6.0 Avoidance and Minimization of Risks in Project Siting (ECP Guidance – Stage 4)

Wind energy development can affect bald and golden eagles in a variety of ways, such as causing direct mortality through collision. *See USFWS 2013a citing Hunt 2002, Krone 2003, Chamberlain et al 2006*. According to the ECP Guidance, this is the primary threat to eagles from wind energy facilities, and the monitoring, avoidance, and minimization measures advocated in the ECP Guidance are primarily aimed at this threat. As described in the ECP Guidance, evidence across multiple studies suggests that three main factors contribute to increased risk of collision by eagles: (1) the interaction of topographic features, season, and wind currents to create favorable conditions for slope soaring or kiting (stationary or near-stationary hovering) in the vicinity of wind turbines; (2) behavior that distracts eagles and presumably makes them less vigilant (e.g., active foraging or inter- and intra-specific interactions); and (3) resident status, with resident eagles being less vulnerable and dispersers and migrants (especially sub-adults and floating eagles) being more vulnerable. *See USFWS 2013a.*

USFWS ECP Guidance Stage 4 – Avoidance and Minimization of Risk Using ACPs and Other Conservation Measures, and Compensatory Mitigation instructs the project developer to address conservation measures that might be employed to minimize or, ideally, avoid eagle mortality and disturbance based on information gathered in Stage 2. The USFWS Region 6 Guidance instructs project developers to address avoidance and minimization of risk in project siting prior to prediction of eagle fatalities (Stage 3). *See USFWS 2013b.* The USFWS Region 6 Guidance then instructs project developers to revisit additional avoidance and minimization measures, ACPs, and compensatory mitigation as a separate section of the ECP. In compliance with the USFWS Region 6 Guidance, this chapter focuses only on those avoidance and minimization measures incorporated into the Phase I siting process. Additional avoidance and minimization measures, conservation measures, experimental ACPs, and compensatory mitigation are described in chapter 8.0.

PCW has worked cooperatively with USFWS to avoid and minimize impacts to eagles from Phase I. *See Appendix H*. PCW used the best available scientific data, including the extensive data collected for Phase I, to develop the specific avoidance and minimizations measures that were incorporated into the Phase I wind turbine layout. This chapter outlines the avoidance and minimization measures that PCW implemented during the Phase I siting consistent with the USFWS Region 6 Guidance, including the following:

1. Considering alternative sites for reducing eagle/raptor/migratory bird risk in the Phase I siting and redesign process.
2. Removing and/or relocating wind turbines or potential wind turbine sites from the Phase I design using site-specific eagle and avian use data.
3. Modifying, removing, and/or relocating other infrastructure from the Phase I design using site-specific eagle and avian use data.
4. Adjusting the Phase I design using site-specific eagle and avian use data.

5. Incorporating the USFWS Region 6 Recommendations for Avoidance and Minimization of Impacts to Golden Eagles at Wind Energy Facilities (USFWS Region 6 Recommendations) as well as complying with project-specific recommendations made by USFWS. *See USFWS 2013c*.

The following sections further describe the substantial redesign that PCW has completed since first applying for Type-II Wind Energy Project Area Grants for wind energy site testing and monitoring, submitting a POD for the CCSM Project to BLM, and applying for a Type-III Wind Energy Development Grant. *See Section 1.2.2.*

PCW's iterative design and siting approach resulted in substantial reconfiguration of the CCSM Project including several revisions in the siting of wind turbines for Phase I. These are exactly the type of actions contemplated and recommended by Stages 2-4 of the ECP Guidance and Tier 3 of the Wind Energy Guidelines. The evolution of the CCSM Project and Phase I described below illustrates:

1. PCW's attention to the early determination of potential environmental risks at the landscape scale;
2. PCW's adjustment of the Phase I design based on eagles and their habitat as well as other environmental considerations;
3. PCW's evaluation of potential environmental risks based on site-specific data; and
4. PCW's adjustment/limitation of the areas of potential wind development to avoid and minimize impacts to eagles from Phase I.

6.1 Overview of Phase I Avoidance and Minimization Efforts

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 for the project siting effort.

PCW has used the site-specific data collected along with the recommendations from USFWS in re-designing the CCSM Project and developing the final wind turbine layout for Phase I. Phase I avoids and minimizes risks to eagles such that additional take is unavoidable, consistent with the ECP Guidance and Wind Energy Guidelines and the provisions of BGEPA and MBTA. The Phase I wind turbine layout - when combined with the best management practices, conservation measures, experimental ACPs and monitoring and adaptive management described in this Phase I ECP - avoids and minimizes impacts to bald and golden eagles such that additional take is unavoidable.

6.1.1 Wind Energy Site Testing and Monitoring Application Area

PCW has an easement from TOTCO for wind development on the privately owned sections of the Ranch; however, PCW must also obtain the proper authorizations for wind development on the intermingled federal land. *See Chapter 1.0.* In November of 2006, PCW applied to BLM for two ROW grants for wind energy site testing and monitoring on federal land (Type-II Wind Energy Project Area Grants) in two areas of the Ranch. *See BLM 2008b.* The northern area was identified as Chokecherry and the southern area was identified as Sierra Madre. BLM 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, covering the Wind Energy Site Testing and Monitoring Application Area (Application Area) in which wind energy development was proposed. The Application Area, located almost entirely within the Ranch, encompassed 169,500 acres. PCW installed its first two meteorological (or "met") towers for monitoring and measuring wind speed, direction and behavior in June 2007, with additional met tower installations shortly thereafter. The data from these met towers were used to generate a site-specific wind map of the Application Area and inform the wind turbine layout for PCW's original Proposed Action. *See Figure 6.1.*

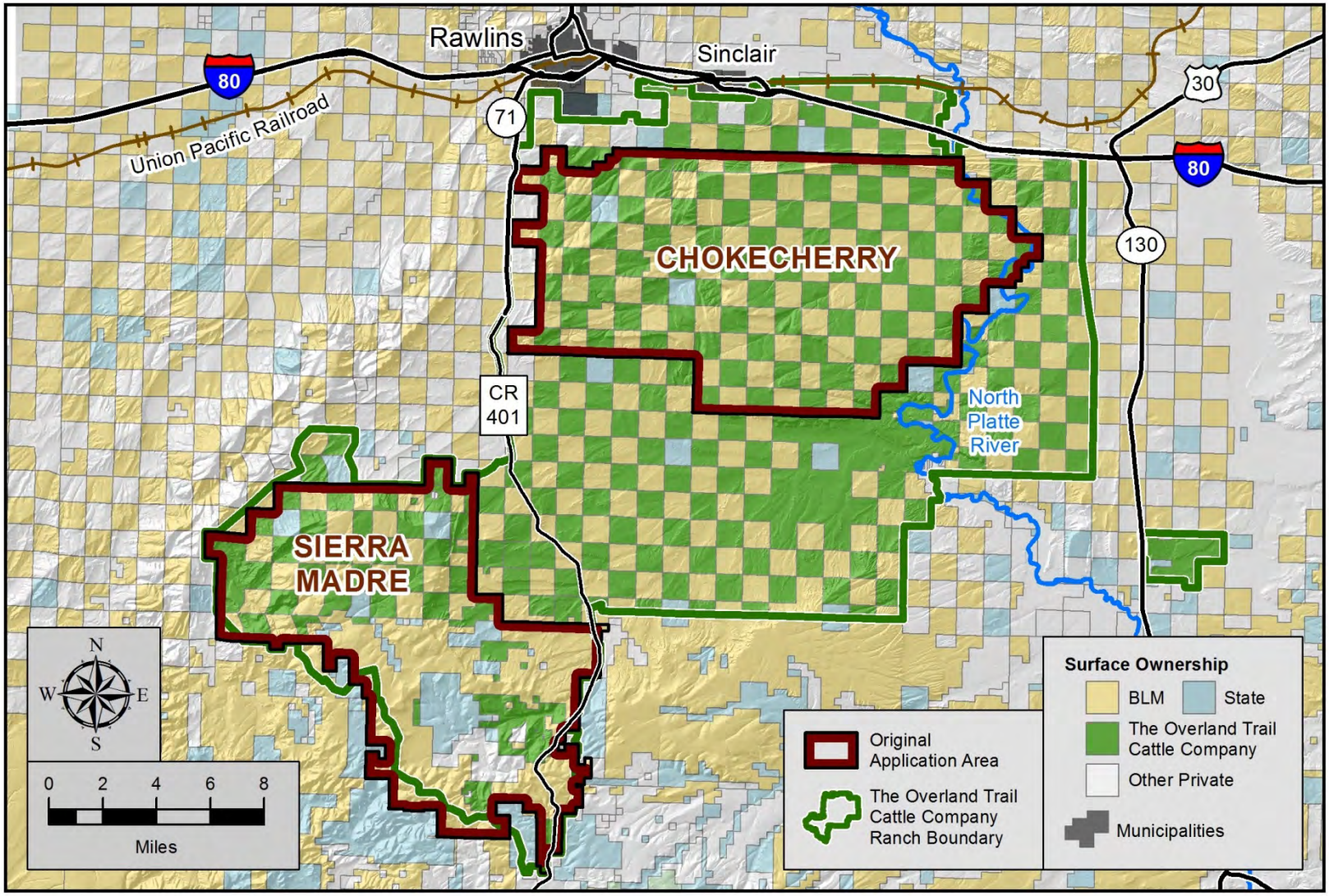

Figure 6.1. Wind Energy Site Testing and Monitoring Application Area – June 2007.

6.1.2 Original Proposed Action

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

In support of its application for a Type-III Wind Energy Development Grant, PCW submitted a POD to BLM in March 2009, which included a proposed wind turbine layout for the CCSM Project (Original Proposed Action). The Original Proposed Action was based on siting the CCSM Project wind turbines to take advantage of the Ranch's best wind resources as verified from the wind data collected since 2007. The Original Proposed Action had 675 wind turbines in Chokecherry and 325 in Sierra Madre, with no wind turbines on Sage Creek Rim or in Lower Miller Hill or the Sage Creek Basin. Wind turbines were planned throughout the full extent of Upper Miller Hill including within the Red Rim-Grizzly WHMA, and along the hogback feature in the north portion of Chokecherry. *See Figure 3.3 & Figure 6.2.*

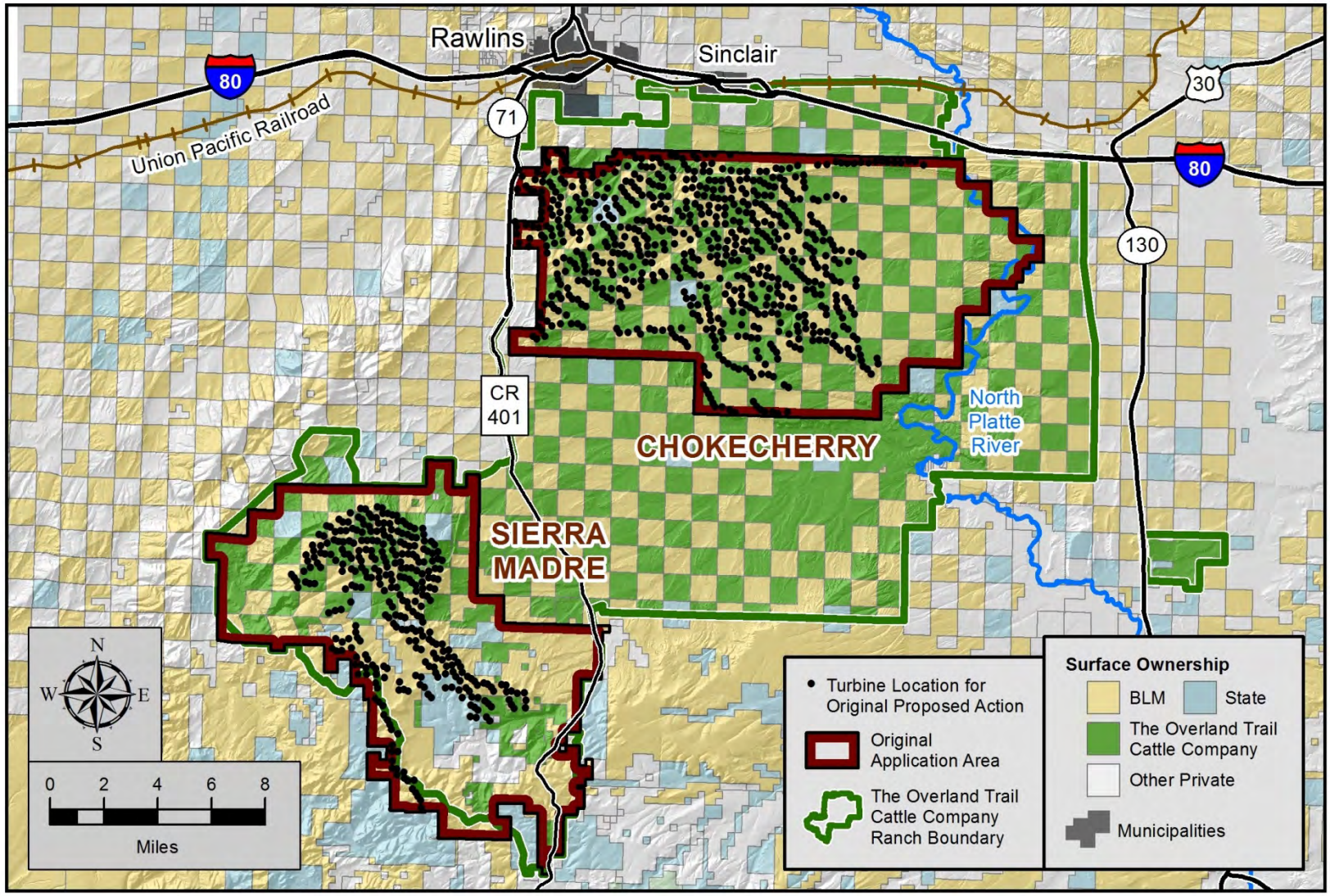

Figure 6.2. Original Proposed Action in Plan of Development – March 2009.

6.1.3 Revision 1, Revised Proposed Action – April 2010

Consistent with Stage 1 of the ECP Guidance and Tiers 1 and 2 of the Wind Energy Guidelines, following the submittal of the Original Proposed Action, PCW conducted a broad, landscape-scale evaluation of the Application Area using the results of the 2008-2009 baseline wildlife surveys. *See Section 5.1.1.* The review included an evaluation of the locations of multiple resources including eagle and non-eagle raptor nest locations, habitat for avian and other wildlife species, greater sage-grouse lek and habitat locations, and other environmental considerations. The review also included identification of preliminary environmental constraints based on the Resource Management Plan (RMP) for the BLM Rawlins Field Office and the best available environmental information and datasets for the Ranch.

As a result of the initial avoidance and minimization efforts associated with PCW's review of the Original Proposed Action, over 30% of the wind turbine locations in the Original Proposed Action (approximately 340 wind turbine locations) were removed from consideration. This included proposed wind turbine locations in the southernmost area of Sierra Madre and the western area of Upper Miller Hill (also in Sierra Madre). Accordingly, PCW amended its Type-II Wind Energy Project Area Grants to add potential development areas in Sierra Madre (Lower Miller Hill, the Sage Creek Basin and Sage Creek Rim). The Application Area along with these expanded areas form the Amended Application Area evaluated by BLM in its FEIS (with a few additional minor adjustments). The Amended Application Area encompasses approximately 216,000 acres, including all of Phase I.

