistent with those for the 2012 reconnaissance surveys. Activity was determined by WTPD presence, fresh burrowing activity, or other signs of recent activity (fresh droppings, fresh scraping, reduced vegetative cover, etc.). For inactive sites, species were identified using burrow characteristics and entrance size. *See Appendix F.*

Waterbird/Waterfowl

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 Appendix G.* Three seasonal surveys (spring, summer, and fall) were completed at each reservoir to create a baseline of potential prey species and assess their spatiotemporal abundance at these locations and the potential to attract and/or concentrate eagles.

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 the survey was conducted at more than one location at a given 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. Section 5.2.4 provides a summary and discussion of the data collected during the waterbird/waterfowl surveys and how this information was used to evaluate and identify important eagle use areas.

Greater Sage-grouse

Understanding seasonal greater sage-grouse movements and patterns provides valuable information on the availability of greater sage-grouse as potential prey item for eagles. PCW has developed a Sage-grouse Conservation Plan with goals and objectives to implement science-based conservation measures for greater sage-grouse and other select species. *See BLM 2012a, App. B at App. N.* As a part of the Sage-grouse Conservation Plan, annual lek counts are conducted through ground surveys to monitor greater sage-grouse populations within the area surrounding the CCSM Project. The objectives of these surveys are to determine lek activity and occupancy, in addition to documenting the attendance of greater sage-grouse observed on a particular lek for each year (lek counts). *See BLM 2012a, App. B at App. N.*

Telemetry monitoring of sage-grouse was initiated in 2010 to refine greater sage-grouse associations with various sagebrush habitat components in order to validate the success of proposed and future conservation projects over time. *See BLM 2012a, App. B at App. N.* Individual sage-grouse have been captured and fitted with global positioning system (GPS) Platform Terminal Transmitters (PTT) to gain a better understanding of the distribution, range and movement patterns of greater sage-grouse within the CCSM Project Site. These units record approximate location, altitude, heading, and speed to allow for identification of migratory pathways and overall use of the landscape. All of these data are useful in determining demographic trends, habitat use, and seasonal use areas. Lek counts and telemetry will continue through construction and post-construction for the CCSM Project. *See BLM 2012a, App. B at App. N.* Section 5.2.4 describes the results of these surveys in relation to eagles.

Other Potential Prey Species

In 2008, baseline wildlife surveys were completed for the CCSM Project. During these surveys potential eagle prey species including WTPD, Wyoming ground squirrel, leporids, and big game species were observed. The results of the 2008 wildlife surveys are reported in the BLM FEIS. *See BLM 2012b.* Further, in 2012, PCW completed general reconnaissance surveys across the CCSM Project Site and completed 74 survey transects to assess fossorial mammal activity. *See Appendix F.* Survey protocols followed USFWS recommendations (McDonald *et al.* 2011) for WTPD surveys and were adapted from Biggins *et al.* 1993. *See Appendix F.* Surveys consisted of locating burrows, determining current or historical use (recent diggings, old or recent scat), recording presence of any small mammals in the area, and measuring burrow entrance diameters to aid in species identification. These surveys provided

information to better understand the distribution and densities of small mammals including Wyoming ground squirrel and leporids.

In addition, beginning in 2009, incidental observations of potential eagle prey species were collected as part of ongoing greater sage-grouse, avian, and other wildlife species monitoring. Incidental observations of certain wildlife species including leporids and Wyoming pocket gopher were also made during pedestrian surveys of Phase I completed from 2012 through 2014. *See PCW 2014b; 2014c; 2014d; 2015b*. Incidental observations provided additional information related to the general distribution of eagle prey species such as Wyoming ground squirrel and leporids across the CCSM Project Site, including Phase I.

5.2 Survey Results and Analysis

Following completion of the scientifically rigorous surveys on eagle use, eagle nests, communal roost locations, and potential prey base, PCW compiled the data for use in assessing the risk to eagles from the CCSM Project. The survey data and analysis are presented in detail in Appendices C through G and are summarized below.

5.2.1 Eagle Use Analysis

Identification of eagle use areas, patterns of use, and seasonal use is essential to prioritize the location and timing for implementing avoidance and risk reduction measures to ensure that Phase I meets Category 2 requirements by avoiding the highest eagle use areas. *See USFWS 2011a; 2011b.* Eagle use for Phase I was evaluated using the results of the site characterization, long-watch raptor, 800-meter raptor count, and avian radar surveys. The results of these surveys and analysis of the data are summarized below.

Site Characterization

Surveys completed from June 2008 to June 2009 documented the presence of 12 species of raptors, including bald and golden eagles, within the Study Area. Raptor use was highest in the fall, followed by summer, spring and winter. *See Appendix C*. Only three raptors were observed in the winter (two golden eagles and one ferruginous hawk). The 2008 surveys covered 9,435 acres, of which only a portion occurred within the Phase I Development Area (1,984 acres or approximately 21%) due to PCW's subsequent substantial redesign of the CCSM Project to avoid and minimize risks. *See Chapter 6.0. See Appendix C.* This redesign is consistent with the avoidance and minimization process set forth in the ECP Guidance and the purpose of the 2008 surveys, which was to inform the wind turbine siting process to minimize impacts to wildlife resources. *See Chapter 6.0*.

Long-watch Raptor Survey Analysis

Between April 4, 2011, and July 24, 2012, 430 long-watch raptor surveys were conducted within the CCSM Project Site. In total, 146,876 minutes (2,447.9 hours) of survey were conducted, with 73,984 minutes (1,233.1 hours) of survey completed within the Phase I Development Area. *See Appendix C.* During the 73,984 minutes of long-watch raptor surveys within the Phase I Development Area, 164 minutes of golden eagle flight (0.002 minutes of flight per minute of survey) and 32 minutes of bald eagle flight (0.0004 minutes of flight per minute of survey) recorded. *See Table 5.2 & Table 5.3.*

The long-watch raptor surveys are intended to detect raptors at all distances for the purposes of identifying high-use areas and potential migration corridors. As a result, the eagle flight path utilization distribution analysis described below includes all survey locations within the CCSM Project Site and has not been parsed to Phase I. Including all long-watch raptor survey locations in a utilization distribution analysis creates a higher resolution dataset for identifying eagle use areas and potential migration corridors within the CCSM Project Site.

To identify spatial and seasonal patterns of eagle use and eagle use areas, eagle flight paths recorded during long-watch raptor surveys were digitized and used to complete a utilization distribution analysis to identify areas with the highest probability for eagle and other raptor use. All eagle flight paths recorded from April 2011 through July 2012 were used to generate the utilization distribution. As stated earlier in this document, 100% of the Phase I wind turbine layout was covered by long-watch raptor surveys. This survey coverage enables a detailed assessment of patterns of spatial and seasonal use across the entire CCSM Project Site, including Phase I.

Observed eagle flight paths recorded from April 2011 through July 2012 were used to generate an eagle flight density grid across the CCSM Project Site with 100-meter resolution. Values in each grid cell represent the relative density of eagle use. Results indicate that eagle use within the CCSM Project Site is concentrated immediately adjacent to the Interior Chokecherry Rim; immediately east of the Miller Hill Rim in the Lower Miller Hill area; directly above Rasmussen Reservoir in the south central area of the Sierra Madre WDA; and immediately north of the Sage Creek Rim in the southeastern corner of the Sierra Madre WDA. *See Figure 5.7 & Figure 5.8.*

Table 5.2. Survey Minutes and Golden Eagle Use within 800 meters of Long-watch Raptor Survey Locations, April 2011 through July 2012.

Phase I	Survey Location	Survey Minutes	Golden Eagle Use Minutes Within 0-150 Meter Altitude					
			April to June 2011	July to August 2011	September to November 2011	November 2011 to April 2012	April to June 2012	July 2012
Chokecherry WDA	RM6	9,041	24	0	0	0	0	0
	RM7	7,790	0	0	0	0	0	0
	RM12	9,050	6	0	7	0	0	0
	RM23	1,044	0	0	0	0	0	0
Sierra Madre WDA	RM3	7,173	0	1	0	0	0	0
	RM4	8,171	11	2	0	0	0	0
	RM13	10,563	11	0	3	6	0	0
	RM14	8,264	14	13	7	16	0	0
	RM15	8,558	6	0	13	5	0	0
	RM17	1,082	0	0	0	0	1	4
	RM18	1,088	0	0	0	0	3	0
	RM19	1,080	0	0	0	0	0	9
	RM20	1,080	0	0	0	0	2	0
Total		**73,984**	**72**	**16**	**30**	**27**	**6**	**13**

Table 5.3. Survey Minutes and Bald Eagle Use within 800 meters of Long-watch Raptor Survey Locations, April 2011 through July 2012.

Phase I	Survey Location	Survey Minutes	Bald Eagle Use Minutes Within 0-150 Meter Altitude					
			April to June 2011	July to August 2011	September to November 2011	November 2011 to April 2012	April to June 2012	July 2012
Chokecherry WDA	RM6	9,041	5	0	0	0	0	0
	RM7	7,790	0	0	3	2	0	0
	RM12	9,050	0	0	0	0	0	0
	RM23	1,044	0	0	0	0	0	0
Sierra Madre WDA	RM3	7,173	0	0	1	0	0	0
	RM4	8,171	0	0	0	0	0	0
	RM13	10,563	0	0	4	0	0	0
	RM14	8,264	0	0	17	0	0	0
	RM15	8,558	0	0	0	0	0	0
	RM17	1,082	0	0	0	0	0	0
	RM18	1,088	0	0	0	0	0	0
	RM19	1,080	0	0	0	0	0	0
	RM20	1,080	0	0	0	0	0	0
Total		**73,984**	**5**	**0**	**25**	**2**	**0**	**0**

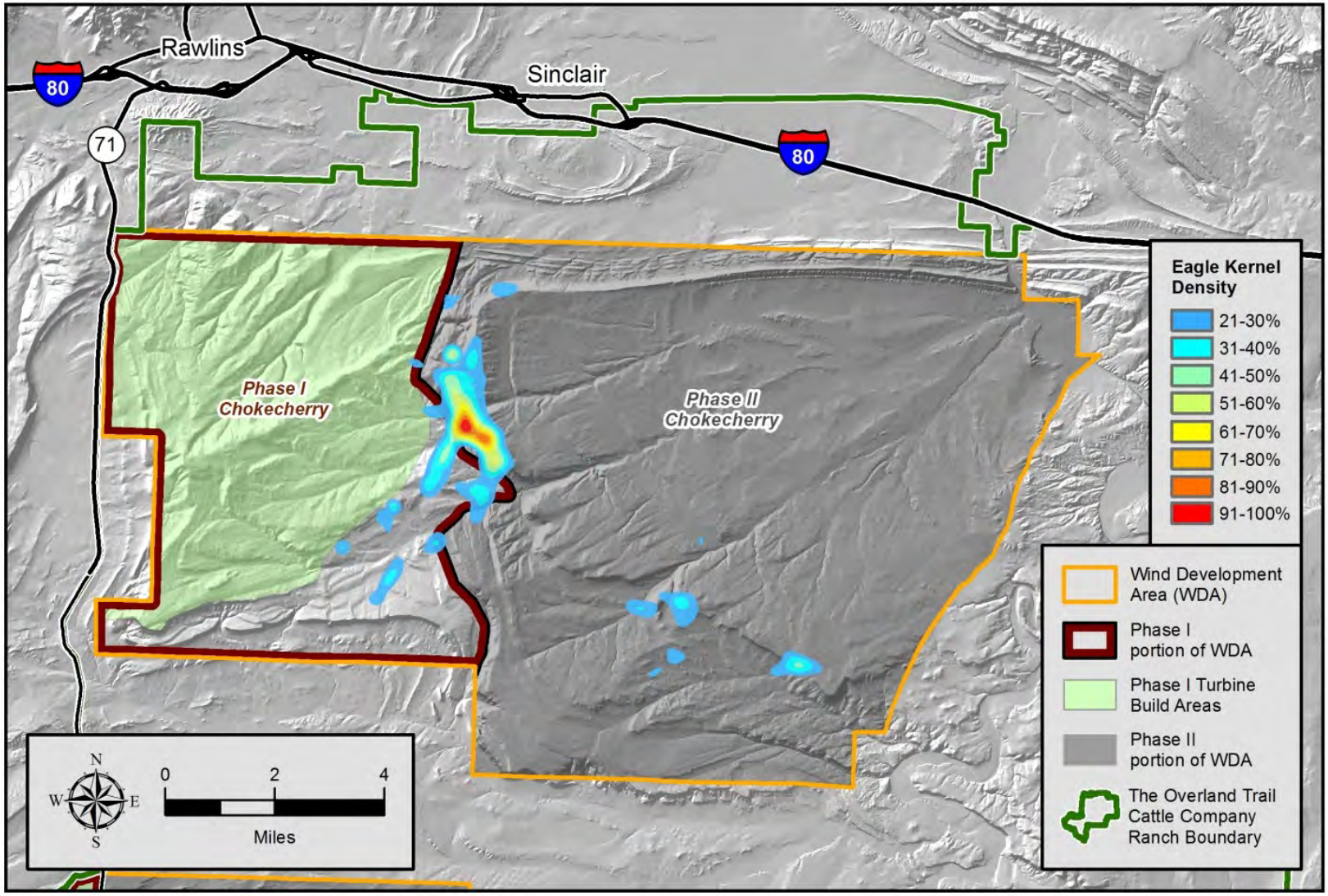

Figure 5.7. Chokecherry WDA Eagle Flight Path Utilization Distribution.