Following amendment of its Type-II Wind Energy Project Area Grants, PCW revised its Original Proposed Action (the Revised Proposed Action). The Revised Proposed Action moved proposed wind turbines from the southernmost area of Sierra Madre and the western area of Upper Miller Hill to areas in Lower Miller Hill, Sage Creek Basin, Sage Creek Rim, and Severson Flats. When compared with the Original Proposed Action, these relocations resulted in decreased impacts to multiple resources, including eagles and other avian species. The Revised Proposed Action was provided to BLM in April 2010. *See Figure 6.3.*

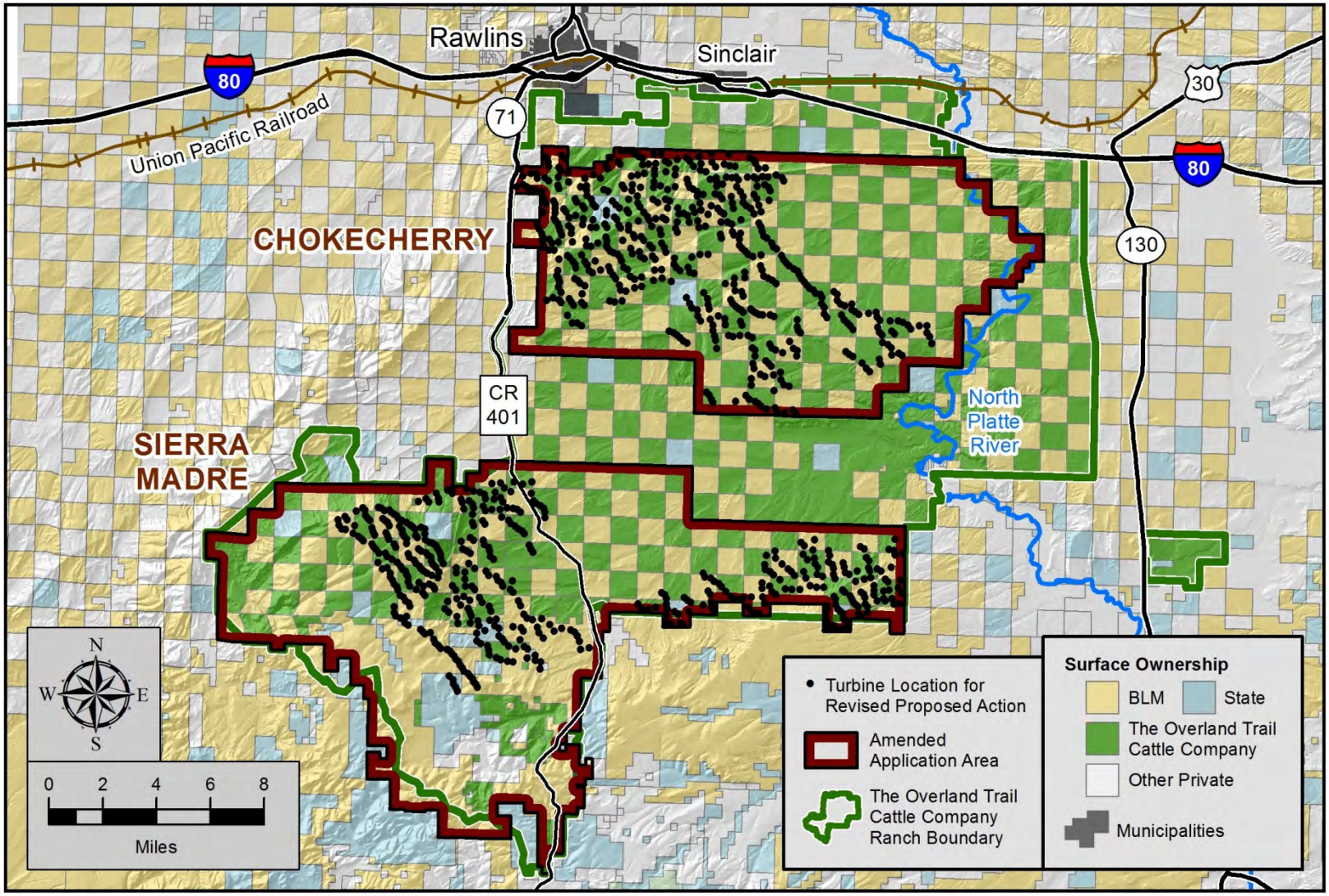

Figure 6.3. Revision 1: Revised Proposed Action – April 2010.

6.1.4 Revision 2, Applicant Proposed Alternative – August 2010

In August 2010, PCW again revised the CCSM Project by removing all wind energy development from greater sage-grouse Core Areas as designated in the Wyoming Governor's Executive Order 2010-4 (and subsequently Executive Order 2011-5). The State of Wyoming Core Area conservation strategy for greater sage-grouse limits development and disturbance in large areas of public, private, and state land across Wyoming. In the vicinity of the CCSM Project, habitats along and east of the North Platte River and habitats south and west of the Sierra Madre WDA are identified as Core Areas for greater sage-grouse conservation. These areas also overlap important eagle nesting habitat and contain much of the high-quality prey base for eagles. Removing wind energy development from greater sage-grouse Core Areas avoids and minimizes impacts to eagles, their prey base, and nesting habitat to aid in the conservation of the local and regional populations.

PCW modified the Revised Proposed Action by relocating 68 wind turbines, primarily from western and southern Upper Miller Hill, where the best wind resources are located, to areas outside of greater sage-grouse Core Areas and the associated eagle prey base and nesting habitat. This is in addition to the over 300 wind turbines that were relocated between the Original Proposed Action and the Revised Proposed Action, most of which were also in what are now designated greater sage-grouse Core Areas and the associated eagle prey base and nesting habitat. Revision 2 to the wind turbine layout was submitted to BLM in August 2010 as the Applicant Proposed Alternative. BLM analyzed the Applicant Proposed Alternative as Alternative 1R in its Draft EIS. *See BLM 2011b*. *See Figure 6.4.*

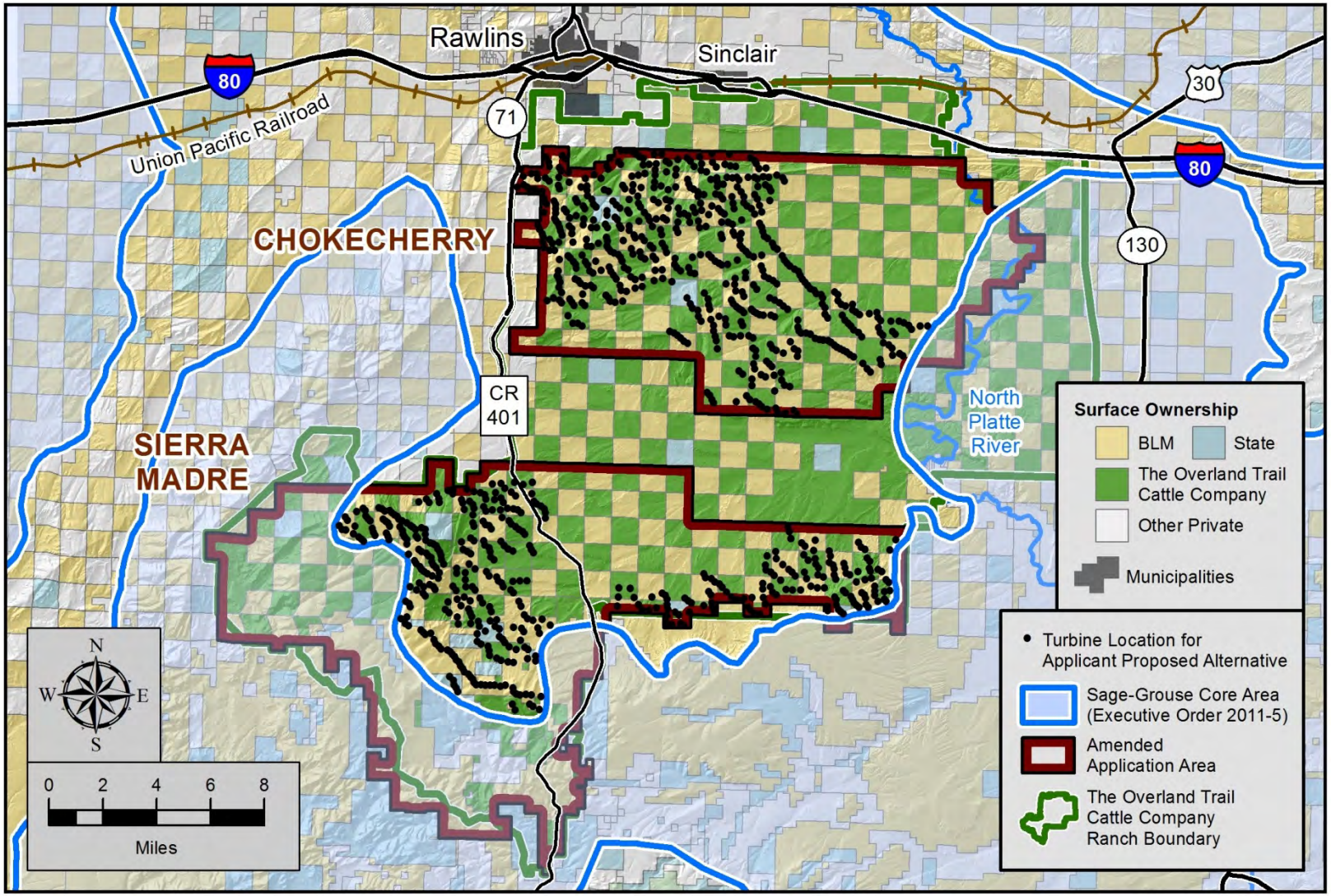

Figure 6.4. Revision 2: Applicant Proposed Alternative – August 2010.

6.1.5 Revision 3, Revised Plan of Development – January 2012

Following the release of BLM's Draft EIS in July 2011, PCW revised the CCSM Project again in its POD dated January 2012. This revision considered the analysis contained in the BLM Draft EIS and incorporated updated ACMs and a revised wind turbine layout. Many of the ACMs are consistent with conservation practices recommended in the ECP Guidance, Wind Energy Guidelines, and other recommendations made by USFWS. Specifically, in the January 2012 POD, PCW worked to further reduce surface disturbance and habitat fragmentation and to provide flight/movement corridors for avian species throughout the CCSM Project by aligning wind turbines into rows consistent with the ECP Guidance. In addition, wind turbines were also removed north of the hogback and south of Rasmussen Reservoir to further reduce potential risks to eagles based on observed eagle use. This revised wind turbine layout formed the basis of BLM's analysis in the FEIS. *See Figure 6.5.*

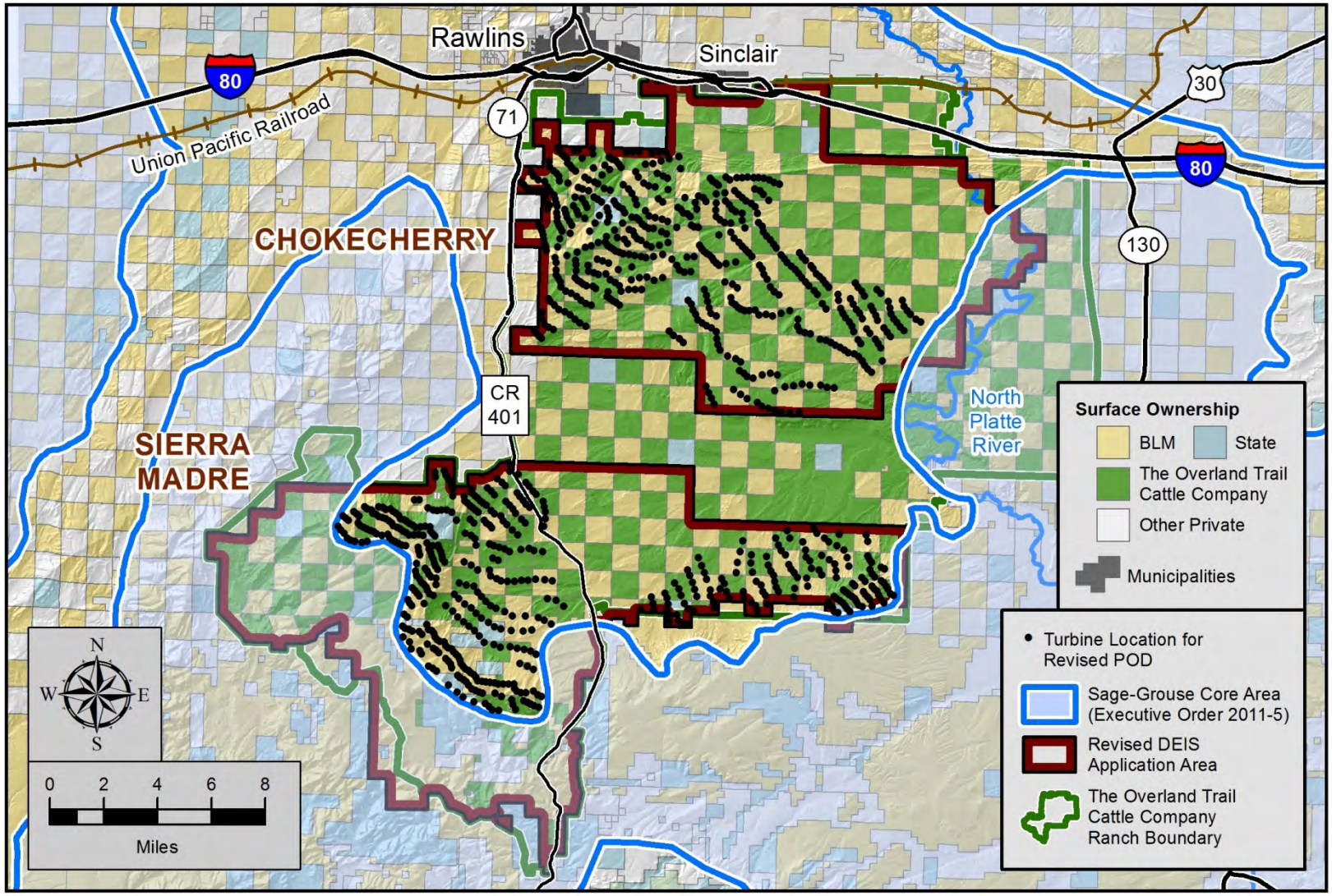

Figure 6.5. Revision 3: Revised Plan of Development – January 2012.

6.1.6 Revision 4, Turbine No-Build Areas – July 2012

Beginning in 2010, PCW coordinated and consulted with USFWS to identify additional surveys necessary to identify and document important eagle use areas and other avian use areas, potential migration areas, nesting use areas, prey base resources for eagles, and other resources associated with eagle and avian use of the CCSM Project Site. The purpose of these surveys was to inform additional avoidance and minimization efforts to reduce risks to eagles by identifying areas of highest eagle use within the CCSM Project Site. These surveys were conducted between April 2011 and July 2012. *See Chapter 5.0.*

Based on the site-specific eagle use data collected through July 2012 and the recommendations made by USFWS, PCW further revised the layout in its January 2012 POD (Revision 4). PCW provided Revision 4, which included Turbine No-Build Areas, to USFWS on July 18, 2012. *See Section 6.2.* Revision 4's Turbine No-Build Areas total over 105,000 acres across the Ranch and were designed to reduce impacts to eagles by avoiding placement of wind turbines in and adjacent to many of the documented avian use areas, flight/movement corridors, and nesting and foraging habitats. The Turbine No-Build Areas were identified through a kernel density analysis of the long-watch raptor survey data, observed eagle flight paths, incidental observations, and consideration of recommendations from USFWS regarding important eagle use areas. Eagle use within the designated Turbine No-Build Areas represents approximately 80% of all eagle use observed during the 2011 and 2012 long-watch raptor surveys. As such, avoidance of these areas substantially reduces the risk to eagles.

In addition to designating Turbine No-Build Areas, Revision 4 removed wind turbines from the Red Rim-Grizzly WHMA located west and south of the Miller Hill portion of the Sierra Madre WDA. Survey data demonstrated that survey points adjacent to and within the Red Rim-Grizzly WHMA had relatively high raptor and eagle use compared to other areas that are currently proposed for the CCSM Project. The Red Rim-Grizzly WHMA is managed to benefit big game and other wildlife species that serve as important forage for eagles. Removal of wind turbines reduces potential impacts to eagles and will ensure that the Red Rim-Grizzly WHMA continues to provide important habitat for eagles and a conservation benefit to local and regional eagle populations.

Approximately 66 wind turbines were moved in Revision 4 such that no wind turbines will be constructed in or overhang the boundaries of the Turbine No-Build Areas. Revision 4 of the wind turbine layout, the Turbine No-Build Areas layout, formed the foundation for the further avoidance and minimization discussions between PCW and USFWS. It was also the basis for PCW's 2012 project-wide draft ECP. *See PCW 2012.* The Turbine No-Build Areas are described in section 6.2. *See Figure 6.6.*

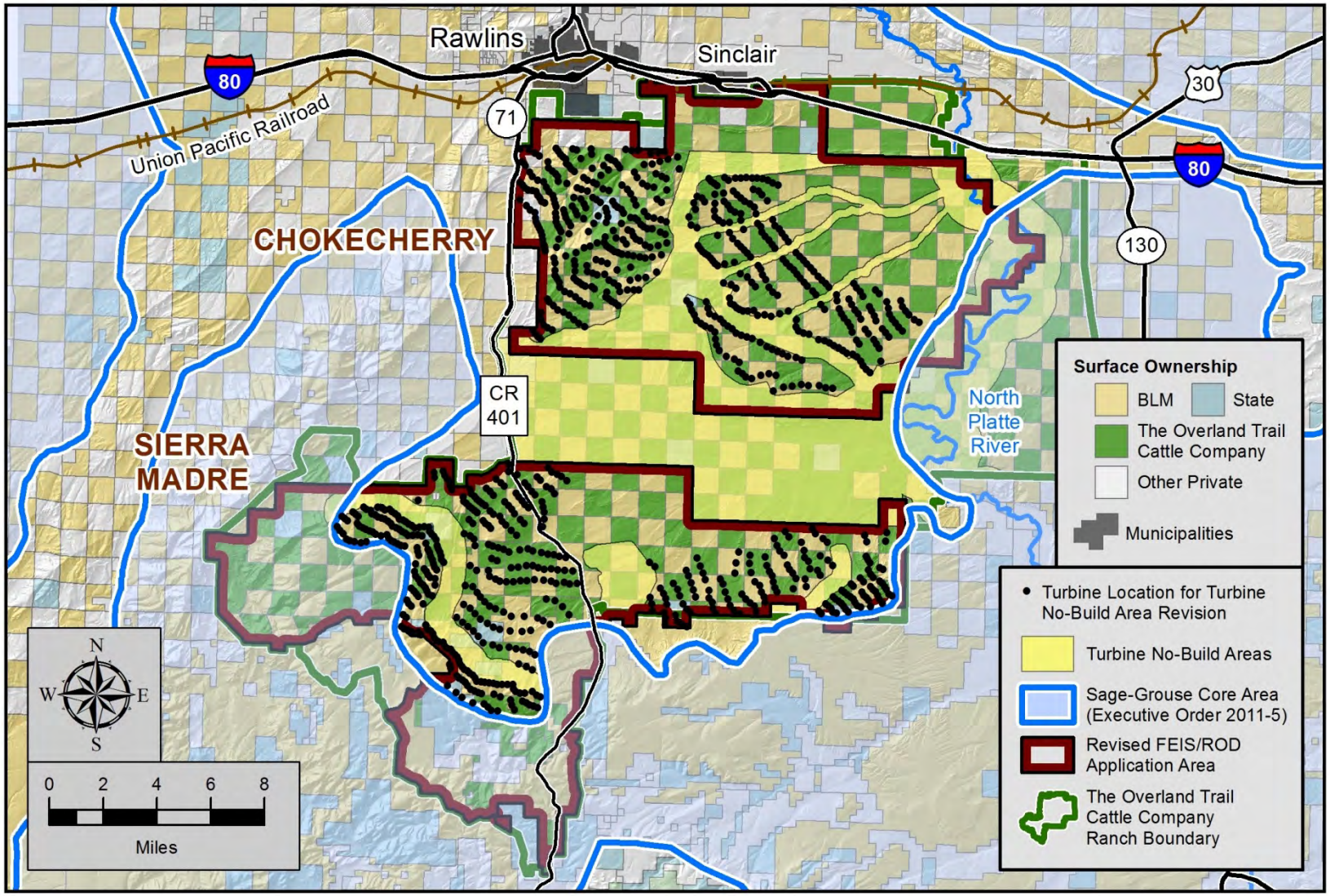

Figure 6.6. Revision 4: Turbine No-Build Areas – July 2012.

6.1.7 Revision 5, Initial Phase I Site-Specific Plan of Development - April 2013

As described in chapter 1.0 of this ECP, BLM's ROD outlined a specific process in which PCW will submit site-specific PODs to BLM for subsequent tiered NEPA analysis. In compliance with this process, PCW divided the CCSM Project into two phases for final design and subsequent analysis. For purposes of developing the site-specific PODs for Phase I, PCW again revised the wind turbine layout for the CCSM Project to create the initial wind turbine layout for Phase I. Revision 5 to the layout incorporated all of the requirements set out in BLM's ROD and also considered all of the most recent environmental data and information for Phase I, including the most recent eagle and raptor count survey data.

Revision 5 to the layout incorporated appropriate eagle and raptor nest buffers, avoidance and minimization measures related to important eagle use areas, the terms and conditions of Carbon County's approved Conditional Use Permit for the CCSM Project, and the USFWS avoidance and minimization recommendations received prior to the revision. *See Figure 6.7.*

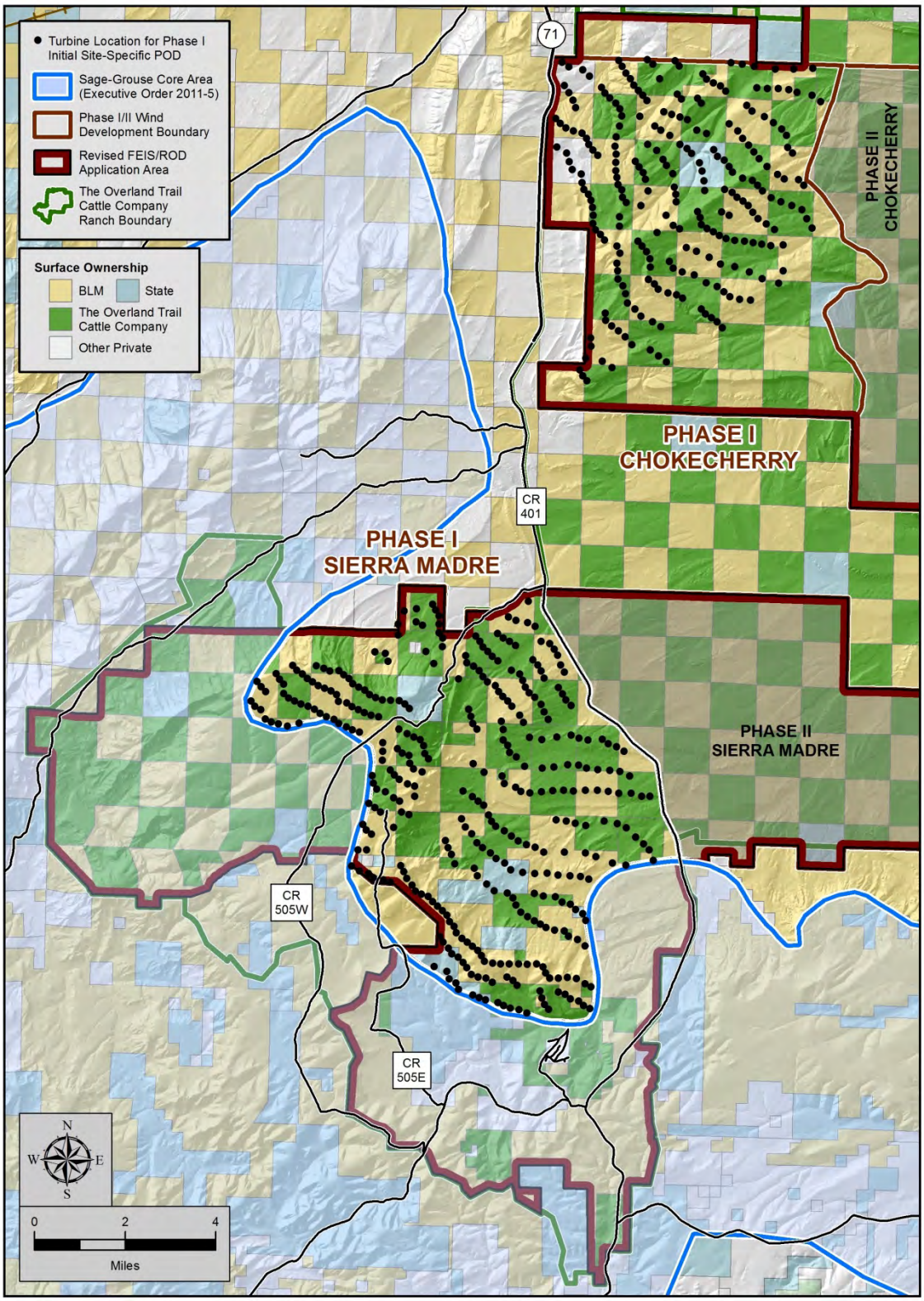

Figure 6.7. Revision 5: Initial Phase I Site-Specific Plan of Development – April 2013.

6.1.8 Revision 6, Final Phase I Site-Specific Plan of Development – January 2014

Revision 5 of the Phase I wind turbine layout was the basis for PCW's micrositing process and pre-construction surveys for Phase I. *See Section 3.1.1.* Beginning in April 2013, PCW conducted engineering field reviews and pre-construction surveys for BLM sensitive species and USFWS threatened and endangered species, Class III cultural resource surveys, and soil, vegetation and aquatic surveys for Phase I, as well as other required pre-construction surveys and inventories. Concurrent with micrositing and pre-construction surveys, PCW continued to work with USFWS and BLM through the remainder of 2013 to refine the Phase I wind turbine layout. In January 2014, PCW revised the Phase I wind turbine layout again. In this revision, PCW incorporated the best available scientific data, including the extensive eagle survey data collected for Phase I, through the application of additional avoidance and minimization measures designed to reduce risk to eagles to the maximum extent practicable. *See Section 6.3*. *See Appendix H.* Over 110 of the 500 Phase I wind turbines were moved to new locations within Phase I to address USFWS and BLM requirements and recommendations. *See Figure 6.8.* The final Phase I wind turbine layout represents the culmination of the extensive data collection and avoidance and minimization effort for Phase I that began in 2008.

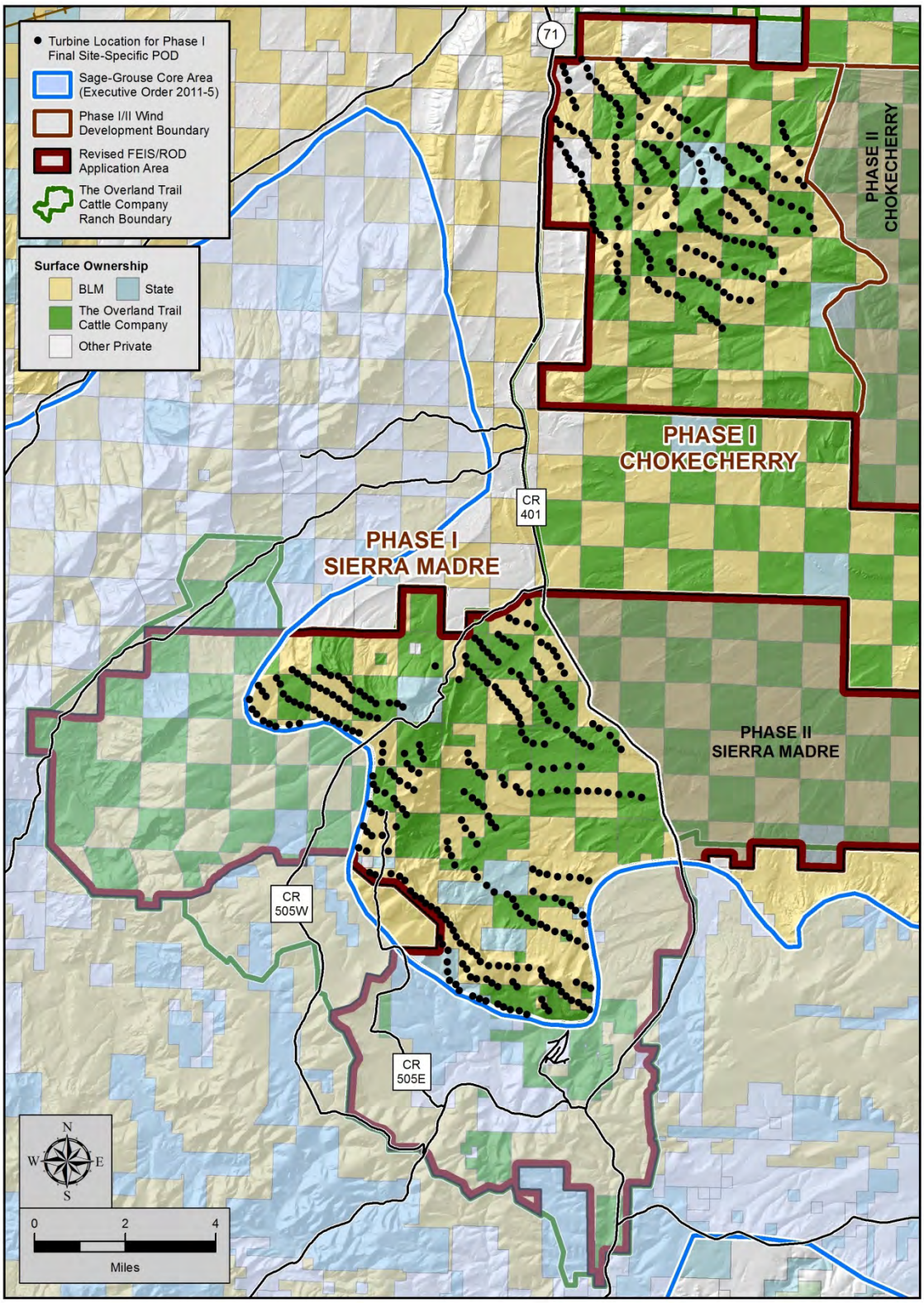

Figure 6.8. Revision 6: Final Phase I Site-Specific Plan of Development – January 2014.

6.2 Turbine No-Build Areas

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 Turbine No-Build Areas for the CCSM Project as a whole to provide context and demonstrate connectivity to other important eagle use areas.

As discussed in section 6.2, PCW designated over 105,000 acres of the Ranch as Turbine No-Build Areas to reduce impacts to eagles by avoiding placement of wind turbines in and adjacent to many eagle use areas, flight/movement corridors, and nesting and foraging habitats. The Turbine No-Build Areas were identified through a kernel density analysis of the long-watch raptor survey data, observed eagle flight paths, incidental observations, and consideration of recommendations from USFWS regarding important eagle use areas. No wind turbines will be constructed in or overhang the boundaries of the Turbine No-Build Areas. **E**agle use within the designated Turbine No-Build Areas represents approximately 80% of all eagle use observed during the 2011 and 2012 long-watch raptor surveys. Turbine No-Build Areas were designated as described below and shown on Figure 6.9.

6.2.1 Bolten Rim and Northern Sage Creek Basin

A Turbine No-Build Area was designated from the Bolten Rim south to the northern extent of the Sierra Madre WDA and from the Bolten Rim north into adjacent portions of the Chokecherry WDA. *See Figure 6.9.* This Turbine No-Build Area was developed based on survey observations made during long-watch raptor surveys and radar observations of eagle use surrounding occupied nests along the Bolten Rim. Observations of golden eagle use surrounding occupied nests on the Bolten Rim demonstrate that the majority of use occurs in the Turbine No-Build Area south of the Bolten Rim where prey resources, perching locations, and suitable soaring conditions are present.

South of the Bolten Rim, the Turbine No-Build Area is 5- to 6-kilometers (3- to 4-miles) wide to avoid placement of wind turbines in the highest quality eagle foraging locations identified within the CCSM Project Site. This area contains the highest density WTPD colonies within the Ranch and also contains three reservoirs (Kindt, Sage Creek, and Teton) that are used by multiple waterbird/waterfowl species and other potential prey species throughout much of the year. These prey resources are described in Appendix F and G. In addition, this area provides a suitable, wide flight/movement corridor from Atlantic Rim and Miller Hill to the North Platte River.