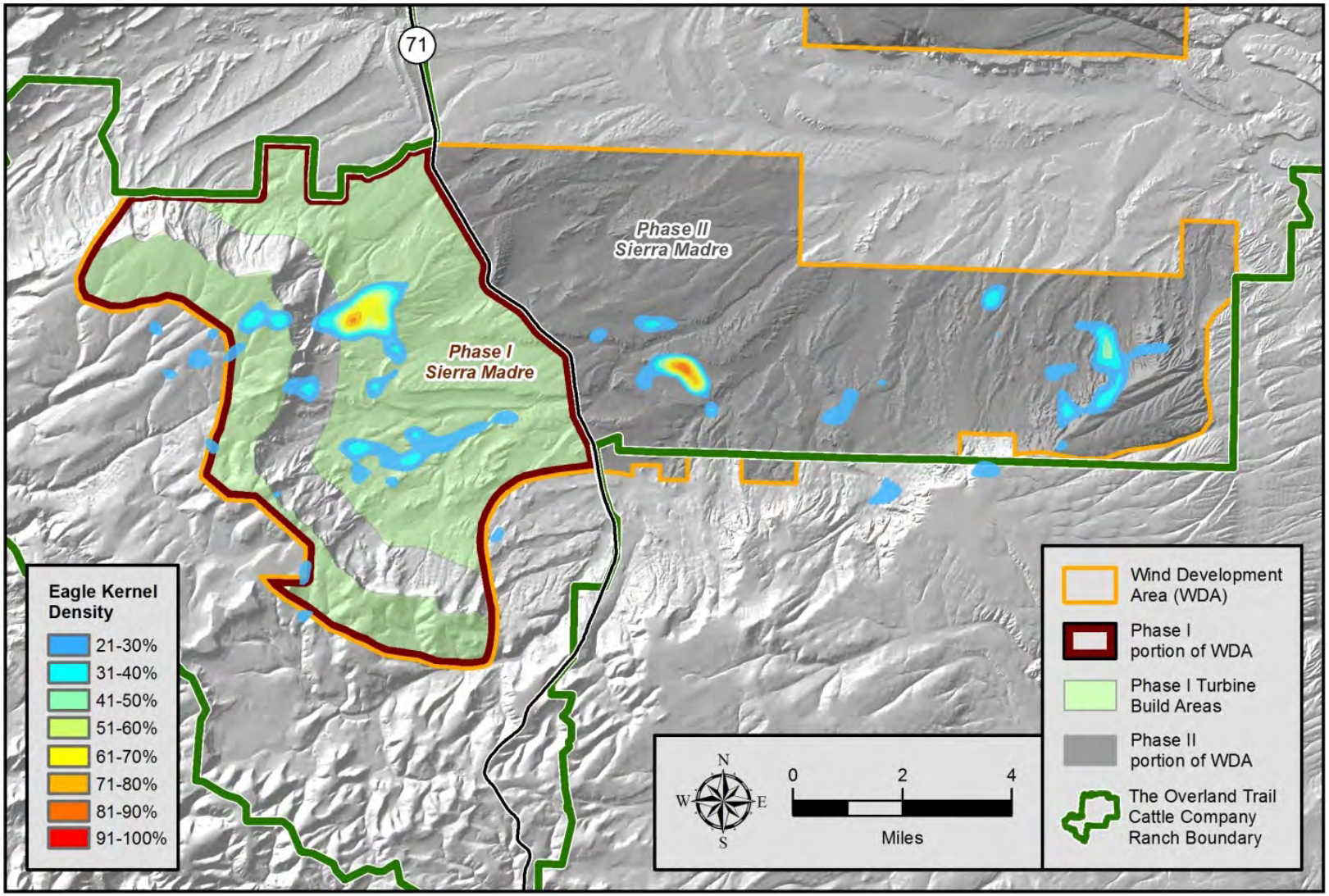

Figure 5.8. Sierra Madre WDA Eagle Flight Path Utilization Distribution.

800-meter Raptor Count Survey Analysis

Data collected using the August 2012 to August 2013 800-meter raptor count protocols for the CCSM Project were shared with USFWS in four quarterly reports. *See Appendix C*. These data serve as the input eagle use data for USFWS's eagle fatality model. As such, while data was collected for the entire CCSM Project, the data discussed below pertain only to Phase I. Separate discussions are provided by seasonal time periods to provide information on changing eagle use patterns throughout the year. For purposes of the analysis below, eagle flight minutes were calculated by subtracting the initial observation time from the final observation time, except when the initial and final observations occurred within the same minute, in which case the flight time was rounded to one full minute. Phase I survey locations for the August 2012 to August 2013 surveys are displayed in Figure 5.3 and Figure 5.4.

In summary, during 800-meter raptor count surveys, 103 minutes of golden eagle flight and 5 minutes of bald eagle flight were recorded during 51,964 minutes (866 hours) of survey time for Phase I, or 0.002 minutes of golden eagle flight per minute of survey and 0.0001 minutes of bald eagle flight per minute of survey. This observed use for golden eagles in Phase I is nearly identical to the use observed during long-watch raptor surveys, and the observed bald eagle use was less than that observed during long-watch raptor surveys. *See "Long-watch Raptor Survey Analysis."*

August 2012 to November 2012

During the August 20 to November 9, 2012, survey period, a total of 51 golden eagle flight minutes were recorded during 16,894 minutes (281.57 hours) of survey or 0.0030 flight minutes per minute of survey for all survey locations within Phase I. *See Table 5.4.* Of the recorded golden eagle flight minutes, 74.51% were outside the rotor swept zone (RSZ). By altitudinal classification, 19.61% of the golden eagle flight minutes were below the RSZ (0 to 30 meters above the ground), 25.5% of the golden eagle flight minutes were within the RSZ (30 to 150 meters), and 54.9% of the golden eagle flight minutes were above the RSZ (above 150 meters). The data collected for Phase I during this survey period is summarized below; the full reports are attached in Appendix C.

With respect to bald eagles, 2 minutes of use were recorded during 16,894 survey minutes or 0.0001 flight minutes per minute of survey. Both of these flight minutes (100%) were recorded between 0 and 30 meters and, therefore, were below the RSZ.

Breaking down the above totals, surveys for the Phase I portion of the Chokecherry WDA were conducted at 9 locations for a total of 6,514 minutes (108.57 hours) during the August 20 to November 9, 2012, survey period. During this survey period, golden eagles were observed in flight for 18 minutes or 0.0028 flight minutes per minute of survey. In total, 54 survey sessions were conducted during which seven golden eagle observations were recorded during six of the sessions. Individual observation times ranged between 2 minutes and 4 minutes, rounded up to the nearest whole minute. Of the recorded use within the Phase I portion of the Chokecherry WDA, 77.78% occurred outside the RSZ. No bald eagles were recorded within the Phase I portion of the Chokecherry WDA.

Surveys for the Phase I portion of the Sierra Madre WDA were conducted at 14 locations for a total of 10,380 minutes (173 hours) during the August 20 to November 9, 2012, survey period. During this survey period, golden eagles were observed in flight for 33 minutes or 0.0032 flight minutes per minute of survey. In total, 85 survey sessions were conducted during which nine golden eagles were observed during eight of the sessions. Individual observation times ranged between 2 minutes and 4 minutes, rounded up to the nearest whole minute. Of the recorded use within the Phase I portion of the Sierra Madre WDA, 72.72% occurred outside the RSZ. One bald eagle was observed during one survey session for 2 minutes or 0.0002 flight minutes per minute of survey.

Table 5.4. Survey Minutes and Golden Eagle Use for Phase I, August to November 2012.

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
Chokecherry WDA	CC1	720	0	0	0	0	0
	CC2	720	0	0	0	0	0
	CC3	698	1	2	1	1	0
	CC4	720	2	4	2	2	0
	CC5	720	0	0	0	0	0
	CC6	716	2	4	1	1	2
	CC7	780	0	0	0	0	0
	CC8	720	2	8	0	0	8
	CC9	720	0	0	0	0	0
Sierra Madre WDA	MH1	720	2	7	1	4	2
	MH2	720	0	0	0	0	0
	MH3	780	0	0	0	0	0
	MH4	720	0	0	0	0	0
	MH5	780	0	0	0	0	0
	MH6	720	1	4	2	2	0
	PG1	720	1	2	2	0	0
	PG2	720	2	8	1	1	6
	PG3	720	1	4	0	0	4

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
	PG4	840	0	0	0	0	0
	PG5	780	2	8	0	2	6
	PG7	720	0	0	0	0	0
	PG8	840	0	0	0	0	0
	PG9	600	0	0	0	0	0
Total		**16,894**	**16**	**51**	**10**	**13**	**28**

November 2012 to March 2013

During the November 12, 2012, to March 29, 2013, survey period, a total of 45 golden eagle flight minutes were recorded during 15,450 minutes (257.5 hours) of survey or 0.0029 flight minutes per minute of survey for all survey locations within Phase I. *See Table 5.5.* Of the recorded golden eagle flight minutes, 53.33% were outside the RSZ. By altitudinal classification, 15.55% of the golden eagle flight minutes were below the RSZ (0 to 30 meters above the ground), 46.67% of the golden eagle flight minutes were within the RSZ (30 to 150 meters), and 37.78% of the golden eagle flight minutes were above the RSZ (above 150 meters). No bald eagles were observed during this survey period. The data collected for Phase I during this survey period is summarized below; the full reports are attached in Appendix C.

Breaking down the above totals, surveys for the Phase I portion of the Chokecherry WDA were conducted at 13 locations for a total of 6,690 minutes (111.5 hours) during the November 12, 2012, to March 29, 2013, survey period. During this survey period, golden eagles were observed in flight for 18 minutes or 0.0027 flight minutes per minute of survey. In total, 112 survey sessions were conducted during which five golden eagle observations were recorded during three of the sessions. Individual observation times ranged between 2 minutes and 5 minutes, rounded up to the nearest whole minute. Of the recorded use within the Phase I portion of the Chokecherry WDA, 61.11% occurred outside the RSZ.

Surveys for the Phase I portion of the Sierra Madre WDA were conducted at 18 locations for a total of 8,760 minutes (146 hours) during the August 20 to November 9, 2012, survey period. During this survey period, golden eagles were observed in flight for 27 minutes or 0.0031 flight minutes per minute of survey. In total, 146 survey sessions were conducted during which six golden eagles were observed during four of the sessions. Individual observation times ranged between 2 minutes and 8 minutes, rounded up to the nearest whole minute. Of the recorded use within the Phase I portion of the Sierra Madre WDA, 48.15% occurred outside the RSZ.

Table 5.5. Survey Minutes and Golden Eagle Use for Phase I, November 2012 to March 2013.

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
Chokecherry WDA	CC2	540	1	2	0	0	2
	CC3	510	0	0	0	0	0
	CC4	540	0	0	0	0	0
	CC5	420	0	0	0	0	0
	CC6	480	0	0	0	0	0
	CC7	480	2	6	1	1	4
	CC9	480	0	0	0	0	0
	CC10	540	0	0	0	0	0
	CC11	540	0	0	0	0	0
	CC12	540	0	0	0	0	0
	CC13	540	2	10	2	6	2
	RM7	540	0	0	0	0	0
	RM12	540	0	0	0	0	0
Sierra Madre WDA	MH1	300	0	0	0	0	0
	MH2	480	0	0	0	0	0
	MH3	480	0	0	0	0	0
	MH4	300	0	0	0	0	0
	MH5	480	0	0	0	0	0

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
	MH6	540	0	0	0	0	0
	MH7	480	0	0	0	0	0
	MH8	540	1	2	1	1	0
	PG1	540	0	0	0	0	0
	PG2	540	0	0	0	0	0
	PG3	540	2	10	0	4	6
	PG4	540	2	7	0	4	3
	PG5	540	0	0	0	0	0
	PG7	480	0	0	0	0	0
	PG8	480	0	0	0	0	0
	PG9	480	0	0	0	0	0
	PG10	540	0	0	0	0	0
	RM14	480	1	8	3	5	0
Total		**15,450**	**11**	**45**	**7**	**21**	**17**

April 2013 to June 2013

During the April 1 to June 21, 2013, survey period, a total of 2 golden eagle flight minutes were recorded during 10,320 minutes (172 hours) of survey or 0.0002 flight minutes per minute of survey for all survey locations within Phase I. *See Table 5.6*. Of the recorded golden eagle flight minutes, 50% were outside the RSZ. By altitudinal classification, 50% of the golden eagle flight minutes were below the RSZ (0 to 30 meters above the ground), 50% of the golden eagle flight minutes were within the RSZ (30 to 150 meters), and no golden eagle flight minutes were above the RSZ (above 150 meters). No bald eagles were observed during this survey period. The data collected for Phase I during this survey period is summarized below; the full reports are attached in Appendix C.

Breaking down the above totals, surveys for the Phase I portion of the Chokecherry WDA were conducted at 13 locations for a total of 4,260 minutes (71 hours) during the April 1 to June 21, 2013 survey period. During this survey period, a golden eagle was observed in flight for 1 minute or 0.0002 flight minutes per minute of survey. In total, 71 survey sessions were conducted during which one golden eagle observation was recorded during one of the sessions. The observation time for this individual was 1 minute, which occurred within the RSZ. No flight minutes occurred outside the RSZ for the Phase I portion of the Chokecherry WDA during this survey session.

Surveys for the Phase I portion of the Sierra Madre WDA were conducted at 18 locations for a total of 6,060 minutes (101 hours) during the April 1 to June 21, 2013 survey period. During this survey period, a golden eagle was observed in flight for 1 minute or 0.0002 flight minutes per minute of survey. In total, 101 survey sessions were conducted during which one golden eagle was observed during one of the sessions. The observation time for this individual was 1 minute, which occurred in the 0 to 30 meter altitude category. No flight minutes occurred within the RSZ for the Phase I portion of the Sierra Madre WDA during this survey session.

Table 5.6. Survey Minutes and Golden Eagle Use for Phase I, April to June 2013.