Along the eastern half of the Bolten Rim to the north the Turbine No-Build Area provides a 1600- to 2400-meter-wide (1- to 1.5-mile-wide) setback. Along the western half of the Bolten Rim to the north the Turbine No-Build Area provides a 800- to 3200-meter-wide (0.5- to 2-mile-wide) setback. These setbacks north of the rim avoid and minimize risks to identified nests and nesting substrates for golden eagles and avoid and minimize impacts to eagles that may use the Bolten Rim for soaring, kiting, perching, or foraging activities.

6.2.2 Hogback

A Turbine No-Build Area was designated along the hogback feature north of Chokecherry WDA. *See Figure 6.9*. PCW's Original Proposed Action identified wind turbine locations in this area. During raptor nest and eagle use surveys of the CCSM Project Site, an occupied eagle territory was located along the hogback. This Turbine No-Build Area minimizes risks to eagles by removing the potential for wind turbine development in this area.

6.2.3 Interior Chokecherry Rim

Long-watch raptor surveys identified that eagle use immediately west of the Interior Chokecherry Rim was substantially higher relative to other areas of the CCSM Project Site. The aspect of the Interior Chokecherry Rim is west to southwest and, as that is the predominant wind direction at the CCSM Project Site, the rim provides suitable topography to create uplift and slope-soaring conditions for eagle movement through the Chokecherry WDA. Prey base in the Chokecherry WDA is limited with no identified suitable WTPD colonies that could be used for foraging. *See Appendix F.* Because of the limited prey-base availability adjacent to the Interior Chokecherry Rim, it appears that the feature is used as a flight/movement corridor. The designation of a Turbine No-Build Area in the 1200- to 3200-meter-wide (0.75- to 2-mile-wide) corridor west and southwest of the Interior Chokecherry Rim provides connectivity to the area north of the Chokecherry WDA, the North Platte River corridor, and the Turbine No-Build Areas adjacent to the Bolten Rim; thus, providing for the use of this contiguous area as a flight/movement corridor. *See Figure 6.9*.

6.2.4 North Platte River Corridor

While this area is outside of Phase I, PCW has committed to not constructing wind turbines within 1600 meters (1 mile) of the North Platte River. Nest surveys have identified that the North Platte River corridor contains the largest number of bald and golden eagle nests and the highest quality foraging and nesting habitat within 8 kilometers (5 miles) of the CCSM Project Site. This Turbine No-Build Area reduces risks to eagles using the North Platte River corridor for nesting and non-nesting purposes. *See Figure 6.9*.

6.2.5 Hugus, Iron Springs, and Smith Draw Corridors

While this area is outside of Phase I, eagle flight path data collected during long-watch raptor surveys indicate that eagles periodically use the areas immediately over Smith, Iron Springs, and Hugus draws to move between the Interior Chokecherry Rim and the North Platte River corridor. To reduce potential impacts, PCW has designated a 250-meter-wide area on either side of each draw as a Turbine No-Build Area to provide contiguous flight/movement corridors between the North Platte River and Interior Chokecherry Rim. *See Figure 6.9*.

6.2.6 Miller Hill Rim

The area 1200 to 1600 meters (0.75 to 1 mile) east and north of the Miller Hill Rim was designated as a Turbine No-Build Area to avoid and minimize impacts to eagles that use mountain shrub and aspen-mixed conifer habitats. *See Figure 6.9*. The corridor adjacent to the Miller Hill Rim provides a flight/movement corridor between areas south of the CCSM Project in greater sage-grouse Core Areas with the Atlantic Rim and other areas north of the CCSM Project. Because prevailing winds are from the west and southwest, the Miller Hill rim does not provide suitable uplift and slope-soaring conditions except in the rare event of winds from the east and north.

6.2.7 Rasmussen Reservoir

While the area surrounding Rasmussen Reservoir is outside of Phase I, a 2.4- to 3.2-kilometer-wide (1.5- to 2-mile-wide) Turbine No-Build area was established south of the reservoir to provide a foraging and flight/movement corridor for nesting bald eagles. *See Figure 6.9*. A bald eagle nest was identified approximately 3.2 kilometers (2 miles) south of Rasmussen Reservoir, outside the Sierra Madre WDA. Eagle use surveys have identified bald eagle use at Rasmussen Reservoir during the periods in which the nest was occupied. *See Appendix C.* Prey base surveys also documented the presence of American coot, redhead duck, and multiple other waterbird/waterfowl species that provide suitable foraging opportunities at Rasmussen Reservoir. *See Appendix G.*

6.2.8 Sage Creek Rim

While this area is outside of Phase I, PCW established a Turbine No-Build Area north of the Sage Creek Rim to maintain a flight/movement corridor that was observed during eagle use surveys. *See Figure 6.9*. During 2011 and 2012 long-watch raptor surveys, eagle use and flight path data indicated that a corridor 800- to 1200-meters (0.5- to 0.75-mile) wide north of the Sage Creek Rim was consistently used by eagles moving from the west to the east along the southern edge of the Sierra Madre WDA. The aspect of the Sage Creek Rim faces to the northwest and provides potential soaring opportunities as the predominantly southwesterly and westerly winds interact with this topographic feature.

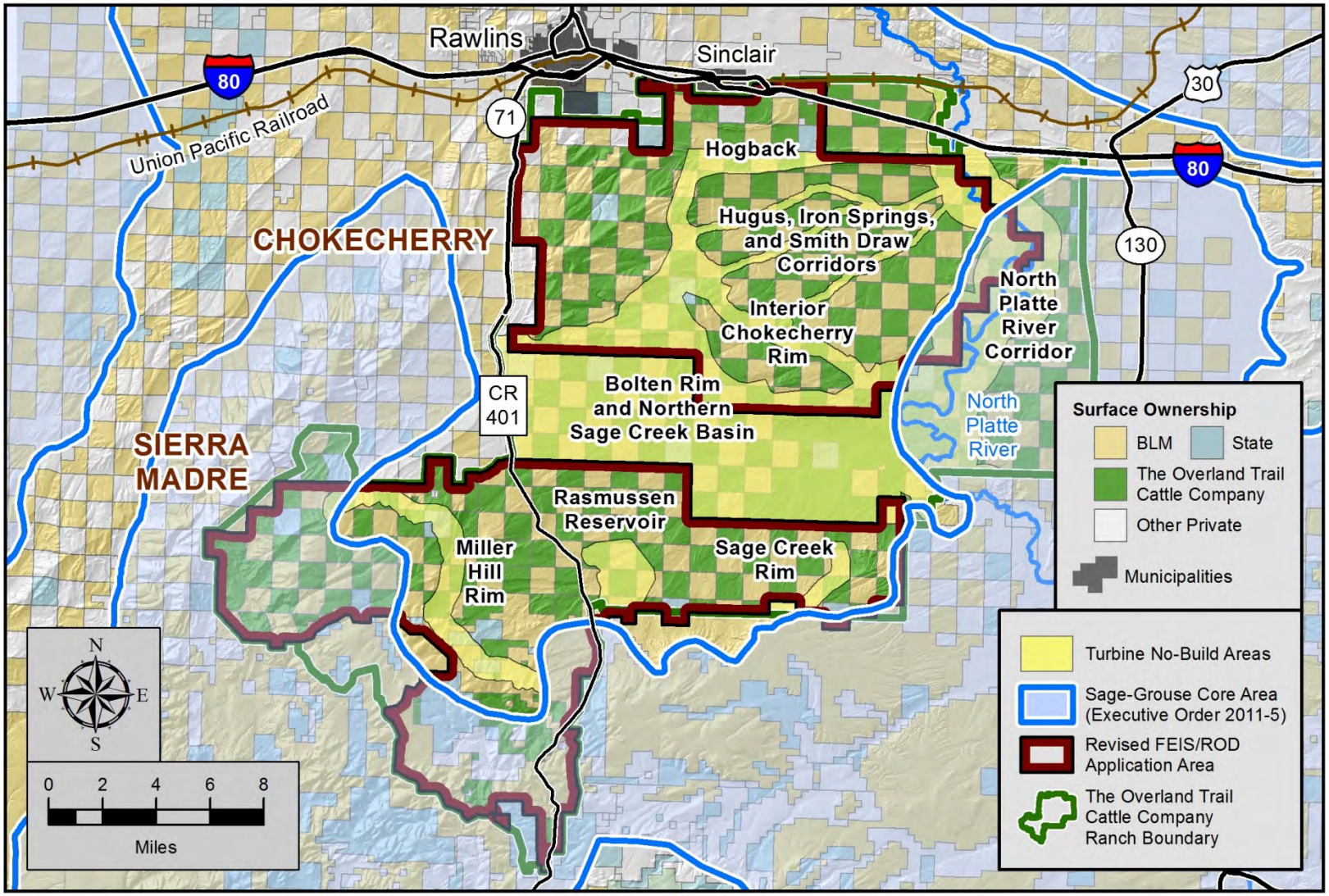

Figure 6.9. Turbine No-Build Areas for the CCSM Project.

6.3 Site-specific Avoidance and Minimization Measures

The avoidance and minimization recommendations developed by USFWS focus on identifying and avoiding areas such as occupied and unoccupied nests, areas of concentrated prey base, and other project-specific eagle activity areas, e.g. flight/movement corridors. *See USFWS 2013a; 2013c.* PCW has worked cooperatively with USFWS to apply appropriate avoidance and minimization measures to Phase I using site-specific data and information. USFWS provided its initial site-specific avoidance and minimization recommendations to PCW in August 2012. These recommendations were reviewed and refined numerous times through the end of 2013 to add specificity and to reflect the additional site-specific data and information collected during this period. *See Appendix H.* The Phase I wind turbine layout is the result of the application of the USFWS site-specific avoidance and minimization recommendations to the Phase I Development Area.

An account of the extensive coordination between PCW and USFWS, ongoing since 2010, to implement the recommendations made by USFWS and the avoidance and minimization measures for Phase I is set forth in Appendix H. A summary of the key recommendations and information regarding how each recommendation is addressed in Phase I is organized by subject matter in the following sections: (1) Eagle Nests; (2) Areas of Concentrated Prey Resources; and (3) Other Project-specific Eagle Activity Areas.

6.3.1 Eagle Nests

"Important eagle use areas," as defined in 50 C.F.R. §22.3, include eagle nests and landscape features surrounding eagle nests that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles. As such, PCW and USFWS have expended significant effort since 2008 to identify eagle nests in the vicinity of Phase I and to develop avoidance and minimization measures to protect these nests and their associated important landscape features.

USFWS has developed standard avoidance and minimization recommendations for occupied and unoccupied eagle nests. *See USFWS 2013a; 2013c.* As described in section 5.1.2 and consistent with the USFWS recommendations, this Phase I ECP uses the terms "occupied nest" and "unoccupied nest" as defined in the ECP Guidance. *See USFWS 2013a.* The USFWS standard avoidance and minimization recommendations for occupied and unoccupied eagle nests are generally based on the ½-mean inter-nest distance (½-MIND). The ½-MIND is a site-specific distance calculated by USFWS that is based on an average distance among all occupied nests in a given year. The ½-MIND is calculated separately for bald and golden eagles and is intended to approximate the average eagle territory size. The ½-MIND calculated by USFWS for the CCSM Project, including Phase I, is 3,686 meters (2.3 miles) for bald eagles and 3,500 meters (2.2 miles) for golden eagles based on eagle nest data from 2012 for bald eagles and 2011 for golden eagles.

As noted in the ECP Guidance, the ½-MIND provides only a "coarse approximation for the territory boundary." *See USFWS 2013a.* The ECP Guidance encourages the use of site-specific data to identify appropriate, practicable avoidance and minimization measures. *See USFWS 2013a.* Further, while USFWS Region 6 adopted the ½-MIND distance as a standard recommended avoidance buffer for occupied eagle nests based on its use in the ECP Guidance, USFWS Region 6 recommends that site-specific information be used to adjust the buffers around eagle nests, "because the one-half mean inter-nest distance is a surrogate for territory size and only approximates eagle use." *See USFWS 2013c. See Appendix H.* The USFWS Region 6 Recommendations further acknowledge the coarse nature of this measure and provide that "[t]he ½-MIND [avoidance buffer] can be adjusted if site-specific data (e.g., telemetry, prey analysis, other data) are adequate to suggest the buffer should be larger/smaller/non-circular." *See USFWS 2013c.*

The following sections summarize the eagle nest and nesting territory avoidance and minimization measures developed for Phase I in response to the USFWS recommendations, including standard measures for occupied and unoccupied nests, as well as nest-specific measures for nests or nesting territories where site-specific data were used to make appropriate adjustments. These measures are based on eagle nest and eagle use data collected through 2014. *See Figure 6.10 & Figure 6.11.*[20] *See Chapter 5.0.* As discussed below, one of the primary avoidance and minimization measures for eagle nests recommended by USFWS and adopted by PCW is the creation of 800-meter buffers around eagle nests where wind turbines will not be placed. While PCW has removed all wind turbines within 800 meters of eagle nests based on the data collected through 2014, it is possible that new eagle nests will be discovered in the future. The Phase I wind turbine layout is final and it is no longer practicable for PCW to move wind turbines to new locations within the Phase I Development Area. Should new eagle nests be discovered within 800 meters of a wind turbine in the future, PCW will work cooperatively with USFWS through the adaptive management process described in section 8.7 to identify appropriate nest-specific avoidance and minimization measures such as curtailment.

[20] The eagle nest identification numbers used in Figure 6.10, Figure 6.11 and the following text correspond to the identification numbers assigned to the nests in the BLM RFO nest database and do not relate to the total number of nests identified within the CCSM Project or Phase I.

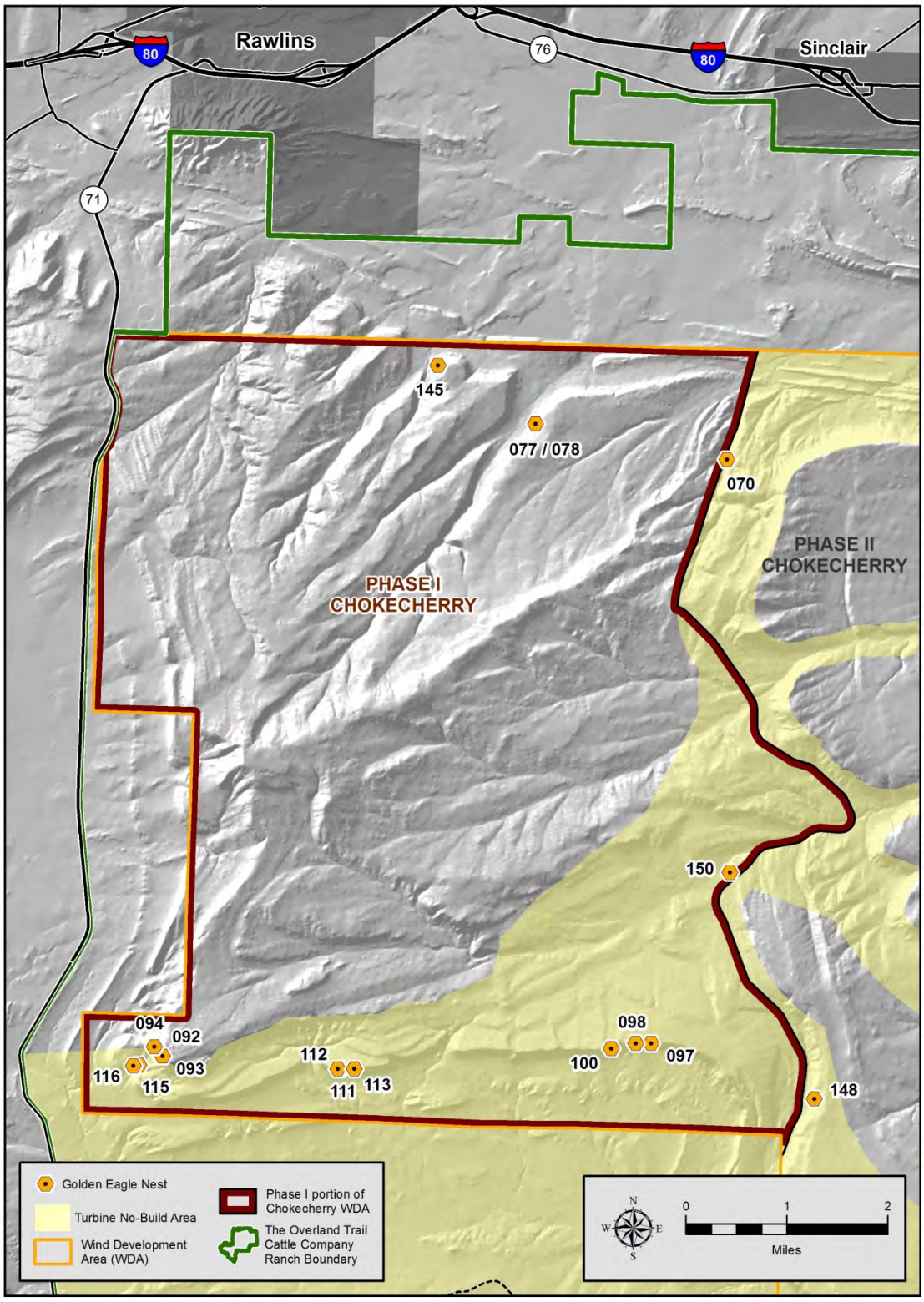

Figure 6.10. Phase I Chokecherry WDA Eagle Nests (1980 to 2014).