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
Chokecherry WDA	CC2	360	0	0	0	0	0
	CC3	360	1	1	0	1	0
	CC4	300	0	0	0	0	0
	CC5	300	0	0	0	0	0
	CC6	300	0	0	0	0	0
	CC7	360	0	0	0	0	0
	CC9	360	0	0	0	0	0
	CC10	360	0	0	0	0	0
	CC11	360	0	0	0	0	0
	CC12	300	0	0	0	0	0
	CC13	300	0	0	0	0	0
	RM7	300	0	0	0	0	0
	RM12	300	0	0	0	0	0

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
Sierra Madre WDA	MH1	360	0	0	0	0	0
	MH2	360	0	0	0	0	0
	MH3	360	0	0	0	0	0
	MH4	300	0	0	0	0	0
	MH5	300	0	0	0	0	0
	MH6	360	0	0	0	0	0
	MH7	360	0	0	0	0	0
	MH8	300	0	0	0	0	0
	PG1	360	0	0	0	0	0
	PG2	300	0	0	0	0	0
	PG3	360	0	0	0	0	0
	PG4	360	0	0	0	0	0
	PG5	360	0	0	0	0	0
	PG7	360	0	0	0	0	0
	PG8	300	0	0	0	0	0
	PG9	300	0	0	0	0	0
	PG10	300	0	0	0	0	0
	RM14	360	1	1	1	0	0
Total		**10,320**	**2**	**2**	**1**	**1**	**0**

June 2013 to August 2013

During the June 24 to August 30, 2013, survey period, a total of 5 golden eagle flight minutes were recorded during 9,300 minutes (155 hours) of survey or 0.0005 flight minutes per minute of survey for all survey locations within Phase I. *See Table 5.7.* Of the recorded golden eagle flight minutes, 60% were outside the RSZ. By altitudinal classification, 60% of the golden eagle flight minutes were below the RSZ (0 to 30 meters above the ground), 40% of the golden eagle flight minutes were within the RSZ (30 to 150 meters), and no golden eagle flight minutes were above the RSZ (above 150 meters). No bald eagles were observed during this survey period. The data collected for Phase I during this survey period is summarized below; the full reports are attached in Appendix C.

Breaking down the above totals, surveys for the Phase I portion of the Chokecherry WDA were conducted at 13 locations for a total of 3,900 minutes (65 hours) during the June 24 to August 30, 2013, survey period. During this survey period, golden eagles were observed in flight for 4 minutes or 0.0010 flight minutes per minute of survey. In total, 65 survey sessions were conducted during which three golden eagle observations were recorded during three of the sessions. Individual observation times ranged between 1 minute and 2 minutes, rounded up to the nearest whole minute. Of the recorded use within the Phase I portion of the Chokecherry WDA, 75% occurred outside the RSZ.

Surveys for the Phase I portion of the Sierra Madre WDA were conducted at 18 locations for a total of 5,400 minutes (90 hours) during the June 24 to August 30, 2013, survey period. During this survey period, a golden eagle was observed in flight for 1 minute or 0.0002 flight minutes per minute of survey. In total, 90 survey sessions were conducted during which one golden eagle was observed during one of the sessions. The observation time for this individual was 1 minute, which occurred within the RSZ. No flight minutes occurred outside the RSZ for the Phase I portion of the Sierra Madre WDA during this survey session.

Table 5.7. Survey Minutes and Golden Eagle Use for Phase I, June to August 2013.

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
Chokecherry WDA	CC2	300	0	0	0	0	0
	CC3	300	1	1	1	0	0
	CC4	300	0	0	0	0	0
	CC5	300	1	1	0	1	0
	CC6	300	0	0	0	0	0
	CC7	300	0	0	0	0	0
	CC9	300	0	0	0	0	0
	CC10	300	0	0	0	0	0
	CC11	300	0	0	0	0	0
	CC12	300	0	0	0	0	0
	CC13	300	1	2	2	0	0
	RM7	300	0	0	0	0	0
	RM12	300	0	0	0	0	0
Sierra Madre WDA	MH1	300	0	0	0	0	0
	MH2	300	0	0	0	0	0
	MH3	300	0	0	0	0	0
	MH4	300	0	0	0	0	0
	MH5	300	0	0	0	0	0
	MH6	300	0	0	0	0	0
	MH7	300	0	0	0	0	0
	MH8	300	0	0	0	0	0
	PG1	300	0	0	0	0	0

Phase I	Survey Location	Survey Minutes	Number of Individual Golden Eagles Observed	Golden Eagle Flight Minutes	Golden Eagle Use Minutes within 0-30m Altitude	Golden Eagle Use Minutes within 30-150m (RSZ) Altitude	Golden Eagle Use Minutes above 150m Altitude
	PG2	300	0	0	0	0	0
	PG3	300	0	0	0	0	0
	PG4	300	0	0	0	0	0
	PG5	300	0	0	0	0	0
	PG7	300	0	0	0	0	0
	PG8	300	0	0	0	0	0
	PG9	300	0	0	0	0	0
	PG10	300	0	0	0	0	0
	RM14	300	1	1	0	1	0
Total		**9,300**	**4**	**5**	**3**	**2**	**0**

Avian Radar Survey Analysis

As stated in section 5.1.1, the avian radar system ran continuously from March 2011 through March 2013 and was deployed at nine different locations across the CCSM Project Site, including three within the Phase I Development Area that covered 100% of the Phase I wind turbine locations. *See Figure 5.5.* During this time, the radar collected data on all avian and bat species that crossed through the scanning radius of the HSR and VSR, whether they were individual targets, small flocks, or broad front migratory movements.

Two primary factors, however, limit the use of this avian radar data for purposes of identifying patterns of eagle use. First, radar technology cannot detect avian use when it occurs in close proximity to topographic relief that reflects the radar signature. 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 eagle 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 is not able to identify targets to species level or component group, it is possible to apply species-specific tags to individual birds through radar validation surveys. Therefore, PCW conducted radar validation surveys to enhance the usefulness of the avian radar data. These surveys were conducted in real-time in the field as the radar was operating, and involved communication between a biologist in the field and one at the radar to add the species-specific tags to individual targets being tracked by the radar. Golden eagles that were tagged during radar validation surveys at the Upper Iron Springs radar location in 2011 were very helpful in capturing use around two of the occupied nests along the Bolten Rim. When flight path data from golden eagles tagged near the two occupied nests along the Bolten Rim were analyzed through a utilization distribution analysis similar to the one described in "Long-watch Raptor Survey Analysis," the analysis showed that the vast majority of activity occurred south of the nest locations over the Sage Creek Basin, not north of the nests over the Chokecherry WDA.

At this time, while avian radar data from validated targets is helpful in determining use, raptor count and long-watch raptor surveys are more effective at determining species-level use across a project site. Of note, however, is that the radar dataset was essential in the analysis of broad-front migratory movements across the CCSM Project Site, including Phase I, as described in the Phase I BBCS and associated avian radar reports. *See DeTect, Inc. 2012; DeTect, Inc. 2013; PCW 2015a.*

5.2.2 Eagle Nest Analysis

In five years of conducting nest surveys for the CCSM Project, (2008 and 2011-2014), only two occupied golden eagle nests were located within Phase I Turbine Build Areas. One occupied nest was located along the northern boundary of the Phase I Turbine Build Area of the Chokecherry WDA in 2008, and the other occupied nest was located along the southwestern boundary of the Phase I Turbine Build Area of the Sierra Madre WDA in 2011. No bald eagle nests were located within Phase I Turbine Build Areas in any of the five years of aerial nest surveys. The closest bald eagle nest is located approximately 1600 meters (1 mile) southeast of Phase I near Rasmussen Reservoir and was occupied in 2011, 2012, 2013, and 2014. The results of the CCSM Project nest surveys are summarized below; detailed data on occupied eagle nests located during 2008 and 2011–2014 nest surveys can be found in Appendix D.

As described in section 5.1.2, BLM has collected information on nests within the CCSM Project Site since 1980 (a 33-year period) and helicopter-based aerial nest surveys have been completed for the CCSM Project, including Phase I, for five years (2008, 2011, 2012, 2013 and 2014). There is a large variance in the current condition of historic eagle nests within the CCSM Project Site. 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. *See Figure 5.9 & Figure 5.10.*

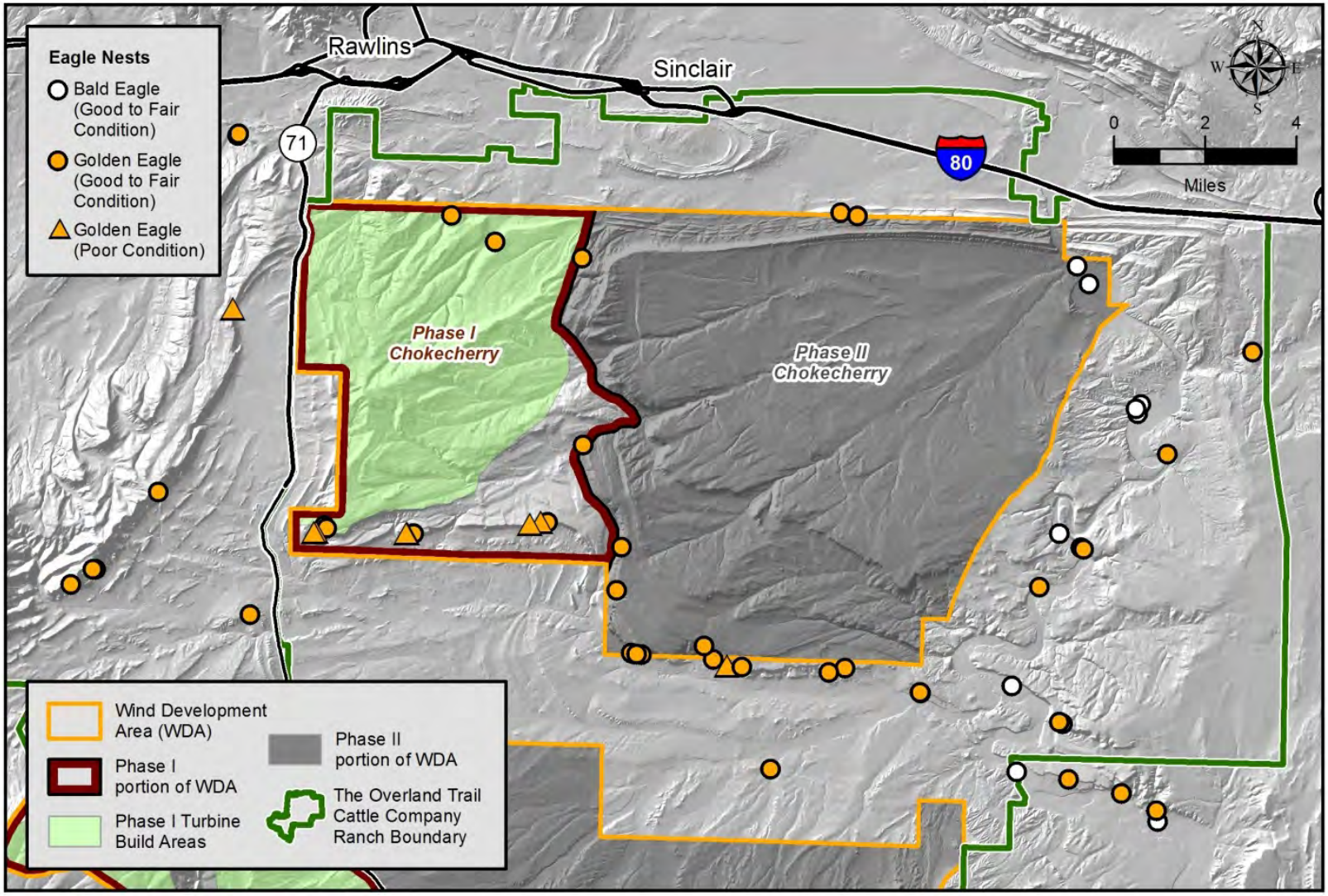

Figure 5.9. Phase I Chokecherry WDA Eagle Nest Locations (1980 to 2014). Condition determined by PCW through aerial surveys.

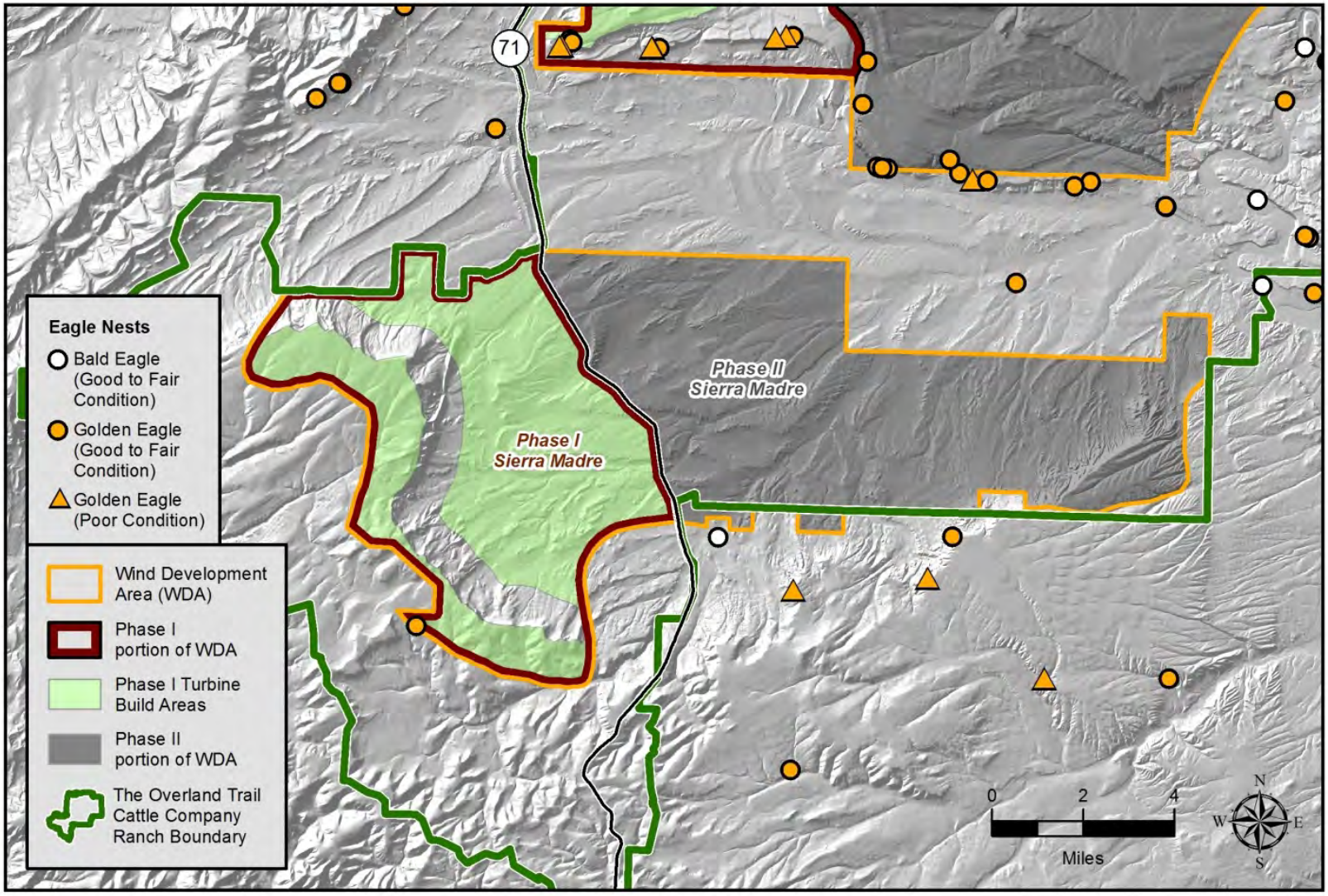

Figure 5.10. Phase I Sierra Madre WDA Eagle Nest Locations (1980 to 2014). Condition determined by PCW through aerial surveys

During the 2008 nest surveys, a total of 24 occupied raptor nests were located, three of which were used by golden eagles. *See Figure 5.11. See Appendix D*. Of the three occupied golden eagle nests, only one was located within the Phase I Turbine Build Areas. The one occupied golden eagle nest was located within the Phase I Turbine Build Area of the Chokecherry WDA on a northwest facing cliff band. The other occupied golden eagle nests were located outside of Phase I, one on the Bolten Rim and the other along the hogback north of the Chokecherry WDA. *See Figure 5.11.* No occupied golden eagle nests were identified in 2008 in the Sierra Madre WDA. Surveys in 2008 did not locate any occupied bald eagle nests, but did not include the North Platte River corridor because it was outside the original Study Area.

During the 2011 nest surveys, only one occupied golden eagle nest was located near the southwestern boundary of Phase I. *See Figure 5.12 & Figure 5.13.* An additional seven occupied golden eagle nests were located within the CCSM Project 8-kilometer (5-mile) wind turbine buffer that was flown during the nest surveys; however none of these were located within the WDAs and all occurred between 10.3 and 26.6 kilometers (6.4 and 16.5 miles) from Phase I. No bald eagle nests were located within Phase I. Four bald eagle nests were located within the Ranch and 8-kilometer (5-mile) buffer, but most were along the North Platte River between 17.7 and 21.2 kilometers (11.0 and 13.2 miles) from Phase I. One of the occupied bald eagle nests was located south of Rasmussen Reservoir, approximately 1600 meters (1 mile) southeast of Phase I. *See Figure 5.13.*

The one occupied golden eagle nest located in 2011 near the southwestern boundary of Phase I was located near the Red Rim-Grizzly WHMA on a small ledge along the southwest face of a small, pyramid-shaped mesa. Eagle flight path data collected during 2011 when the nest was occupied indicates that the majority of the observed eagle activity occurred south and west of the nest location in an area with documented greater sage-grouse use and pronghorn fawning activities. Very little eagle use was observed north and east of this nest within the Phase I Turbine Build Areas. With respect to the occupied bald eagle nest located south of Rasmussen Reservoir, very little bald eagle use was documented in Phase I during the time this nest was occupied. Most of the observed use associated with this nest occurred between the nest and Rasmussen Reservoir, where waterbirds/waterfowl create foraging opportunities for this pair of eagles. The use associated with this nest led to the development of the Rasmussen Reservoir Turbine No-Build Area. *See Section 6.2.7.*

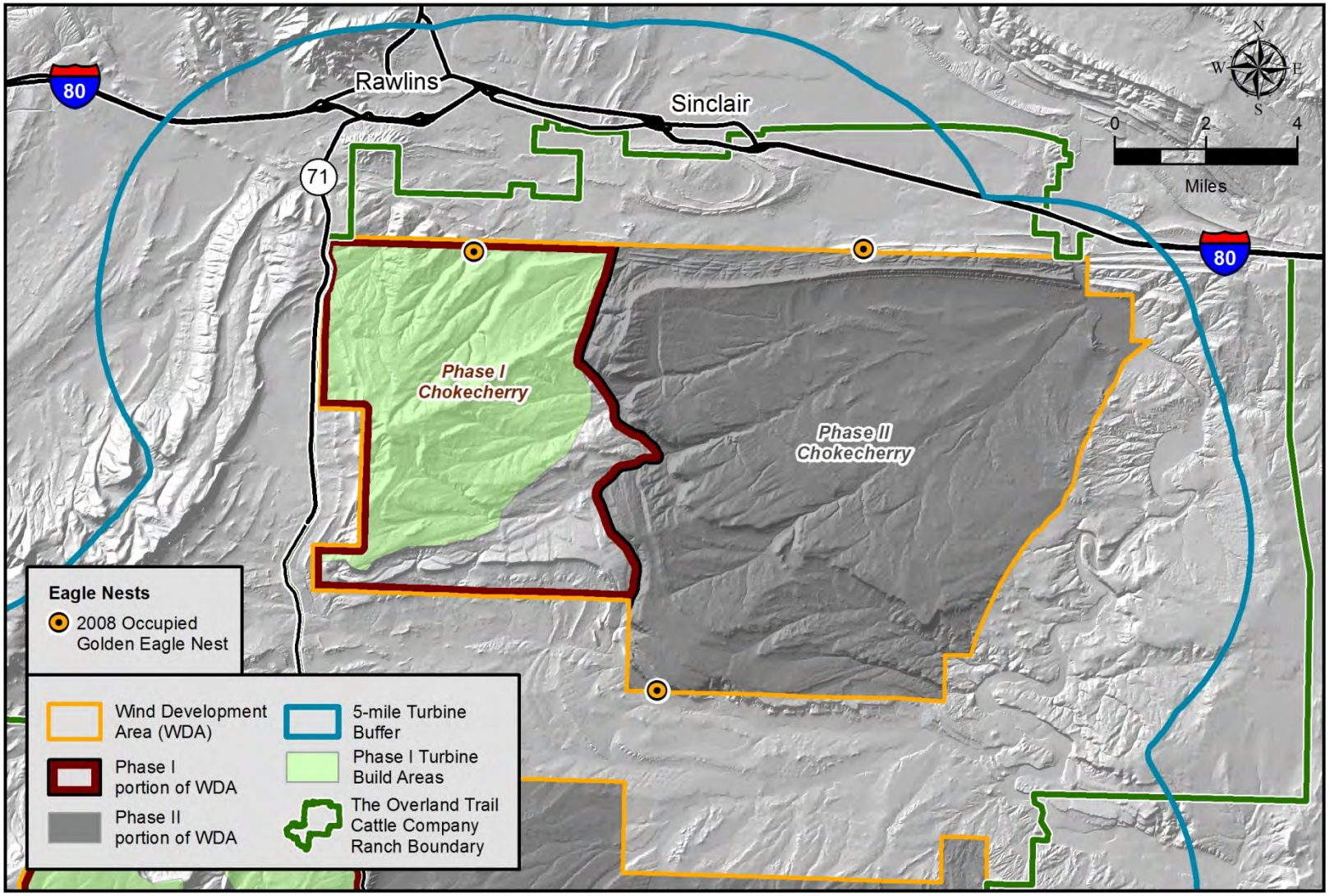

Figure 5.11. Occupied Golden Eagle Nests, 2008.

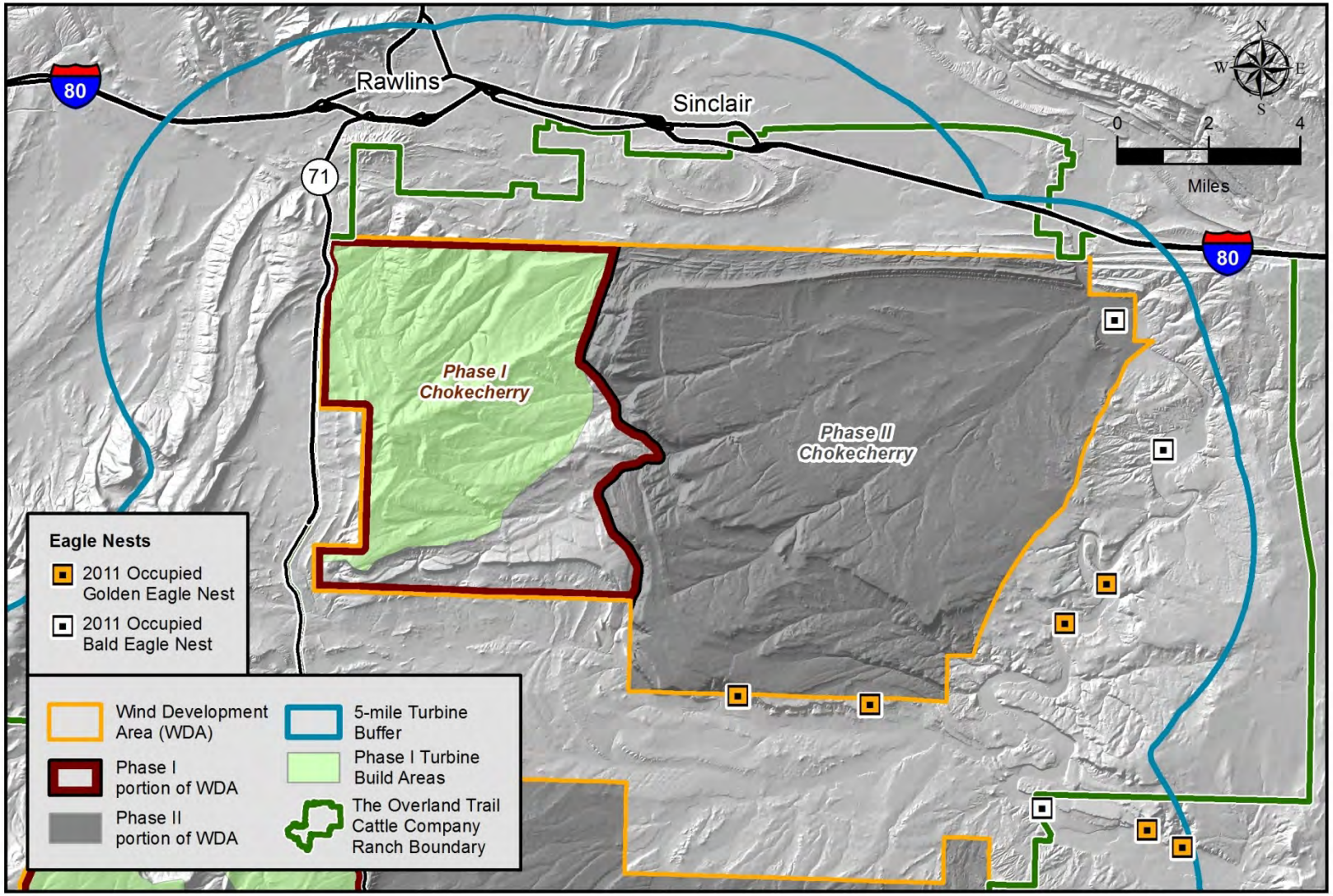

Figure 5.12. Chokecherry WDA Occupied Eagle Nests, 2011.

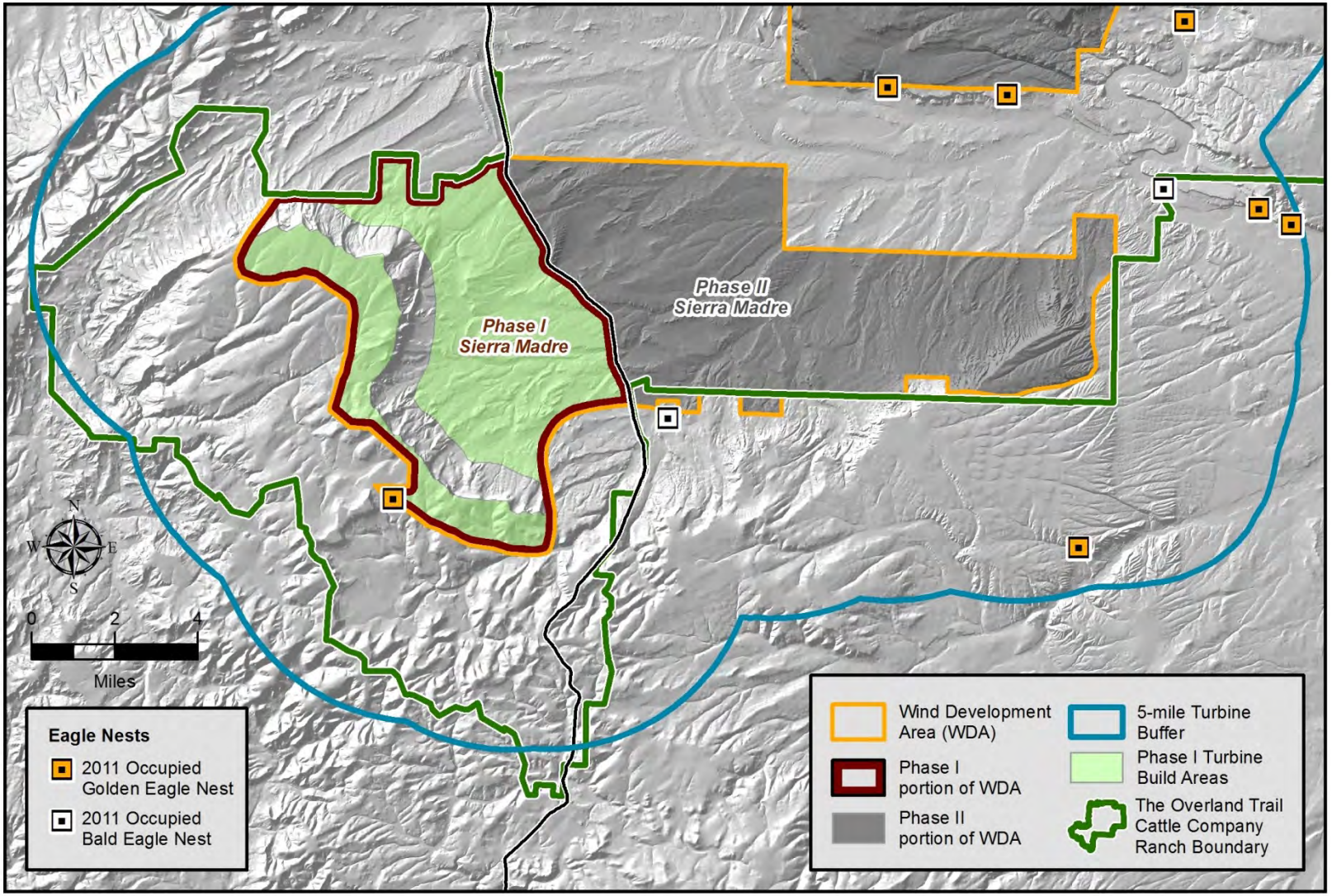

Figure 5.13. Sierra Madre WDA Occupied Eagle Nests, 2011.