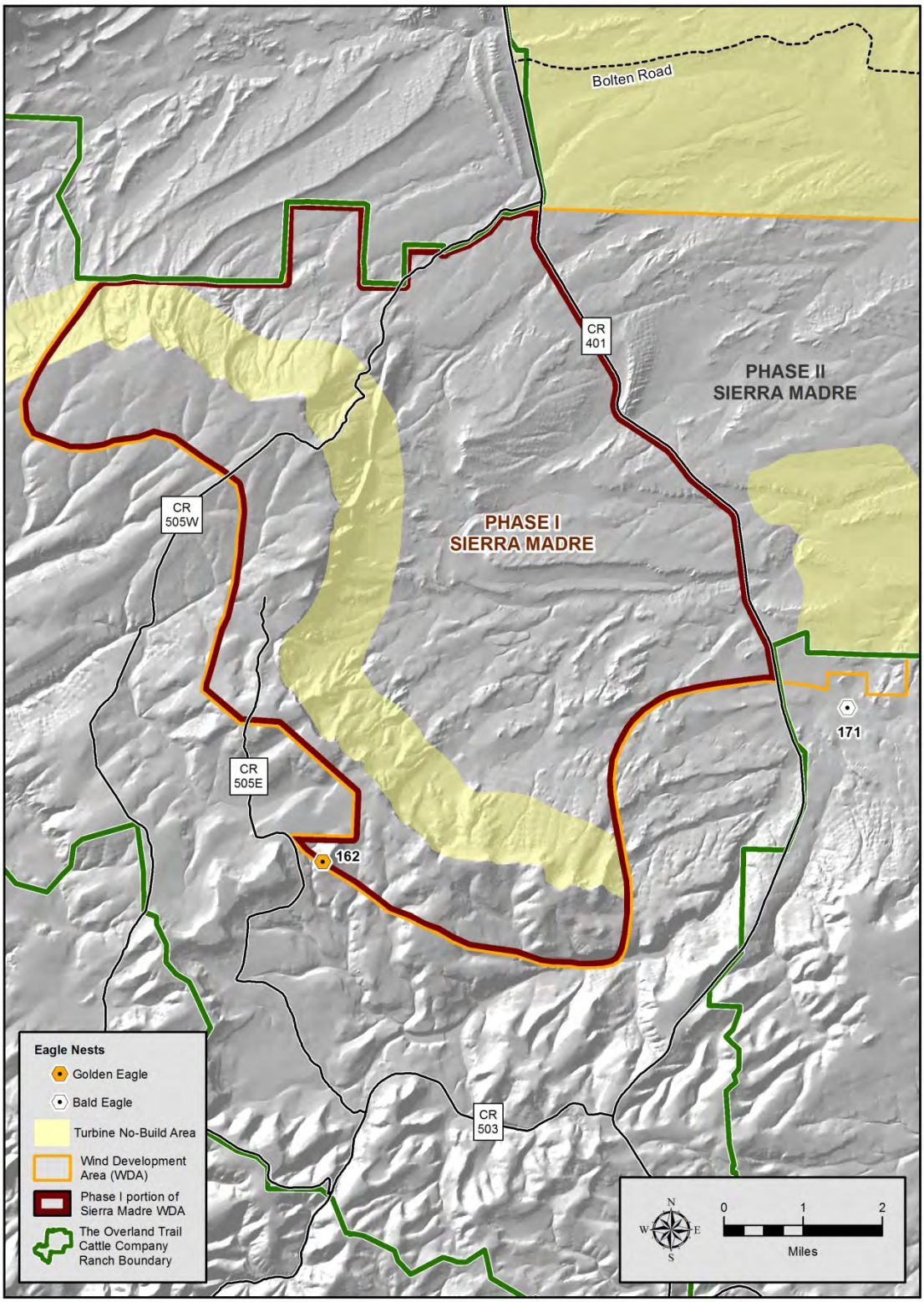

Figure 6.11. Phase I Sierra Madre WDA Eagle Nests (1980 to 2014).

Unoccupied Nests

USFWS Region 6 Recommendations state that for unoccupied nests the recommendations are applicable only to nests "that were not occupied during the last five years or last five years of field surveys." *See USFWS 2013c.* Therefore, for nests that do not meet this criterion or for unoccupied nests that become occupied, the standard avoidance and minimization measures for occupied nests or the nest-specific measures described in the following sections will apply in lieu of the measures described in this section. *See Figure 6.12. See "Occupied Nests" & "Nest-specific Measures."*

USFWS Region 6 recommends that "no turbines will be constructed within 0.5-mile (800-meters) of any unoccupied (historic) eagle nest." *See USFWS 2013c.* PCW developed the Phase I wind turbine layout using the survey and historic data described in section 5.2.2 such that no wind turbines are located within 800 meters of identified eagle nests.[21] *See Figure 6.10 & Figure 6.11.*

In addition, USFWS Region 6 recommends that "all turbines between 0.5-mile and 1.0 mile (1,600-meters) of any unoccupied nest will be curtailed during each year starting 15 January until 1 May, unless adequate nest surveys demonstrate that the nests are unoccupied." *See USFWS 2013c.* This recommendation was reviewed by PCW and USFWS using site-specific data gathered for the CCSM Project, including Phase I. Based on this site-specific data, PCW and USFWS developed an alternate curtailment strategy. For Phase I, PCW will curtail all wind turbines located between 800 and 1,600 meters of any unoccupied eagle nest each year during daylight hours (sunrise to sunset) starting February 1 until May 1 (i.e. sunset April 30), or until adequate nest surveys demonstrate that the nests are unoccupied. *See Section 9.2.* This alternate curtailment strategy is based upon the site-specific conditions and observed eagle use in Phase I and is therefore appropriate.

In developing the alternate curtailment strategy for unoccupied nests in Phase I, PCW and USFWS reviewed the site-specific data, including the 2011-2012 long-watch raptor survey data and the 2012 to 2013, 800-meter raptor count survey data. *See Section 5.2.1.* Site-specific long-watch raptor survey data collected in 2011 and 2012 demonstrates that eagle activity is very low within the CCSM Project Site, including Phase I, during early morning and late evening hours. In 42 hours of survey data collected prior to 8:00 AM in 2011 and 2012, only one eagle observation was recorded. This observation was recorded at 7:55 AM on August 18, 2011, substantially later than sunrise which occurred at approximately 6:12 AM on that day. Similarly, very few eagle observations occurred during the hours surrounding sunset. During April to June 2011 and January to June 2012 (selected to represent periods of use during nesting activities), only 11 minutes of eagle use were recorded in nearly 55 hours of survey time after 5:00 PM. These minutes represent only 0.78% of all observed eagle activity within the CCSM Project Site during spring 2011 and spring 2012, and all of this activity occurred prior to 5:20 PM and

[21] As noted earlier, while PCW has removed all wind turbines within 800 meters of eagle nests based on the data collected through 2014, it is possible that new eagle nests will be located in the future. Should new eagle nests be located within 800 meters of a wind turbine, PCW will work cooperatively with USFWS to identify appropriate nest-specific avoidance and minimization measures such as curtailment.

before sunset. In addition, PCW and USFWS reviewed the 2012-2013 800-meter raptor count data to determine the appropriate annual curtailment period. The raptor count data shows that eagle use within Phase I is very low during January and increases in mid-February. Based on the site-specific, scientific data, curtailment of wind turbines located between 800 and 1,600 meters of any unoccupied eagle nest each year during daylight hours (sunrise to sunset) starting February 1 until May 1 (i.e. sunset April 30), or until adequate nest surveys demonstrate that the nests are unoccupied, is an appropriate, practicable avoidance and minimization measure that protects eagles.

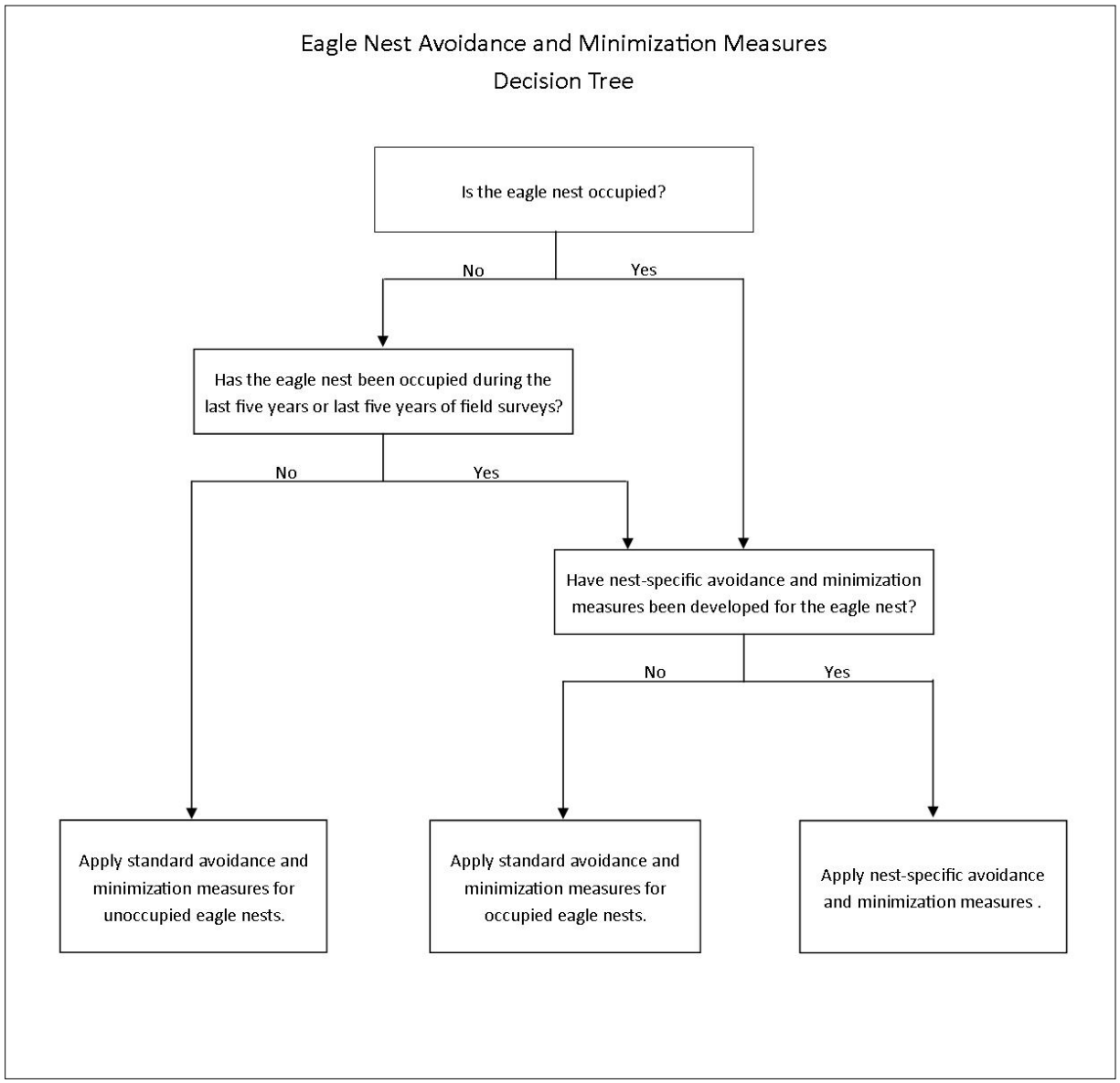

Figure 6.12. Application of Eagle Nest Avoidance and Minimization Measures.

Occupied Nests

In accordance with the USFWS Region 6 Recommendations, the avoidance and minimization measures described in this section are applicable to nests "that were occupied at least once during the last five years or last five years of field surveys." *See USFWS 2013c. See Figure 6.12.* However, this section does not apply to those nests for which nest-specific measures have been developed using site-specific information. *See Figure 6.12. See "Nest-specific Measures."* In addition, as additional data are collected for occupied nests or new nests are discovered, PCW may coordinate with USFWS to develop additional nest-specific avoidance and minimization measures that will replace these measures as appropriate. In the event a nest has not been occupied during the last five years or last five years of field surveys, the standard avoidance and minimization measures for unoccupied nests will apply. *See Figure 6.12. See "Unoccupied Nests."*

PCW developed the Phase I wind turbine layout using the survey and historic data described in section 5.2.2, such that no wind turbines are located within 800 meters of identified eagle nests.[22] *See Figure 6.10 & Figure 6.11*. Further, for those nests for which nest-specific measures have not been developed, PCW will establish a buffer within the ½-MIND of an occupied nest by curtailing wind turbines during daylight hours (sunrise to sunset) starting February 1 until May 1 (i.e. sunset April 30), or until adequate nest surveys demonstrate that the nests are unoccupied. *See Section 9.2. See Appendix H.*

Nest-specific Measures

In accordance with the USFWS recommendations, nest-specific avoidance and minimization measures were developed for eagle nests where adequate site-specific data suggest that the standard avoidance and minimization measures should be modified. *See USFWS 2013c. See Appendix H.* The avoidance and minimization measures described below will be applied to the individual named nests and their associated territories in lieu of the standard measures for occupied nests, i.e. the individual avoidance and minimization measures will be applied if the named nest was occupied at least once during the last five years or last five years of field surveys. In the event the individual nest has not been occupied during the last five years or last five years of field surveys, the standard avoidance and minimization measures for unoccupied nests will apply. *See Figure 6.12.*

[22] As noted earlier, while PCW has removed all wind turbines within 800 meters of eagle nests based on the data collected through 2014, it is possible that new eagle nests will be discovered in the future. Should new eagle nests be discovered within 800 meters of a wind turbine, PCW will work cooperatively with USFWS to identify appropriate nest-specific avoidance and minimization measures such as curtailment.

Nests #094, #098, and #112 and other nests in their associated territories

PCW is applying nest-specific avoidance and minimization measures to golden eagle nests #094, #098, #112, and other nests in their associated territories based on site-specific data.[23] *See Figure 6.13.* Golden eagle nests #094, #098, and #112 and the other nests in their associated territories are all located along the western Bolten Rim in the southern portion of the Chokecherry WDA within a Turbine No-Build Area that establishes a 800- to 3200-meter-wide (0.5- to 2.0-mile-wide) area north of the Bolten Rim in which wind turbines will not be constructed. The application of nest-specific avoidance and minimization measures to nests #094, #098, #112 and other nests in their associated territories is consistent with the ECP Guidance, which provides for use of site-specific data to identify appropriate, practicable avoidance and minimization measures.