During the 2012 nest surveys, no occupied golden eagle or bald eagle nests were located within Phase I. *See Figure 5.14 & Figure 5.15.* A total of seven occupied golden eagle nests (two nests were likely nesting attempts by the same pair) and 6 occupied bald eagle nests were located within the CCSM Project 8-kilometer (5-mile) wind turbine buffer, with most of the occupied eagle nests occurring along the North Platte River. The occupied golden eagle nests ranged between 8.7 and 23.8 kilometers (5.4 and 14.8 miles) from Phase I. Most of the occupied bald eagle nests were located between 17.7 and 21.2 kilometers (11.0 and 13.2 miles) from Phase I; however, the occupied bald eagle nest located south of Rasmussen Reservoir in 2011 and discussed above was recorded as occupied again in 2012.

During the 2013 nest surveys, no occupied golden eagle or bald eagle nests were located within Phase I. *See Figure 5.16 & Figure 5.17.* A total of seven occupied golden eagle nests and seven occupied bald eagle nests were located within the CCSM Project 8-kilometer (5-mile) wind turbine buffer; however, none of these occupied eagle nests occurred within the WDAs and most were located along the North Platte River. An additional active golden eagle territory was identified in northern Sage Creek Basin near Sage Creek Reservoir; however, no nest initiation was detected at this location and it was considered unoccupied. The occupied golden eagle nests ranged between 7.9 and 22.4 kilometers (4.9 and 13.9 miles) from Phase I. Most of the occupied bald eagle nests were located between 17.2 and 25.9 kilometers (10.7 and 16.1 miles) from Phase I. The bald eagle nest located south of Rasmussen Reservoir outside of Phase I that was recorded as occupied in 2011, 2012, was occupied again in 2013.

During the 2014 nest surveys, no occupied golden eagle or bald eagle nests were located within the Phase I Turbine Build Areas. *See Figure 5.18 & Figure 5.19*. A total of sixteen occupied golden eagle nests and seven occupied bald eagle nests were located within the CCSM Project 8-kilometer (5-mile) wind turbine buffer. As in previous years, the highest density of occupied eagle nests, seven bald eagle and six golden eagle, was located along the North Platte River. Six of the occupied golden eagle nests were located along the Bolten Rim; of these, two were on the eastern half of the Bolten Rim and are 8.5 and 14.0 kilometers (5.3 and 8.7 miles) from Phase I Turbine Build Areas and the remaining four were on the western half of the Bolten Rim between 2.9 and 3.5 kilometers (1.8 and 2.2 miles) from the Phase I Turbine Build Areas. One occupied golden eagle nest was located on a small cliff in the Sage Creek Basin between the Chokecherry and Sierra Madre WDAs in a Turbine No-Build Area approximately 14.6 kilometers (9.1 miles) from Phase I. Two occupied golden eagle nests were located along the Atlantic Rim, approximately 6.8 and 8.7 kilometers (4.2 and 5.4 miles) from Phase I. None of the occupied eagle nests were located within the Sierra Madre WDA. However, two occupied golden eagle nests were located south of the Sierra Madre WDA 8.4 and 11.4 kilometers (5.2 and 7.1 miles) from Phase I. The bald eagle nest that was occupied in 2011, 2012 and 2013, located approximately 600 meters (0.4 miles) south of the Sierra Madre WDA and 3.9 kilometers (2.4 miles) from Phase I, was occupied again in 2014. This occupied bald eagle nest is located immediately south of the Turbine No-Build Area surrounding Rasmussen Reservoir that was created to avoids and minimizes impact to foraging and use areas associated with the nest.

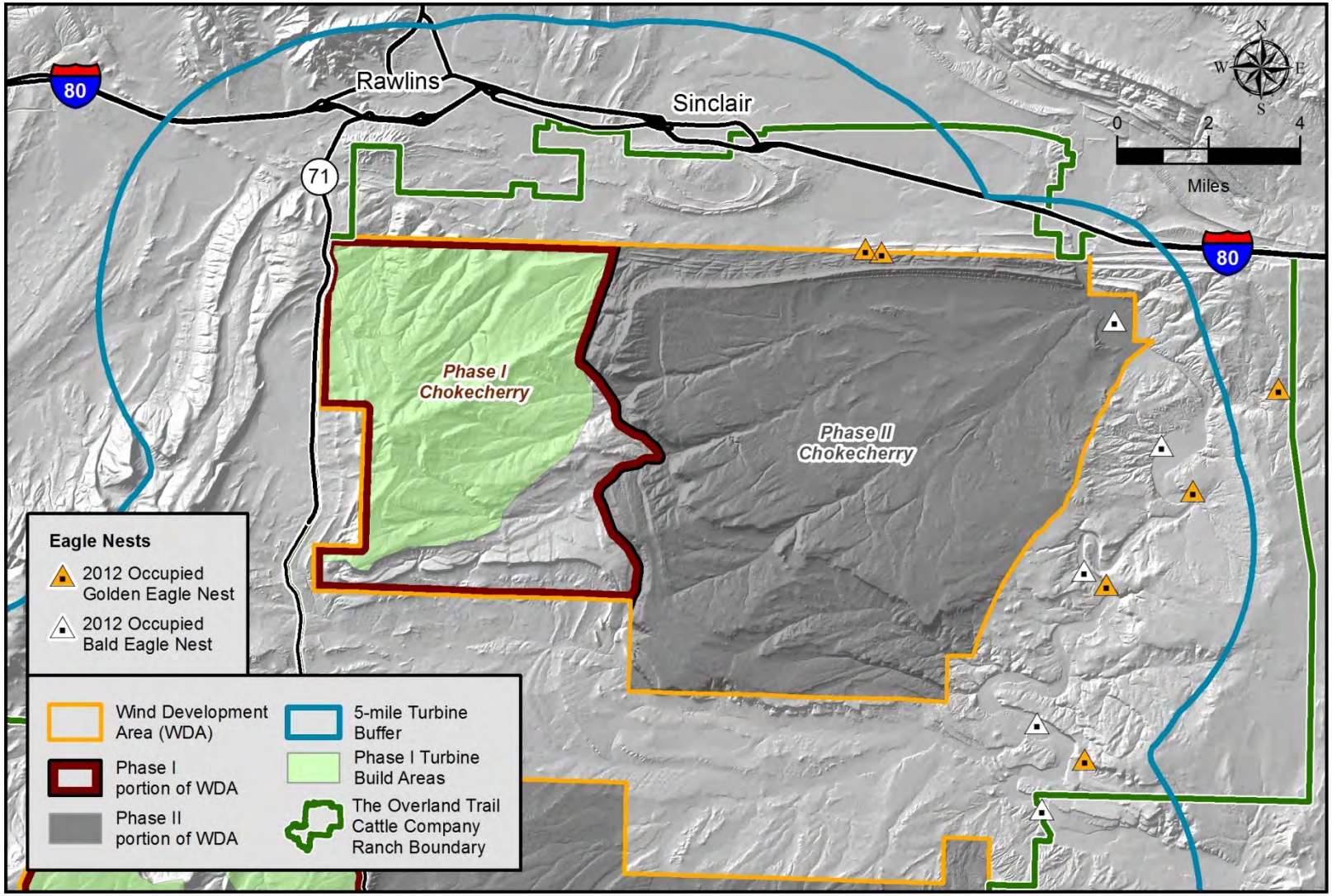

Figure 5.14. Chokecherry WDA Occupied Eagle Nests, 2012.

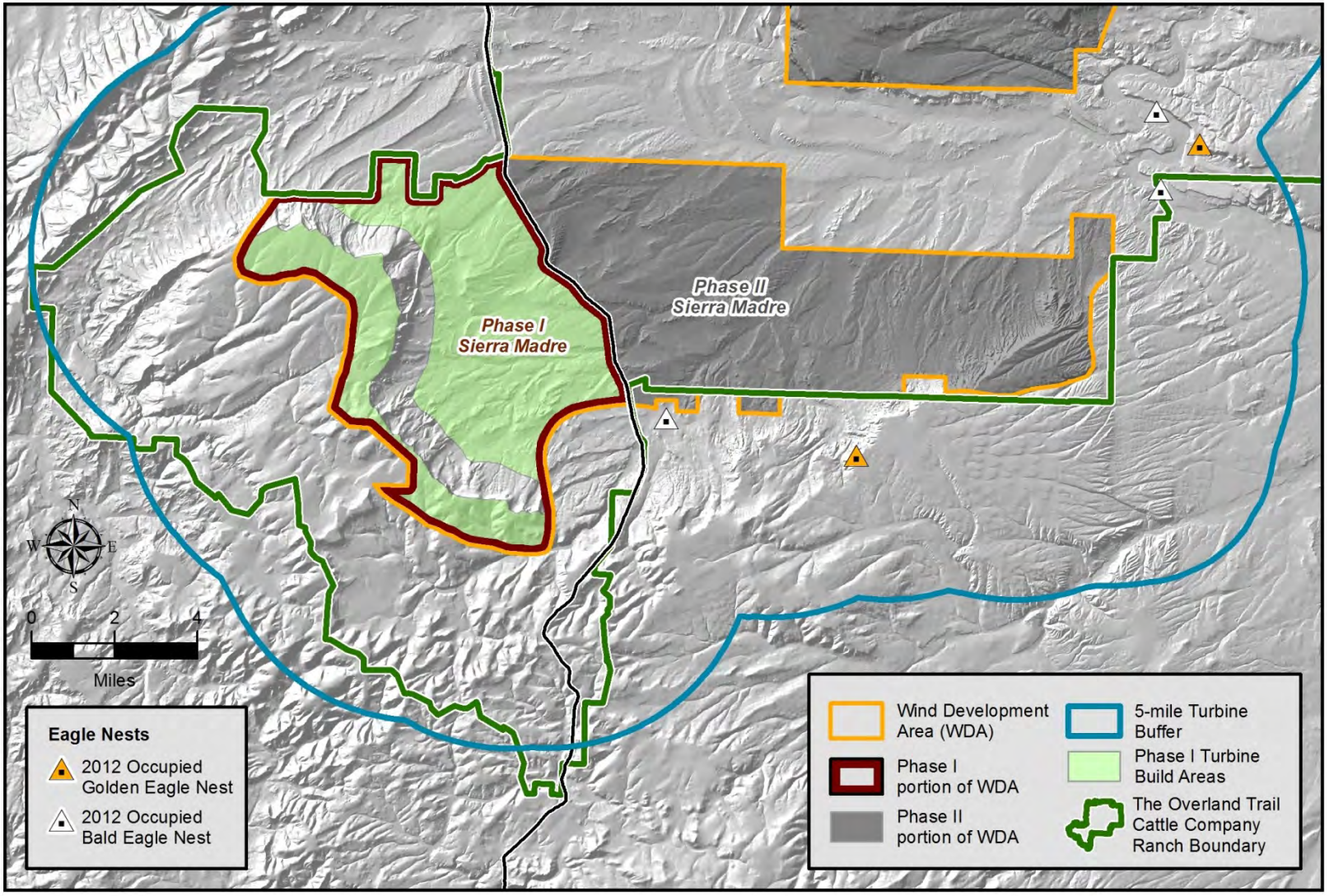

Figure 5.15. Sierra Madre WDA Occupied Eagle Nests, 2012.

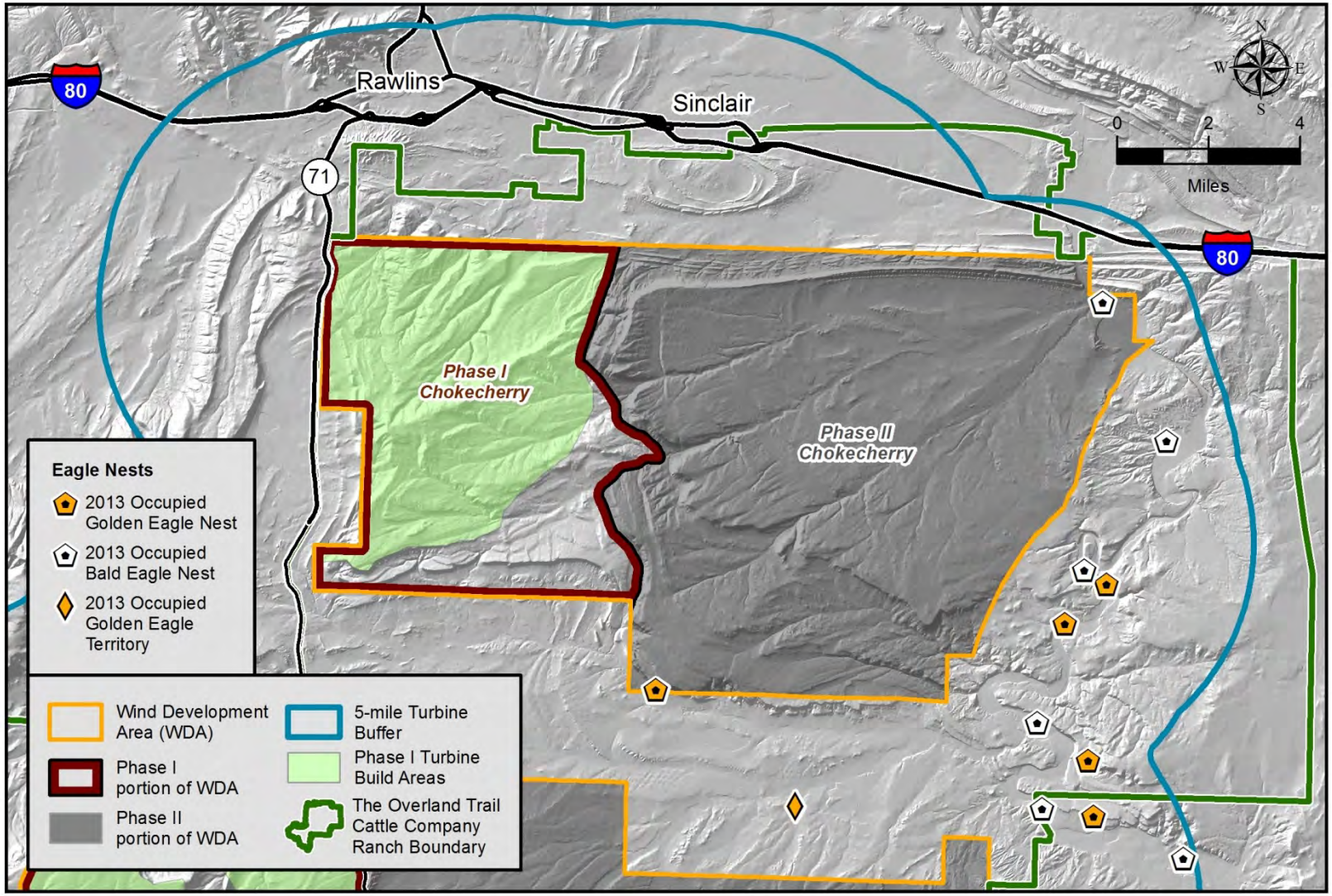

Figure 5.16. Chokecherry WDA Occupied Eagle Nests, 2013.

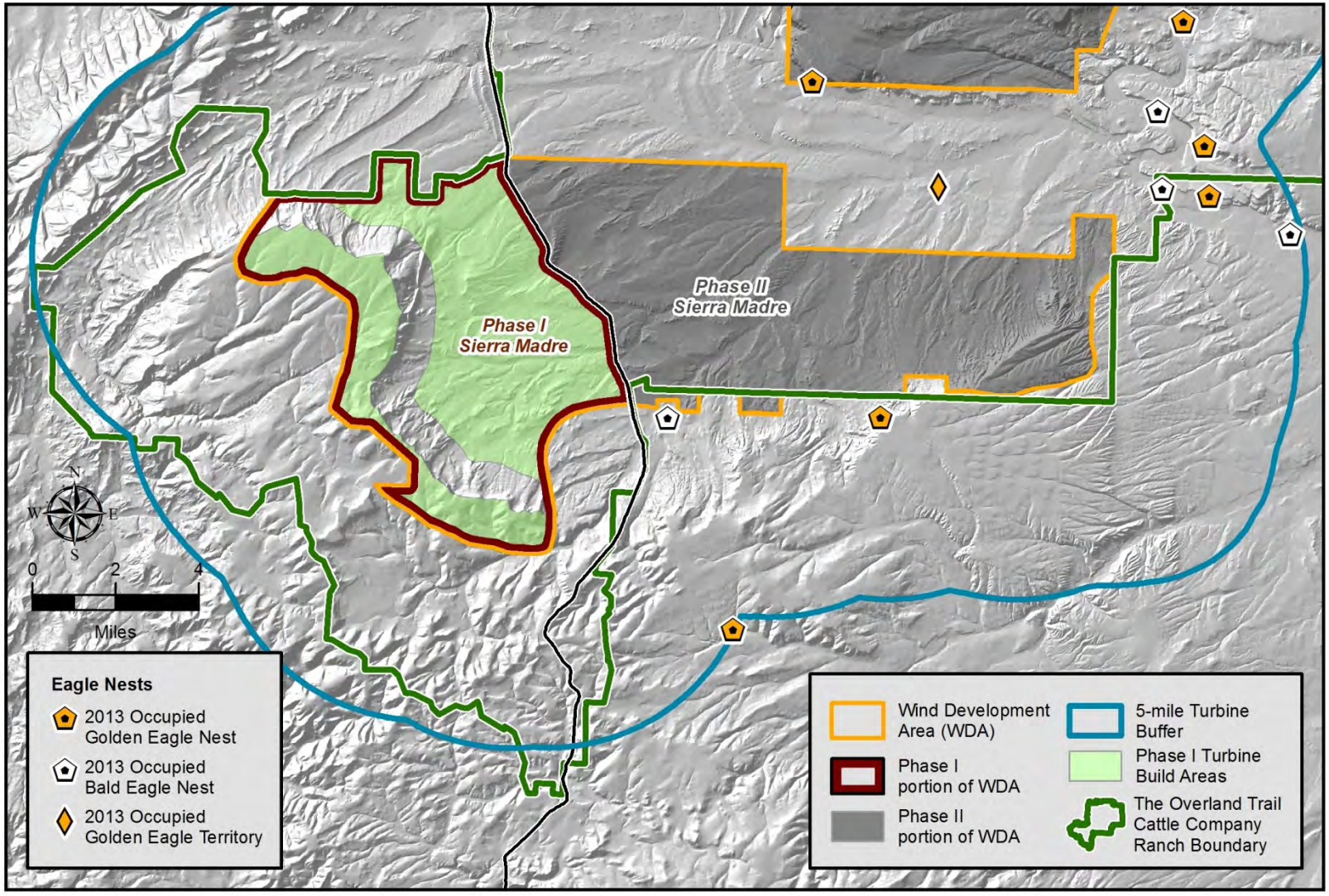

Figure 5.17. Sierra Madre WDA Occupied Eagle Nests, 2013.

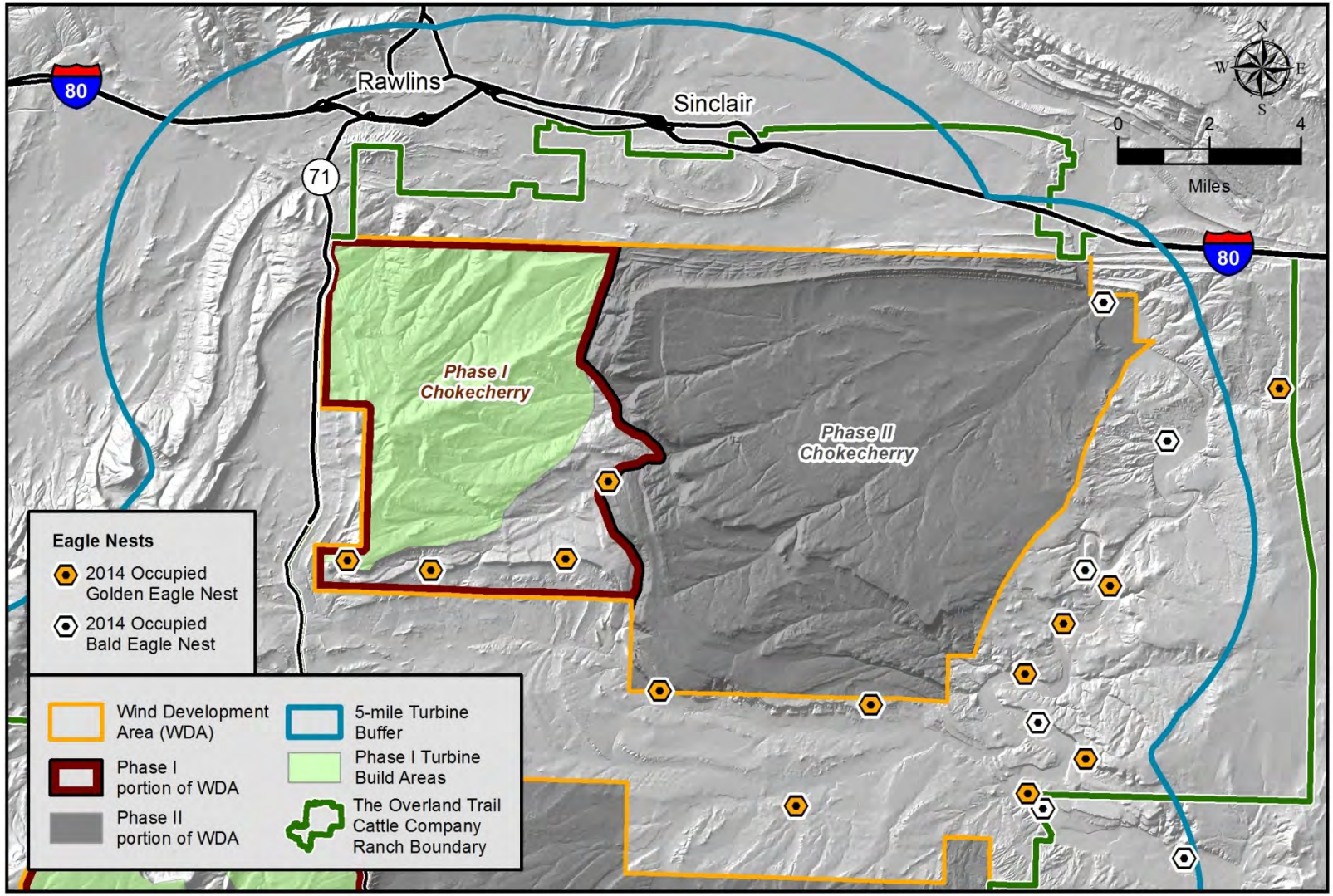

Figure 5.18. Chokecherry WDA Occupied Eagle Nests, 2014.

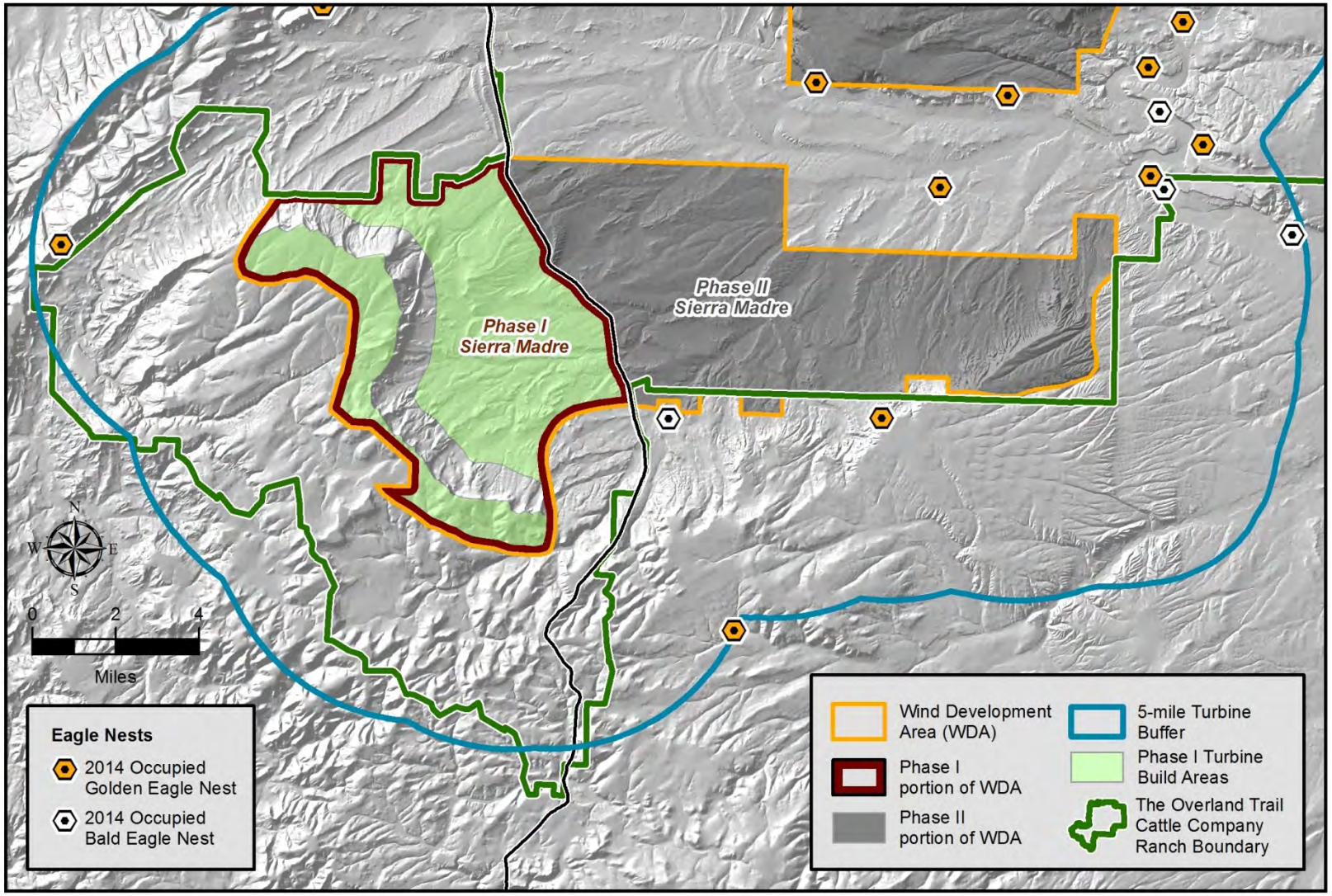

Figure 5.19. Sierra Madre WDA Occupied Eagle Nests, 2014.