For nests #094, #098, #112, and other nests in their associated territories, PCW has located wind turbines such that no wind turbines will be built within 800 meters (0.5 mile) of the nests. Further, in place of the USFWS recommended curtailment, PCW has adjusted the Phase I wind turbine layout such that no wind turbines are located within 1,600 meters (1 mile) of nests #094, #098, #112, and other nests in their associated territories. Based on site-specific data indicating that golden eagle use of areas surrounding the nests primarily occurs south of the Bolten Rim, when nest #094, #098, #112, or other nests in their associated territories are occupied, wind turbines within the ½-MIND surrounding the nests will not be curtailed.

In 2014, golden eagle nests #094, #098, and #112 were occupied. The site-specific data collected in 2014 and summarized in the 2014 Nest Summary Report demonstrate that golden eagle use of areas surrounding the nests located on the western Bolten Rim primarily occurs south of the rim more than 3,000 meters (1.9 miles) from the nearest wind turbine location. *See Figure 6.13*. As shown on Figure 6.13, there were two observations of use north of the Bolten Rim and all of these observations were within several hundred meters of the rim edge within the Turbine No-Build Area and 1,500 meters (0.9 mile) or more from the nearest wind turbine location. The observations are consistent with the use observed for other occupied nests on the Bolten Rim (in Phase II) as part of 2011, 2012, and 2013 monitoring. Therefore, this nest-specific alternate curtailment strategy is appropriate based on the site-specific conditions and observed eagle use surrounding nests #094, #098, #112, and other nests in their associated territories.

[23] Nests #092, #093, #115, and #116 are associated with the territory surrounding nest #094. Nests #109, #111, and #113 are associated with the territory surrounding nest #112. Nests #097 and #100 are associated with the territory surrounding nest #098. *See Figure 6.10.*

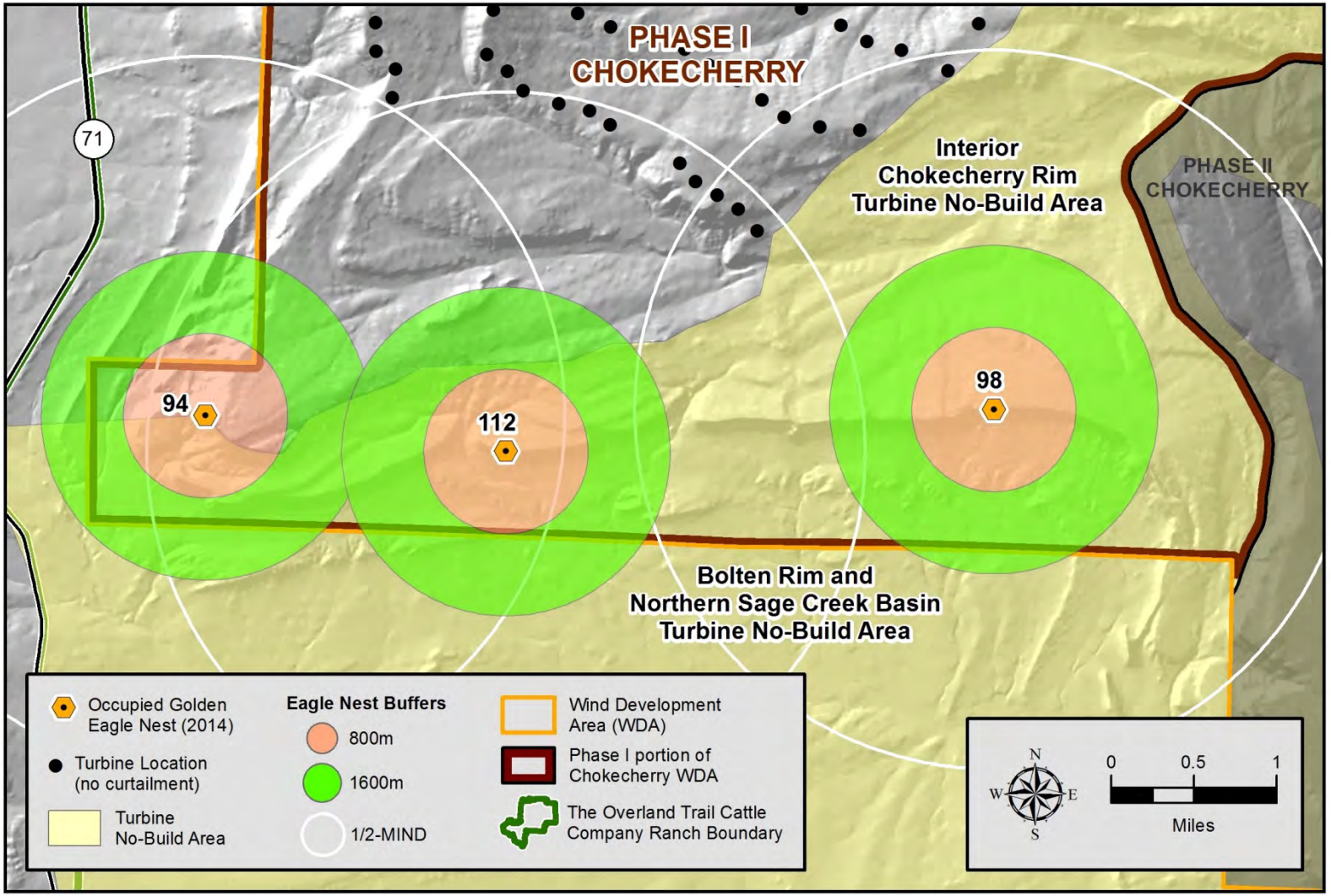

Figure 6.13. Avoidance and Minimization Measures for Nest #094, #098, #112, and their Associated Territories.

Nests #070, #077, #078, and #145

Nest #145 was occupied in 2008 and is located on a northwest facing cliff band along the north central edge of the Phase I portion of the Chokecherry WDA. Three nests are located in close proximity to nest #145, nests #070, #077, and #078. Nests #070, #077, and #078 were not occupied during the eagle nest surveys described in section 5.2.2. Nevertheless, PCW and USFWS developed nest-specific avoidance and minimization measures for nests #070, #077, #078, and #145 based on topographic features, potential prey-base locations, and eagle use observed in the vicinity of all four nests.

For nests #070, #077, #078, and #145, PCW has located wind turbines such that no wind turbines will be built within 800 meters (0.5 mile) of the nests. Further, in place of the USFWS recommended curtailment, PCW has adjusted the Phase I wind turbine layout such that no wind turbines are located within 1,600 meters (1 mile) of nest #070, #077, #078, or #145. This measure avoids and minimizes impact to the nests and provides a flight/movement corridor connecting the nests with the Interior Chokecherry Rim and Hogback Turbine No-Build Areas. This measure also avoids topographic features potentially used by eagles and provides connectivity to potential prey resources located north and northeast of the nests. *See Figure 6.14*. Further, implementing this measure will provide increased conservation benefits to eagles nesting in this area in the future.

In accordance with USFWS recommendations, if nest #070, #077, #078, or #145 becomes occupied, wind turbines within the ½-MIND of the occupied nest will be curtailed during daylight hours (sunrise to sunset) until adequate nest surveys demonstrate that the nest is unoccupied. *See Section 9.2.* PCW will work cooperatively with USFWS using the adaptive management process described in section 8.7 to modify the curtailment strategy if a nest becomes occupied and adequate site-specific data are collected to suggest that modification is appropriate.

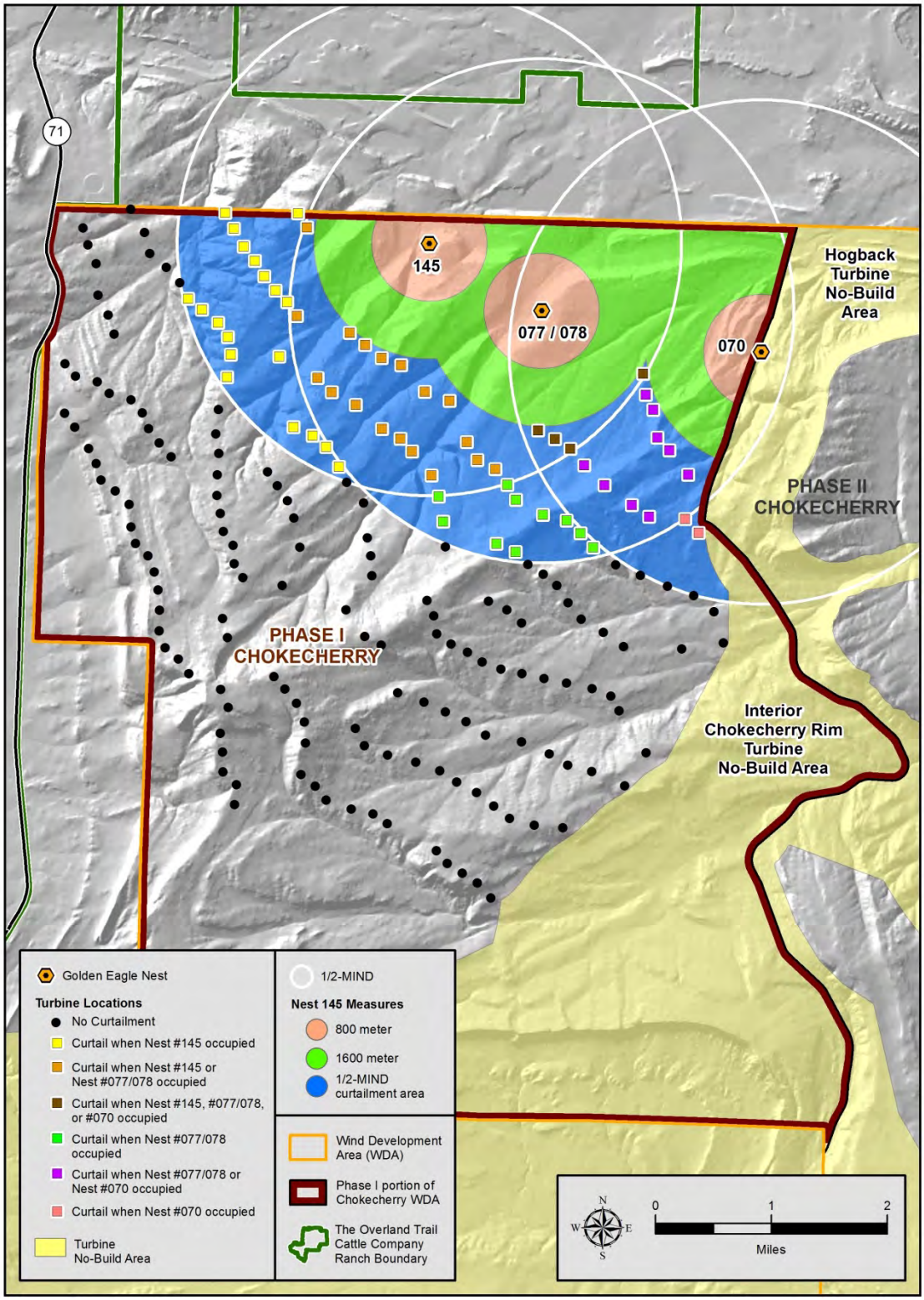

Figure 6.14. Nest #070, #077, #078 and #145 Avoidance and Minimization Measures.

Nest #150

Nest #150 is located outside of the eastern boundary of Phase I within the Turbine No-Build areas designed to avoid and minimize impacts to eagles using the Bolten Rim and Interior Chokecherry Rim. This nest is positioned on a small west-facing rock outcrop, approximately 2,850 meters (1.8 miles) north of the Bolten Rim. Nest #150 was occupied in 2014 and failed by the beginning of June. Areas within the ½-MIND surrounding nest #150 were surveyed in 2008 and 2011 through 2014.

PCW is applying nest-specific avoidance and minimization measures for golden eagle nest #150 based on site-specific data collected in 2011 through 2012 and 2014. *See Figure 6.15.* No wind turbines will be built within 800 meters (0.5 mile) of nest #150. Further, in place of the USFWS recommended curtailment, PCW has adjusted the Phase I wind turbine layout such that no wind turbines are located within 1,600 meters (1 mile) of nest #150 to provide additional protection for the nest. However, when nest #150 is occupied, wind turbines within the ½-MIND surrounding the nest will not be curtailed. This modification to the standard avoidance and minimization measure is based on the distance from the nest to the nearest Phase I wind turbine, which is 1,944 meters (1.2 miles) northwest of the nest. In addition, the nest is fully encompassed within Turbine No-Build areas designed to avoid and minimize impacts to eagles. Eagle flight path data collected in 2011 and 2012 during 671 hours of long-watch raptor surveys conducted at nearby survey locations also indicate that the majority of flight paths surrounding nest #150 occurred within the established Turbine No-Build areas, primarily along the Interior Chokecherry Rim. Finally, the 2012 and 2013 800-meter raptor count data corroborate the long-watch raptor survey data and indicate eagle use occurs almost exclusively within the Turbine No-Build areas surrounding nest #150.

The nest-specific measures developed for nest #150, including the establishment of Turbine No-Build areas, avoid and minimize impacts to the nest and provide a flight/movement corridor connecting nest #150 with the Interior Chokecherry Rim and Hogback Turbine No-Build Areas. These measures provide connectivity between the nest and potential foraging areas south of Chokecherry in the Sage Creek Basin, and north of Chokecherry as well. These measures are consistent with the ECP Guidance which provides for use of site-specific data to identify appropriate, practicable avoidance and minimization measures.

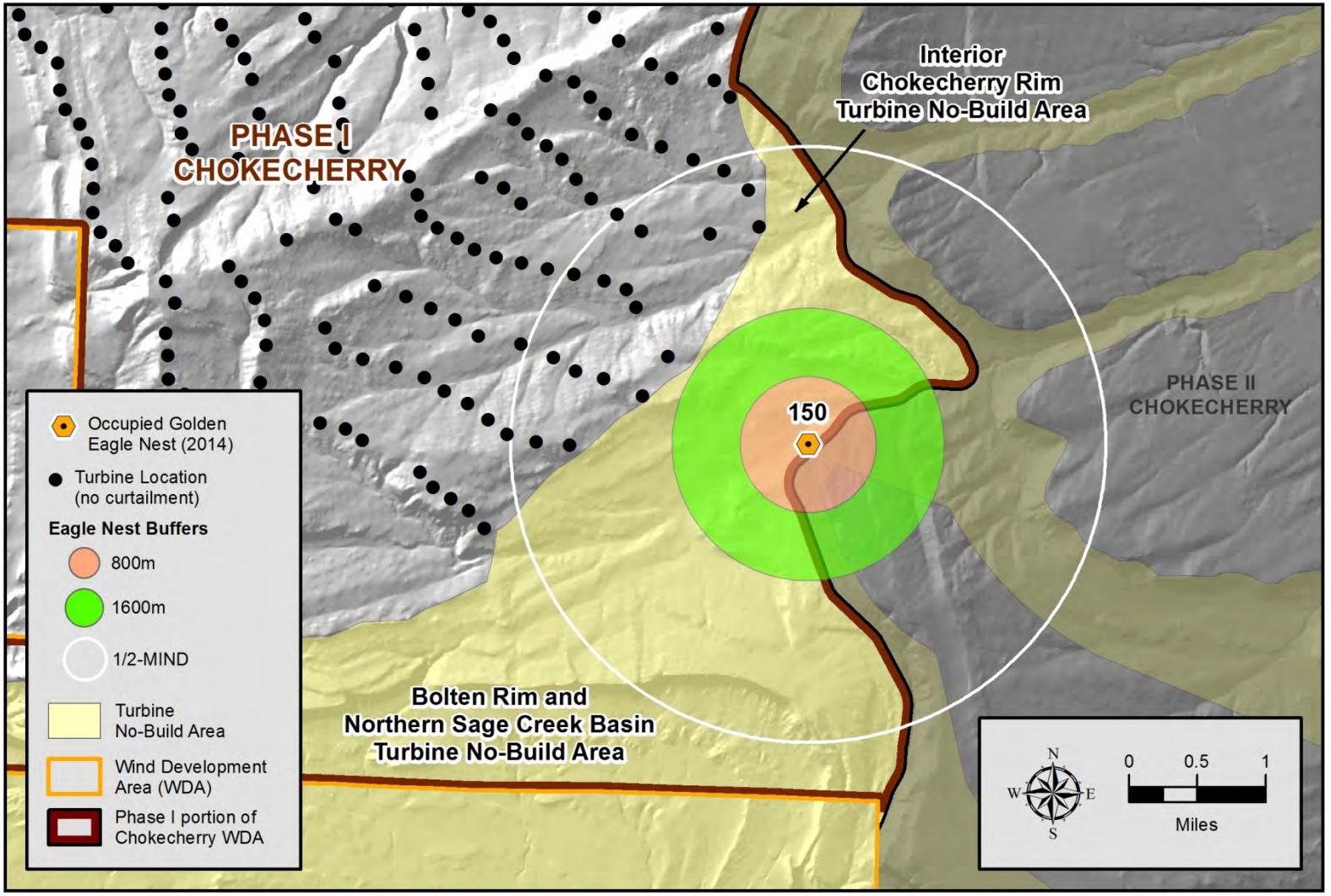

Figure 6.15. Nest #150 Avoidance and Minimization Measures.