5.2.3 Communal Roost Location Analysis

No communal eagle roosts have been identified within Phase I, the CCSM Project Site or the CCSM Project 8-kilometers (5-mile) wind turbine buffer and survey area. *See Appendix E*. No roost locations were identified during ground-based surveys or during aerial reconnaissance flights in winter 2011, 2012, and 2013. Further, no communal eagle roosts were located during the 2013 aerial surveys that focused on the highest probability locations for potential roosts (i.e., North Platte River corridor, along Bolten Rim, etc.).

These communal eagle roost survey results are consistent with the habitat available on and adjacent to the CCSM Project Site as there are very few forested areas or areas with trees large enough to support a communal eagle roost. The North Platte River corridor, located more than 16 kilometers (10 miles) from Phase I, is the only area within the CCSM Project survey area that has any potential to support a communal roost as it has scattered galleries of cottonwood trees, adjacent cliffs that provide some protection from inclement weather conditions, and potential prey during periods when the river is not frozen over. However, during winter aerial surveys of the area, only two individual bald eagles were observed along the North Platte River corridor. Further, during other winter wildlife surveys, only occasional incidental observations of individual bald eagles were made. Outside of the North Platte River corridor, no other areas of the CCSM Project Site have suitable habitat to support a communal eagle roost as the available trees are too small and scattered, there is little protection from inclement weather, and there are few consistent prey sources to support a large number of wintering eagles. *See Appendix E & F*.

The findings of PCW's communal roost surveys are consistent with data that have been collected by BLM across the entire RFO planning area as described by USFWS in the 2007 Biological Opinion for the RFO Resource Management Plan. *See BLM 2008a, App. 14.* The Biological Opinion identified that only two communal winter roosts are known in the RFO, one in the San Pedro Mountains in the northern portion of the RFO and one in the riparian forests along the Little Snake River in the southern portion of the RFO. *See BLM 2008a, App. 14.* These locations are 48 to 64 kilometers (30 to 40 miles) from the CCSM Project Site.

5.2.4 Prey Base Analysis

Prey base assessments were conducted throughout the CCSM Project Site and adjacent land from April 2011 to August 2013. Prey base surveys were conducted to identify areas containing prey densities sufficient for eagle and large raptor foraging activities. A summary of the CCSM Project Site prey base assessments is included below. Complete reports on prey base surveys and assessments are located in Appendix F.

White-tailed Prairie Dogs (WTPD)

WTPD are generally available as prey for eagles only from mid-March through late October and are considered prey resources for eagles during nesting and summer use periods. *See Keinath 2004.* WTPD

are unavailable as prey beginning in late July as they enter their burrows. *See Clark and Stromberg 1987.* Peak activity occurs from late May when juveniles emerge from burrows to late July when adult males begin to descend into burrows. Adult females descend two to three weeks later than males in the fall and emerge two to three weeks later in the spring. Juveniles begin to hibernate in late October or early November. *See Keinath 2004*.

The CCSM Project Site, including Phase I, provides small, scattered pockets of prairie dogs that likely provide only low foraging potential for raptors and eagles. Reconnaissance surveys in 2012 identified relatively low densities of active and total WTPD burrows across the CCSM Project Site, including Phase I. *See Appendix F.* Active burrows ranged from zero per acre in the higher elevations of Upper Miller Hill and Sage Creek Rim to 3.3 active burrows per acre in the colonies in northern Sage Creek Basin just below the Bolten Rim. Highest burrow densities were located outside of the WDAs. All burrow densities within Phase I are at the lower end of the range of conditions reported for other WTPD colonies, supporting the conclusion that WTPD are not an important forage source for eagles across much of the CCSM Project Site, including Phase I. *See Menkens et al. 1987; Clark and Stromberg 1987.*

In 2013, full-scale WTPD surveys were conducted throughout Phase I. No WTPD colonies were recorded within the Phase I portion of the Chokecherry WDA; however, eleven colonies were found north of the Chokecherry WDA between Interstate 80 and the hogback, and one colony was located approximately 6.4 kilometers (4.0 miles) east of Phase I. *See Figure 5.20. See Appendix F.* Of the eleven colonies between Interstate 80 and the hogback, ten were clustered in close proximity. *See Figure 5.20.*

Surveys in 2013 on Upper Miller Hill identified eight WTPD colonies, all very small and all within an approximately 2.9-kilometer (1.8-mile) stretch of the northern portion of the Miller Hill rim. *See Figure 5.21. See Appendix F.* WTPDs or signs of recent activity were noted at three of the eight colonies; therefore, these are deemed active colonies. Two of the three active colonies contained only one active burrow and the population size of the other colony was estimated as being between 1 and 5 prairie dogs based on observations of individuals and burrowing activity. The collective acreage for all three active prairie dog colonies was 3.7 acres (average of less than 1 acre per colony). Five colonies, each consisting of a single prairie dog burrow, were determined to be inactive due to the lack of WTPDs or signs of recent activity.

A total of 127 WTPD colonies were identified in the Lower Miller Hill portion of the 2013 survey area. *See Figure 5.21*. *See Appendix F*. Of the 127 colonies identified, 28 colonies were determined to be inactive. The remaining 99 colonies had at least one prairie dog present or a burrow with sign of recent activity. Of the 99 active colonies, 43 colonies were less than 5 acres in size and were located in scattered or loosely associated groups and 14 were identified as having burrow densities of less than five burrows per acre with very few individuals. These 57 active colonies are not considered to be important prey resources for eagles due to their small populations, ephemeral nature, and lack of observed use by eagles. The remaining 42 active colonies in Lower Miller Hill were more than five acres in size and had burrow densities of more than five burrows per acre.

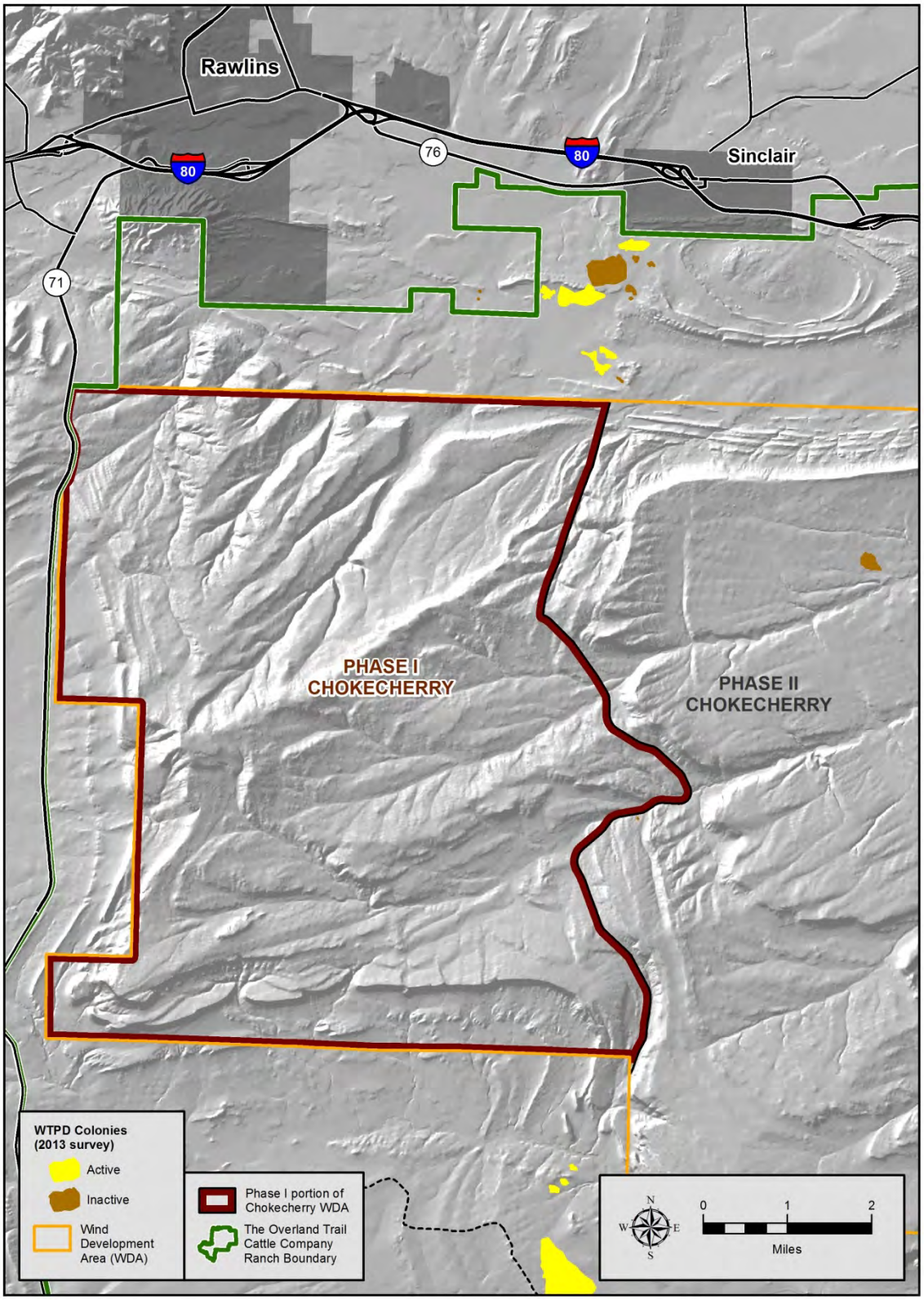

Figure 5.20. Phase I Chokecherry WDA White-tailed Prairie Dog Colonies.

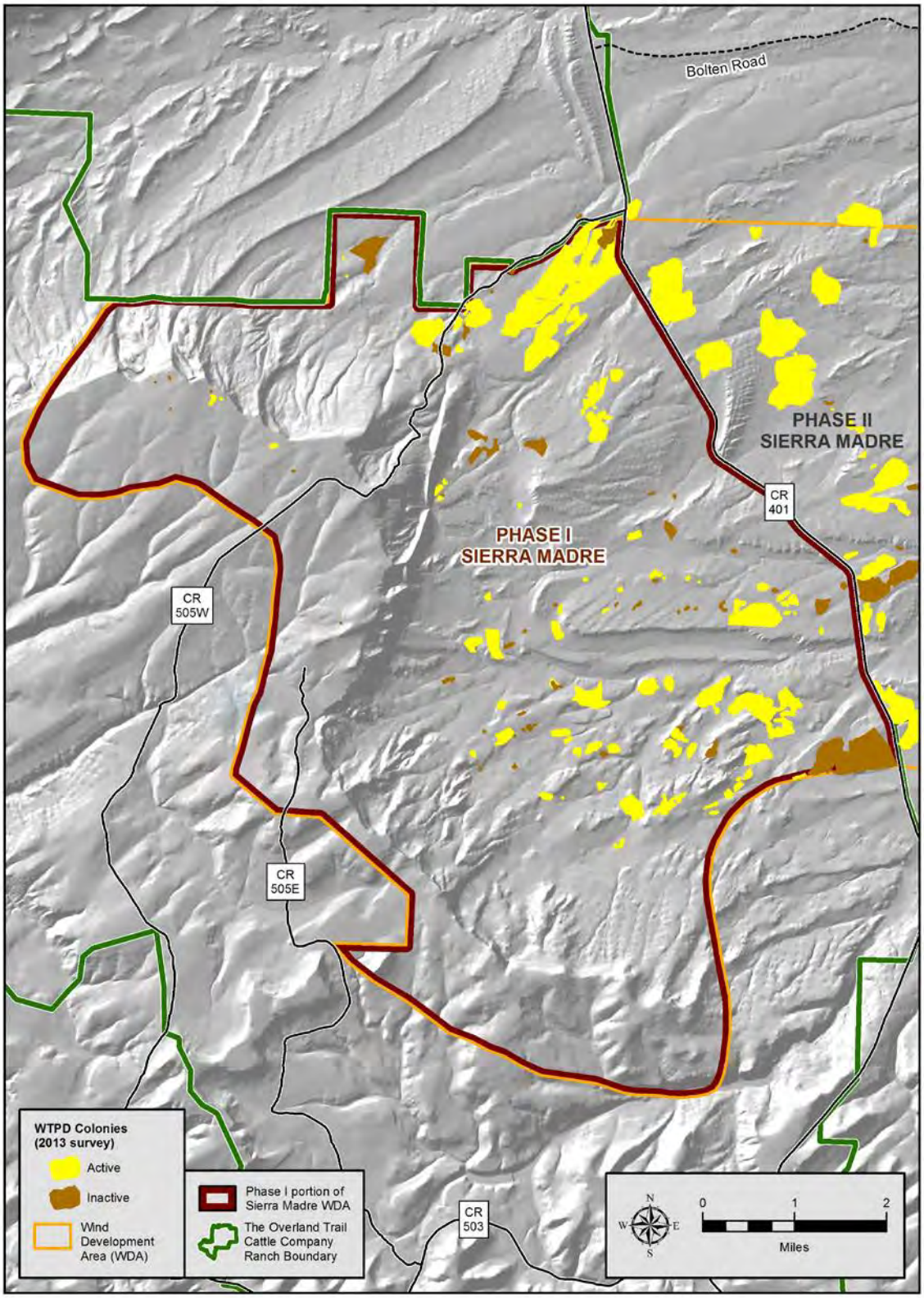

Figure 5.21. Phase I Sierra Madre WDA White-tailed Prairie Dog Colonies.