Nest #162

Nest #162 is located in the southwest corner of the Phase I portion of the Sierra Madre WDA. *See Figure 6.16*. The nest is located on a ledge along the southwest face of a small, pyramid-shaped mesa. Nest #162 was occupied in 2011. Areas within the ½-MIND surrounding nest #162 were surveyed for eagle use in 2011 through 2014. During the period in which the nest was occupied, approximately 100 hours of survey data were collected to document flight paths and use surrounding the nest. An additional 163 hours of survey data were collected within the ½-MIND surrounding this nest in 2011 following the fledging of the juvenile golden eagle. Collectively, these data were used to identify nest-specific avoidance and minimization measures for nest #162.

Eagle flight path data collected during the period in which the nest was occupied in 2011 indicates that the majority of the observed eagle activity occurs south and west of the nest location in an area with documented greater sage-grouse use and pronghorn fawning activities. Two of the greater sage-grouse that were fitted with GPS transmitters by PCW were preyed upon by the eagles occupying this nest location as evidenced by the transmitters being recovered inside and at the base of the nest. Inspection of the nest after fledging indicated that the majority of prey remains in the nest were greater sage-grouse and pronghorn. Areas to the north and east of the nest within Phase I do not provide suitable habitat for consistent use by pronghorn or greater sage-grouse; this information and the lack of observed eagle flight paths in this area during the nesting period indicate that use from this nest occurs mainly outside of Phase I to the south and west.

Using the site-specific data collected for nest #162, PCW and USFWS developed nest-specific avoidance and minimization measures for the protection of eagles that may use nest #162. No wind turbines will be built within 800 meters (0.5 mile) of nest #162 and wind turbines within 1,600 meters (1 mile) of the nest will be curtailed seasonally during daylight hours (sunrise to sunset) starting February 1 until May 1 (i.e. sunset April 30) or until adequate nest surveys demonstrate that the nest is unoccupied. *See Section 9.2.* Further, to avoid and minimize impacts to a potential flight/movement corridor from the nest location to the Miller Hill Rim, nine additional wind turbines along the Miller Hill Rim east of the nest will be curtailed seasonally during daylight hours starting February 1 until May 1 (i.e. sunset April 30) or until adequate nest surveys demonstrate that the nest is unoccupied. *See Figure 6.16*. *See Section 9.2.*

If nest #162 becomes occupied, wind turbines within the ½-MIND of the nest, with the exception of 11 wind turbines located north and east of the nest in areas that lack eagle use, will be curtailed during daylight hours (sunrise to sunset) until adequate nest surveys demonstrate that the nest is unoccupied. *See Figure 6.16. See Section 9.2.* The 11 wind turbines located within the ½-MIND to the north and east will continue to operate normally with no curtailment based on the site-specific eagle use data.

Due to the majority of the use associated with nest #162 occurring to the south and west, this curtailment strategy avoids and minimizes impact to eagles that may use nest #162 and is consistent with the ECP Guidance, which provides for use of site-specific data to identify appropriate, practicable avoidance and minimization measures. *See Figure 6.16.*

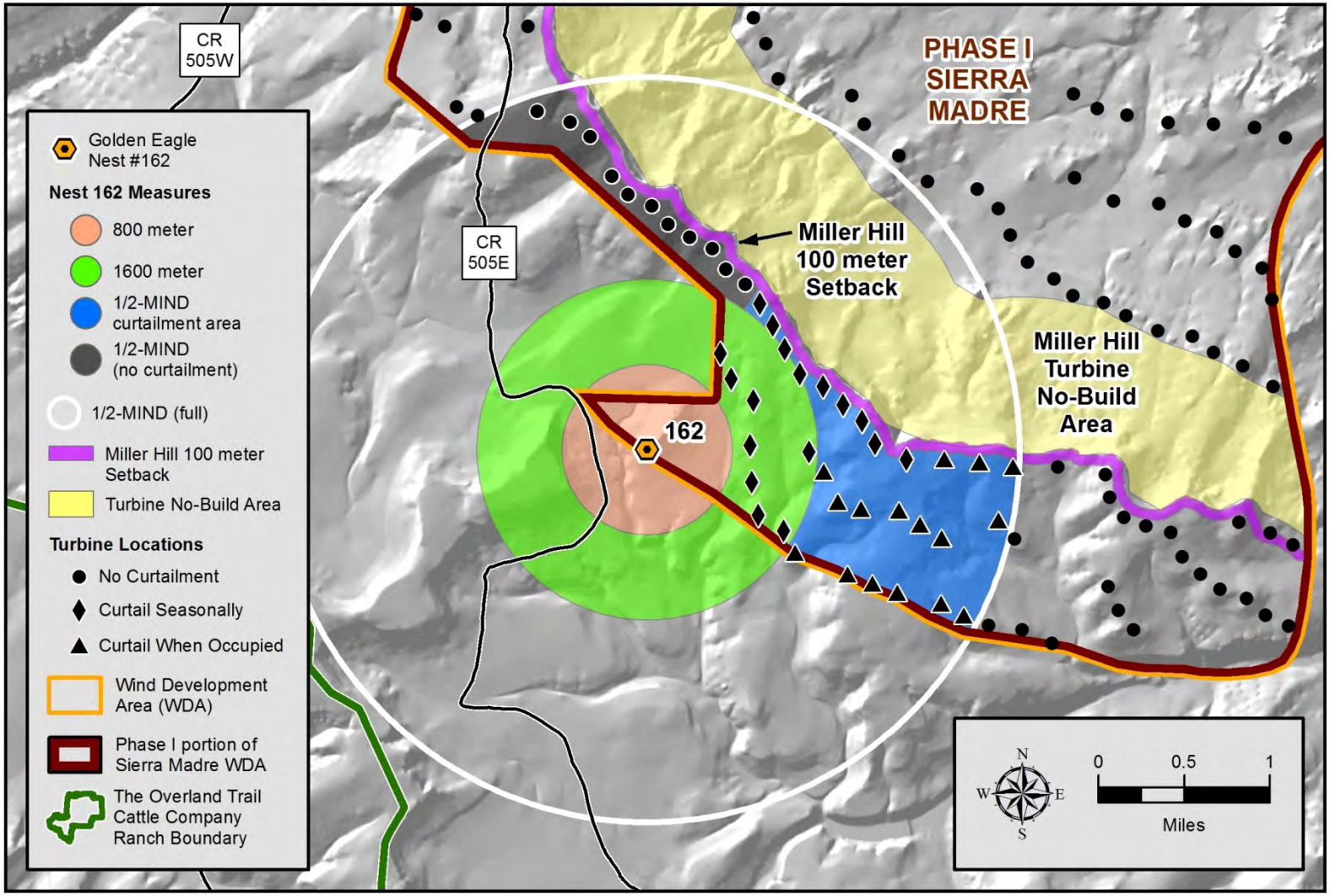

Figure 6.16. Nest #162 Avoidance and Minimization Measures.

6.3.2 Areas of Concentrated Prey Resources

While areas of concentrated prey resources are not "important eagle use areas" as defined in 50 C.F.R. §22.3, USFWS recommends that areas of concentrated prey resources should be avoided if they overlap with or are adjacent to important eagle use areas or areas USFWS has identified as "project-specific eagle activity areas." *See USFWS 2013c.* PCW conducted prey base surveys for Phase I to delineate prey resources of sufficient size and density that are also associated with eagle use so as to identify those that may meet USFWS's criteria for avoidance. *See Section 5.2.4. See Appendix F.* PCW's prey base and eagle use surveys did not identify any areas of concentrated prey resources; however, USFWS recommended avoidance of one prey resource location with demonstrated eagle use within Phase I (Prey Area). *See Figure 6.17. See Appendix H.*

The Prey Area is a complex of multiple small, dispersed colonies of WTPD that was identified west of Rasmussen Reservoir. *See Figure 6.17.* During avian survey, eight eagle flight paths were mapped in this area. As recommended by USFWS, PCW reviewed the data for the Prey Area to identify appropriate avoidance and minimization measures. Upon review of the data, PCW noted that the WTPD colonies in the southeastern portion of the Prey Area were generally smaller with lower densities and more scattered distributions than the colonies in the northern portions of the area. In addition, all documented eagle use occurred in the northern portions of the Prey Area. Therefore, at the recommendation of USFWS, PCW revised the Phase I wind turbine layout (Version 5) by relocating 28 wind turbines from the northern portions of the Prey Area to other locations within the Phase I Development Area. The exclusion of 28 wind turbines from the Prey Area avoids potential impacts to eagles that may use the area for foraging or other activities. In addition, moving the 28 wind turbines from the Prey Area provides a 800- to 2400-meter-wide (0.5- to 1.5-mile-wide) corridor between the prey base area, the Miller Hill Turbine No-Build Area, and greater sage-grouse Core Areas. *See Figure 6.17*.

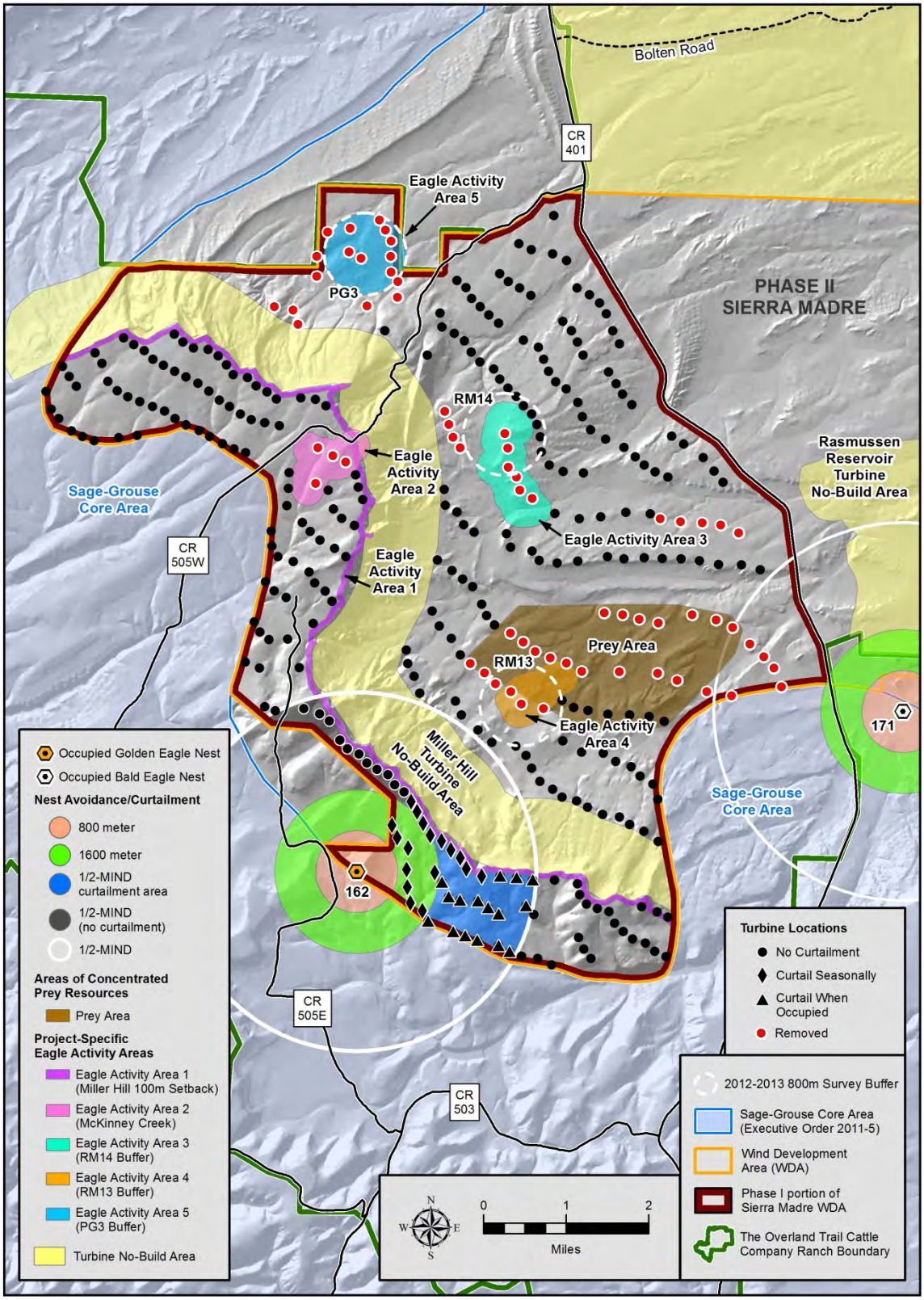

Figure 6.17. Prey Resource and Eagle Activity Area Avoidance and Minimization Measures.

6.3.3 Other Project-specific Eagle Activity Areas

In addition to important eagle use areas, USFWS Region 6 recommends avoidance of areas referred to as "other project-specific eagle activity areas." USFWS states that "although project-specific, certain areas (e.g., topographic relief creating uplifts, migration corridors, perch sites) are typically used by eagles; therefore, it is appropriate to identify these areas and provide buffer recommendations for them." *See USFWS 2013c.* The following section summarizes the avoidance and minimization measures developed cooperatively by PCW and USFWS for the project-specific eagle activity areas identified by USFWS.

Miller Hill

USFWS identified Miller Hill Rim as a project-specific eagle activity area and recommended a 100-meter (328-foot) setback along the rim (Eagle Activity Area 1) to avoid and minimize impacts to eagles using this area. *See Figure 6.17.* In response to the USFWS recommendation, PCW evaluated its data on the use of Miller Hill Rim by eagles to identify appropriate avoidance and minimization measures. Eagles are known to use uplifts from winds along cliffs to gain and maintain altitude for soaring and kiting. However, PCW's observations of eagles in this area generally note powered flight from Upper Miller Hill to Lower Miller Hill with few observations of soaring and kiting along Miller Hill Rim. PCW's extensive wind data for the area confirms that winds in the Miller Hill area are from the west and southwest for as much as 75% of the time, as shown on the wind rose from meteorological tower Sierra Madre 3 located on Upper Miller Hill. *See Figure 6.18*. Since Miller Hill rises from the southwest to the northeast and the rim faces to the east and northeast, downdraft conditions are commonly created along the rim. The strong directionality of the winds in this area and the predominantly downdraft conditions on Miller Hill (as opposed to the uplifts necessary for soaring and kiting) means that the Miller Hill Rim does not provide regular soaring and kiting opportunities for eagles. However, it is possible that the Miller Hill Rim may be used for soaring and kiting during low wind conditions or infrequently when winds are from the east or northeast; therefore, a setback from the rim avoids and minimizes impact to eagles under these conditions.

Following consideration of the site-specific data for Phase I, PCW implemented the USFWS recommended 100-meter (328-foot) setback by siting all wind turbines in Upper Miller Hill a minimum of 100 meters (328 feet) from Miller Hill Rim. *See Figure 6.17*. Further, PCW moved the bases of the wind turbines farther than 100 meters (328 feet) from the Miller Hill Rim to avoid overhang of blades into the 100-meter (328-foot) setback (generally the wind turbine bases are 160 meters (525 feet) or more from the rim). To implement the setback, PCW revised the Phase I wind turbine layout (Version 5) by relocating 65 wind turbines to other locations within the Phase I Development Area.[24]

[24] The 65 wind turbines relocated in response to establishment of the Miller Hill Rim 100-meter (328-foot) setback are not shown on Figure 6.14 for reasons of scale and clarity; however, the movement of these wind turbines to other locations within the Phase I Development Area can be seen when comparing Figure 6.7 and Figure 6.8.