Waterbirds/Waterfowl

Waterfowl and waterbirds provide seasonal foraging opportunities for bald and golden eagles at the four major reservoirs (Kindt, Rasmussen, Sage Creek, and Teton) located on the Ranch, as well as along the North Platte River corridor. Three of the four reservoirs and the North Platte River are located outside of the WDAs; Rasmussen Reservoir is located within the Phase II portion of the Sierra Madre WDA. Waterfowl /waterbirds are available as a forage source from early spring through late fall during periods when the reservoirs and the river are ice-free; however, the highest concentration of waterbird/waterfowl species occurs during the fall when nesting is completed and adults and juveniles of many species aggregate on the reservoirs to prepare for southerly migration.

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 reservoirs located on the Ranch. *See Appendix G.* Spring waterbird/waterfowl surveys resulted in a total count of 1,415 individuals representing 35 species. American coot (*Fulica americana*) was the most abundant species accounting for 364 individuals (26% of total count). Scaup (*Aythya* sp.), *Aechmophorus* grebes (i.e., western and Clark's), and eared grebe (*Podiceps nigricollis*) were the next most abundant species with 351, 209, and 113 individuals, respectively. Collectively, those four groups 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.

In total, 1,708 individuals representing 29 species were recorded on summer waterbird/waterfowl surveys. Redhead (*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, those 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, the fewest number of species (12) were recorded at that location.

Waterbird/waterfowl surveys during the fall migration period resulted in 11,473 individuals of 29 species recorded. Similar to spring, in the fall American coot accounted for the majority of individuals (8,024, 70% of all 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 wigeon (99%).

Observations of bald eagles actively foraging at Rasmussen Reservoir indicate that this location is an important foraging location for a known bald eagle pair nesting immediately south of the Sierra Madre WDA and Rasmussen Reservoir. These observations led to the designation of the Rasmussen Reservoir Turbine No-Build Area. *See Section 6.2.7.* Observational data from 2011 also indicate the potential use of Kindt Reservoir as a foraging location for a golden eagle pair that nested just above the reservoir during that year. Kindt Reservoir is already located outside of the WDAs. Waterbirds/waterfowl using the North Platte River are also an available prey source for eagles nesting along this corridor. Similar to Kindt Reservoir, the North Platte River is located outside of the WDAs. *See Appendix G.*

Greater Sage-grouse

PCW's intensive greater sage-grouse monitoring and research program indicates that greater sage-grouse are prey for eagles. Greater sage-grouse tagged by PCW have been killed by eagles as evidenced by tags located in eagle nests or at perch locations. *J. Kehmeier, personal communication.* Therefore, it is believed that greater sage-grouse could provide a year-round forage base for eagles. In 2011, Wyoming Governor Matt Mead issued Executive Order (EO) 2011-5 establishing the current greater sage-grouse Core Areas, which protect the best greater sage-grouse habitat and largest populations of greater sage-grouse remaining in Wyoming. Greater sage-grouse Core Areas represent important eagle foraging locations within the vicinity of Phase I because of the higher quality sagebrush habitat and associated usage by other potential eagle prey species including leporids, big game species, and fossorial mammals. *See Appendix F.* Results of PCW's greater sage-grouse monitoring program indicate that the majority of greater sage-grouse use during late brood-rearing periods occurs in Core Areas outside the boundaries of the WDAs; late brood-rearing periods are potentially important for eagle foraging because greater sage-grouse populations are generally highest during this period and they concentrate around mesic habitats. *J. Kehmeier, personal communication.* PCW has committed to developing the CCSM Project, including Phase I, entirely outside of designated greater sage-grouse Core Areas. *See BLM 2012a; Wyoming EO 2011-5 at Attachment A, Sage-Grouse Core Breeding Areas Version 3.*

Other Potential Eagle Prey Species

Wyoming Ground Squirrel

Similar to WTPDs, Wyoming ground squirrels are only active from mid-March/early April (depending on late winter conditions) to late July when they begin to hibernate. *See Armstrong et al. 2011; Reid 2006.* By mid-September, almost all ground squirrels have entered hibernation. Males usually emerge from hibernation one to three weeks before the females. Breeding takes place a few days after females emerge from hibernation and one litter of 5 to 7 young is born in late April or May after a three- to four-week gestation period. *See Zegers 1984; Reid 2006*. Juveniles emerge from burrows at 4 to 5 weeks old, therefore highest population densities above ground occur between May and July.

Even during their active season, ground squirrels are typically only above ground during cooler weather in the mornings and evenings, retreating into their burrows during hot weather. *See Clark and Stromberg 1987*. Wyoming ground squirrels spend around 21 hours per day inside their burrows. *See*

Zegers 1984. As discussed in PCW's Prey Base Assessment for the CCSM Project, including Phase I, Wyoming ground squirrel colonies are unlikely to achieve the necessary densities required to consistently attract eagles and to support eagle nesting populations due to the restrictive activity schedule and colony structure of Wyoming ground squirrels. Therefore, Wyoming ground squirrels are at best a secondary prey item. *See Appendix F.*

Leporids

Leporids are known to be an important prey source for eagles. Some scientific studies have shown that fitness and overall nesting success of some breeding populations of golden eagles may depend heavily on the cyclic abundance and deficiencies of leporid populations, especially the white-tailed jackrabbit. *See Bates and Moretti 1994; Preston 2011; Steenhof et al. 1997*. These cycles in leporid populations are caused by an abundance or shortage of available forage, with shortages of forage typically linked to periods of drought.

The leporids commonly found within the CCSM Project Site, including Phase I, are white-tailed jackrabbit, desert cottontail and mountain cottontail (*Sylvilagus nuttallii*). These three species appear to be diffuse and widespread across the CCSM Project Site based on field observations collected since 2009. *See Appendix F.* As described in PCW's Prey Base Assessment, white-tailed jackrabbit typically inhabit the lower-lying Sage Creek Basin of the CCSM Project Site, which is comprised of salt desert scrub and dense sagebrush steppe vegetation, but may also be found in higher areas of the CCSM Project Site. Desert cottontail may also be found in the Sage Creek Basin, the North Platte River corridor, and to a lesser extent on Chokecherry and Upper Miller Hill, while mountain cottontail mainly occur on Upper Miller Hill and to a lesser extent on the higher elevations of Chokecherry. *See Appendix F.* All three species tend to inhabit areas with moderate shrub densities for use as cover from predators.

All three leporid species found within the CCSM Project Site, including Phase I, are crepuscular, feeding predominantly during the early morning and late evening hours; however, white-tailed jackrabbits are known to forage throughout the night as well. Though leporids are able to meet much of their water needs through absorbing moisture from forage, they are attracted to the moist low-lying vegetation along state and county roads surrounding Phase I. *See Appendix F.* This attraction leads to many individuals being killed along roadways and results in increased scavenging opportunities for eagles in the vicinity of the CCSM Project Site on public roads and highways such as Interstate 80 and State Highways 130 and 71.

Leporids differ from many potential eagle prey species in that they do not hibernate and are active during the winter months, which may create some additional foraging opportunities for eagles during this time of year. This winter activity is typically concentrated in lower-lying basin areas with little or no snow cover, or in areas where they are able to forage from underneath shrub cover.

Scientific literature describes the importance of the eagle-leporid predator-prey relationship. Leporids within the CCSM Project Site likely represent a quality food source for eagles. However, due to leporids' mainly crepuscular habits and the diffuse nature of leporid populations across the many habitats within the CCSM Project Site, including Phase I, they are likely taken as prey opportunistically, albeit regularly, by eagles. *See Appendix F.*

Big Game Species

Big game species provide eagle foraging opportunities throughout the year. During spring and summer months, big game parturition (birthing) areas can be important as eagles will prey on young deer (*Odocoileus* spp.), elk (*Cervus elaphus*), and pronghorn (*Antilocapra americana*). No parturition areas have been identified by PCW, WGFD, or BLM in Phase I or the CCSM Project vicinity; however, young pronghorn may be found in the Sage Creek Basin and young mule deer may be found along the North Platte River during the spring and early summer. Observations of two golden eagle and one bald eagle nest during the recovery of greater sage-grouse GPS telemetry tags have shown high concentrations of juvenile pronghorn legs located on and around the base of these nests, indicating that young pronghorn are a viable prey item that may be taken regularly by eagles nesting in the vicinity of the CCSM Project Site. *J. Kehmeier, personal communication.*

During fall and early winter months, carcasses and remains left by hunters could be an important food source for eagles. Eagle scavenging of big game carcasses and other remains during hunting season has been observed in the landscape surrounding Phase I. *J.Kehmeier personal communication*. Hunting in the vicinity of the CCSM Project Site occurs primarily in the Red Rim-Grizzly WHMA, in block federal land south of the Sierra Madre WDA, and in the Medicine Bow National Forest. In the FEIS, BLM identified that in 2010, 1,593 big game animals were harvested within the hunt units overlapping the CCSM Project Site, including Phase I. *See BLM 2012b.* However, the majority of the harvest occurs outside of the CCSM Project Site because the privately-owned and controlled land on the Ranch is either not hunted or hunted very lightly. Therefore, there are not adequate carcasses or remains to support eagle foraging and scavenging within the Phase I Development Area. *See Appendix F.*

WGFD has identified areas of big game winter range in the vicinity of the Phase I. Portions of mule deer winter range overlap with the northern portions of the Chokecherry WDA along the hogback and pronghorn winter range occurs east of the Chokecherry WDA. *See BLM 2012b. See Figure 3.3.* PCW is currently working with WGFD, BLM, and the University of Wyoming to better understand use of the CCSM Project Site, including Phase I, by mule deer and other big game species. These efforts will continue and may be used to inform adaptive management options and future conservation measures.

Livestock and Grazing

Phase I was historically, and is currently, used for raising livestock. The Ranch dates to the early 20th century and was once one of the largest sheep ranches in the state of Wyoming. *See Barclay 2011*. Golden eagle depredation on livestock has been documented in many areas of the western United States. *See Avery and Cummings 2004*. Most depredation involves golden eagles preying on young lambs and goats; depredation of domestic calves occurs only occasionally. *See Avery and Cummings 2004*. A survey conducted from 1997 to 2002 by Wyoming Agriculture and presented in the Wyoming Agriculture Statistics, indicated that eagles, specifically golden eagles, took over 40,000 sheep/lambs during this period. *See Avery and Cummings 2004*. O'Gara (1978) draws a connection between a decline in jackrabbit populations and increased lamb predation by golden eagles, especially juvenile and subadult birds, which have no established territories.

From the turn of the century until the mid-1990s, the Ranch was primarily run as a sheep operation; however, the Ranch has since been converted to a cattle operation. Historically, the widespread availability of sheep/lambs as a prey source within Phase I may have created more forage opportunities for golden eagles serving to potentially support larger populations by stabilizing the prey base during periods of declining leporid populations; however, predation on domestic calves rarely occurs. *See Avery and Cummings 2004; Phillips et al. 1996*. The conversion of the Ranch from a sheep to a cattle operation in the mid-1990's dramatically decreased potential opportunities for eagles to forage upon livestock. For this reason, domestic livestock operations on the Ranch do not create or support significant eagle foraging or use areas. *See Appendix F.*

Roadkill

During fall and winter months, vehicle collision-killed carcasses or roadkill are a forage source for bald and golden eagles. In January 2014, U.S. Forest Service Ranger Melanie Fullman published a column in The Saratoga Sun newspaper citing the recent discovery of another eagle killed on the road and reminding drivers to be cautious in the area. *See Fullman 2014.* During February 2012 avian surveys, 14 individual eagles and one ferruginous hawk concentrated around two pronghorn carcasses were observed during a 15-minute drive along a 16-kilometer (10-mile) stretch of Highway 130 east of the CCSM Project. *J. Kehmeier, personal communication.* At the same time, several other eagles were observed along Interstate 80 north of the CCSM Project. *J. Kehmeier, personal communication.* In contrast, in February of 2012, only seven eagles (all golden eagles) were observed during more than 56 hours of winter raptor count surveys within the CCSM Project Site. *See Appendix C.* This indicates that winter eagle activity is likely higher along roadways where roadkill is present versus areas where prey and scavenging opportunities are infrequent. In the vicinity of the Phase I, winter eagle use is closely tied to the availability of winterkill carcasses along area highways. *See Appendix F.*

5.3 Risk Assessment Following Stage 2

PCW used the information obtained in its Stage 2 surveys and assessments to identify important eagle use areas likely to be affected by the CCSM Project and to assist in applying measures to avoid and minimize impacts to eagles to the extent practical. As discussed in detail in chapter 6.0, PCW substantially redesigned Phase I of the CCSM Project based upon the information and data gathered to address potential environmental risks to species of concern, including eagles. *See Chapter 6.0*. PCW has used iterative implementation of Stage 2 of the ECP Guidance as Phase I has been redesigned to avoid and minimize impacts to eagles. Following completion of Stage 2, PCW characterized the CCSM Project, including Phase I, as a Category 2 project.

According to the ECP Guidance, a project is a Category 2 if, as currently sited and planned, it is (1) reasonably likely to take eagles at a rate greater than is consistent with maintaining stable or increasing populations, but (2) the risk might be reduced to an acceptable level through a combination of conservation measures and reasonable compensatory mitigation, per an effective and verifiable ECP. While Phase I has potential to take golden eagles, the risk will be avoided and minimized to the extent practicable as set forth in this Phase I ECP. In addition, PCW commits to compensatory mitigation as set forth in this Phase I ECP to offset unavoidable take from construction, operation and maintenance of Phase I such that there is no net loss to the golden eagle population. PCW has prepared this Phase I ECP following the ECP Guidance to meet the regulatory requirements for a programmatic ETP.

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