Implementation of the setback avoids and minimizes impact to eagles that use Eagle Activity Area 1. In addition, the setback provides increased connectivity to the Miller Hill Turbine No-Build Area.

McKinney Creek

USFWS identified west and southwest facing slopes in the McKinney Creek headwaters as a project-specific eagle activity area and recommended placing a 300-meter (984-foot) buffer around these slopes roughly adjacent to County Road 505W (Eagle Activity Area 2). *See Figure 6.17.* Similar to the Miller Hill Rim setback (Eagle Activity Area 1), this recommendation is related to eagle soaring and kiting behavior along the Miller Hill Rim. As documented above, eagle soaring and kiting behavior along Miller Hill Rim occurs infrequently. Analysis of eagle flight paths collected between 2011 and 2013 in Eagle Activity Area 2 indicates that eagles generally fly perpendicular to Miller Hill Rim in this area and movement consists primarily of direct powered flight. This demonstrates that eagles are using the predominant westerly and southwesterly wind directions to move through the area. However, to address the USFWS recommendation, PCW revised the Phase I wind turbine layout (Version 5) by moving four wind turbines to other locations within the Phase I Development Area. When combined with the setback established for Eagle Activity Area 1, the removal of wind turbines from Eagle Activity Area 2 creates a 1200- to 1600-meter-wide (0.75- to 1-mile-wide) corridor that provides a connection to undeveloped portions of Miller Hill, the Miller Hill Turbine No-Build Area, and greater sage-grouse Core Areas. *See Figure 6.17.*

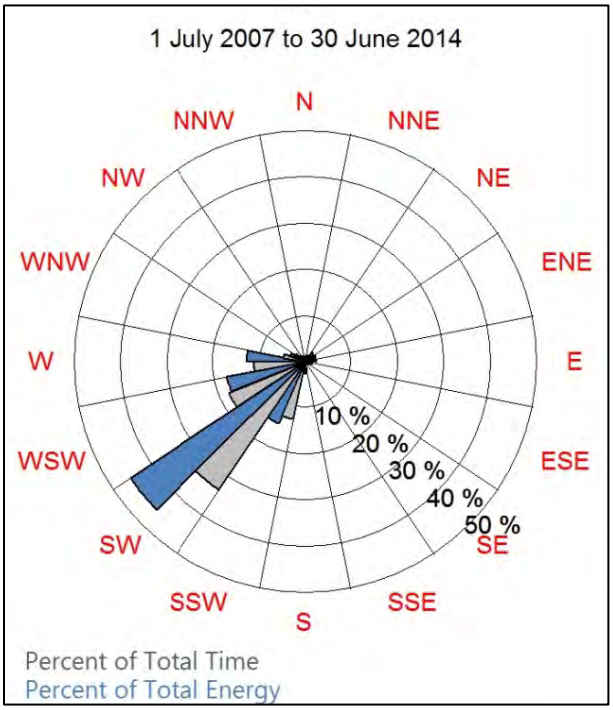

Figure 6.18. July 2007 to June 2014 Wind Rose for Meteorological Tower Sierra Madre 3.

Lower Miller Hill

USFWS identified certain slopes adjacent to Raptor Monitoring site 13 (RM13) and Raptor Monitoring site 14 (RM14) as project-specific eagle activity areas and recommended placing a 300-meter (984-foot) buffer around these areas (Eagle Activity Areas 3 and 4, respectively). *See Figure 6.17*. PCW monitored the RM13 survey location for eagle use in 2011 and monitored the RM14 survey location for eagle use in 2011, 2012, and 2013. Eagle use in both areas indicates that certain slopes surrounding the monitoring sites could be used by eagles for soaring and kiting. To implement the USFWS recommendations, PCW revised the Phase I wind turbine layout (Version 5) by relocating 3 wind turbines near RM13 and 11 wind turbines near RM14 to other locations within the Phase I Development Area. Implementation of the buffer around RM13 avoids and minimizes impact to eagles that may use the area and provides additional connectivity to Prey Area 1. *See Figure 6.17*. Designation of the buffer around the RM14 survey location avoids and minimizes potential impacts to eagles in the area and provides additional connectivity with the Miller Hill Turbine No-Build Area, Eagle Activity Areas 1 and 2, and greater sage-grouse Core Areas. *See Figure 6.17*.

Other Potential Project-specific Eagle Activity Area

PCW identified one additional area with observed eagle use and prey resources and that provides connectivity to other important eagle use areas. Eagle Activity Area 5 is located north of Miller Hill and contains several small WTPD colonies that may contain suitable foraging opportunities for eagles. During eagle use surveys, PCW observed eagle flight paths and foraging behaviors in this area. PCW revised the Phase I wind turbine layout (Version 5) by relocating 17 wind turbines from Eagle Activity Area 5 to other locations within the Phase I Development Area. The exclusion of 17 wind turbines from Eagle Activity Area 5 avoids potential impacts to eagles that may use the area for foraging or other activities. In addition, moving the 17 wind turbines provides increased connectivity to the Miller Hill Turbine No-Build Area as well as other undeveloped habitats north of Miller Hill. *See Figure 6.17*.

6.4 Infrastructure Avoidance and Minimization Measures

PCW has designed Phase I to avoid and minimize risks to eagles, including potential disturbance take. As requested by USFWS, PCW evaluated all eagle nests located within 800 meters (0.5 mile) of Phase I. Based on the eagle nest surveys completed through 2014, there are no eagle nests within 800 meters of a Phase I wind turbine, and there are only 5 nests within 800 meters of Phase I infrastructure, as follows:

- Bald eagle nest #055: 160 meters (0.1 mile) from North Platte River Water Extraction Facility
- Golden eagle nest #145: 160 meters (0.1 mile) from Road Rock Quarry
- Golden eagle nest #147: 640 meters (0.4 mile)from Phase I Haul Road and transmission line
- Golden eagle nest #148: 160 meters (0.1 mile) from Phase I Haul Road and transmission line
- Golden eagle nest #150: 100 meters (0.06 mile)from Phase I Haul Road and transmission line

As described below, the Phase I infrastructure within 800 meters (0.5 mile) of the five eagle nests was located to avoid and minimize risks to eagles to the extent practical such that the remaining take is unavoidable.

6.4.1 North Platte River Water Extraction Facility

The North Platte River Water Extraction Facility will extract surface water from the North Platte River for delivery via pipeline to the CCSM Project, including Phase I. The facility consists of a submersible pump (approximately 50 horsepower) mounted in a 72-inch precast concrete wet well adjacent to the North Platte River. The wet well and pump will be below grade to minimize visibility and noise. The power source for the pump will be a diesel generator located over 3.2 kilometers (2 miles) away at a booster station. PCW will operate the facility remotely as needed to supply water. The facility will be inspected at least weekly during normal operation. During the winter months, the facility will be shut down and the pump will be removed from the wet well.

The North Platte River Water Extraction Facility is located on the North Platte River at the intersection of an existing Ranch road and Carbon County Road 374S. This location is outside of greater sage-grouse Core Areas near WGFD's Fort Steele/Rochelle Public Access Area approximately 3.2 kilometers (2 miles) south of Interstate 80. WGFD's Fort Steele/Rochelle Public Access Area allows for public fishing and hunting and the river in that location is heavily used for fishing and recreational boating activities.

The location of the North Platte River Water Extraction Facility near existing sources of potential disturbance, such as public roads and river access points, minimizes the potential for the facility to disturb bald eagle nest #055. Further, the location of the facility facilitates the use of the existing Ranch road for access to the CCSM Project, minimizing the amount of ground disturbance required for the facility and reducing impacts on other resources such as soil, vegetation, and water quality.

There are numerous bald eagle nests along the North Platte River and the majority of the North Platte River adjacent to the CCSM Project is within greater sage-grouse Core Area. Alternative facility locations outside of greater sage-grouse Core Areas would be in previously undisturbed areas that are also within 800 meters (0.5 mile) of eagle nests, in some cases more than one, and as such would create a higher risk for potential disturbance. The North Platte River Water Extraction Facility is located consistent with the requirements of BLM's ROD and avoids and minimizes risks to eagles to the extent practicable.

6.4.2 Road Rock Quarry

The Road Rock Quarry is a single-site, sandstone/shale surface rock quarry operation designed to provide aggregate for construction of Phase I. Located at the site of an existing quarry, the primary material to be obtained from the Road Rock Quarry is unweathered sandstone and shale. Operations at the quarry generally consist of stripping and stockpiling topsoil and overburden to expose the underlying material for excavation. The target material is then removed by excavation and/or drilling and blasting, transferred to a staging area for separation and crushing, and stockpiled for use throughout Phase I. The quarry will improve the efficiency of Phase I by decreasing the number of train and truck trips from

off-site quarries necessary to supply the project with road base aggregate. Development of the Quarry will also further ensure that local material shortages do not occur during construction of Phase I. In addition, the lower volume of materials delivered by train allows a portion of the material handling facilities and aggregate storage stockpiles at the West Sinclair Rail Facility to be eliminated, reducing the required surface disturbance and the cost of the West Sinclair Rail Facility.

The Road Rock Quarry is located at an existing quarry that has been operated intermittently over the last 100 years. No other feasible locations for an on-site quarry with suitable material in sufficient quantities were identified. The CCSM Project alternatives analyzed in BLM's FEIS provided for delivery of aggregate by rail and truck from off-site sources. At the time the BLM FEIS was completed, a feasible on-site source of aggregate had not been identified. Subsequent to the BLM FEIS, PCW identified the existing quarry site, with rock material that was a suitable source of base aggregate for Phase I, on land acquired by TOTCO. The EA for the Phase I Infrastructure Components analyzed the environmental impacts of the Road Rock Quarry and BLM's Decision Record determined that the Road Rock Quarry "would reduce the net adverse impacts associated with the project." *See BLM 2014a; 2014b.* The location of the Road Rock Quarry at an existing active quarry minimizes new surface disturbance and impacts to biological resources, including bald and golden eagles.

6.4.3 Phase I Haul Road and Transmission Lines

In accordance with BLM's ROD, the Phase I Haul Road and transmission line are co-located between the WDAs and within the WDAs the transmission lines follow the Phase I roads as closely as practical. The Phase I Haul Road is a key component of the CCSM Project's transportation strategy and the internal transmission lines provide critical electrical connections between the collection substations and interconnection substation.

The Phase I Haul Road is designed for efficient transport of materials, components, equipment, and personnel throughout the CCSM Project Site. The Phase I Haul Road provides access to Interstate 80, the West Sinclair Rail Facility, the Road Rock Quarry, and the Phase I WDAs. To meet the Phase I construction schedule, the road is designed to handle oversize loads while maintaining two-way traffic at speeds of up to 40 mph. The road design also minimizes the use of public roads to reduce potential impacts to public safety. While the Phase I Haul Road is designed for speeds of up to 40 mph, in compliance with the ROD, PCW will post speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow and to reduce wildlife collisions and disturbance and airborne dust. *See BLM 2012a at App. D.* During construction, the primary traffic on the Phase I Haul Road will be material and equipment deliveries along with traffic associated with an estimated construction workforce of up to 945 workers. Following construction, traffic will be greatly reduced and will generally be limited to traffic from an operation staff of approximately 114 workers.

The CCSM Project's 230 kV internal transmission lines will transfer the electrical generation from the collection substations to the interconnection substation. The use of 230 kV lines reduces the number of lines and the transmission line follows the Phase I roads as closely as practical. PCW intends to construct the internal transmission lines using steel monopole structures. Minimum horizontal and vertical clearances will be calculated using National Electric Safety Code or similar requirements. The Avian Power Line Interaction Committee (APLIC) has issued guidelines designed to reduce operational and avian risks that result from avian interactions with electric facilities. *See APLIC 2005; 2006; 2012.* The internal transmission system will be designed to meet APLIC recommendations by ensuring there are sufficient separation distances between components.

BLM's FEIS analyzed multiple alternatives for the location of the Phase I Haul Road and internal transmission lines including: (1) routing the CCSM Project traffic on existing public roads; (2) establishing a new route parallel to existing public roads; (3) upgrading an existing Ranch road through Hugus Draw to create an internal haul road and transmission line; and (4) upgrading an existing two-track road through Wild Horse Canyon to create an internal haul road and transmission line.

In the ROD, BLM determined that the preferred alternative is to locate the haul road and transmission line internal to the CCSM Project along the existing road through Hugus Draw, primarily because the location avoids steep terrain and is located further from important recreation areas. However, BLM also notes that upgrading the existing road through Hugus Draw would have less surface disturbance and associated impacts to soils and vegetation than creating a new alignment parallel to the public roads or upgrading the two-track through Wild Horse Canyon. BLM further recognizes that if existing public roads are used, PCW must upgrade these roads and BLM acknowledges that PCW does not own or have access to the private land adjacent to these roads that would be required to upgrade the existing road or create a parallel route.

Consistent with BLM's ROD, the Phase I Haul Road and internal transmission line alignment in the vicinity of golden eagle nests #147, #148, and #150 follows the existing Ranch road through Hugus Draw. While routing the haul road through Wild Horse Canyon was evaluated in the BLM FEIS and is also consistent with some of the benefits identified by BLM, as noted in the ROD, there would be substantial additional surface disturbance required. Additional impacts to eagles and known eagle use areas are also likely on the route through Wild Horse Canyon. The alternative location through Wild Horse Canyon would route the haul road in the vicinity of a number of raptor nests, multiple large prairie dog colonies and the Wild Horse Canyon greater sage-grouse lek, one the largest and most active greater sage-grouse leks in the Chokecherry WDA. Further, the existing road through Wild Horse Canyon is a two-track road that is not frequently used; therefore, existing disturbance in that area is minimal in comparison to existing disturbance on the road through Hugus Draw.

In conclusion, for all of the reasons detailed above, locating the Phase I Haul Road and internal transmission line on the existing Ranch road through Hugus Draw, i.e. in an area with an existing well-used road and the associated disturbance, avoids and minimizes risks to eagles to the extent practical.

6.5 Preliminary Risk Assessment Following Stage 4 (Project Siting)

PCW has worked closely with USFWS to develop measures to avoid and minimize impacts to bald and golden eagles. The comprehensive measures described in this chapter avoid or minimize risks in important eagle use areas as well as other areas commonly used by eagles including topographic features, prey resources, and flight/movement corridors.

Through the implementation of the avoidance and minimization measures described in this chapter, PCW developed a final wind turbine layout for Phase I. *See Section 6.1.8.* The final layout reflects PCW's micrositing efforts and incorporates the avoidance and minimization measures recommended by USFWS as described in this ECP. As a result, the Phase I wind turbine layout complies with the ECP Guidance and Wind Energy Guidelines and represents the culmination of an iterative approach to siting and site characterization consistent with Stages 1-4 of the ECP Guidance and Tiers 1-3 of the Wind Energy Guidelines. The resulting Phase I wind turbine layout - when combined with the various conservation and mitigation measures, monitoring and adaptive management practices, and experimental ACPs described throughout this Phase I ECP - avoids and minimizes impacts to bald and golden eagles such that additional take is unavoidable. Following the application of the avoidance and minimization measures described in this chapter, PCW characterized Phase I as a Category 2 project.

7.0 Predicting Eagle Fatalities (ECP Guidance Stage 3)

In compliance with Stage 3 of the ECP Guidance, this chapter identifies both direct mortality and other risks to eagles for Phase I. Stage 3 of the ECP Guidance recommends that USFWS and the project developer use data from Stage 2 to generate predictions of eagle risk in the form of an estimated average number of fatalities per year extrapolated to the tenure of the permit.[25] Stage 3 of the ECP Guidance also instructs USFWS and the project developer to evaluate Stage 2 data to determine whether disturbance take is likely, and if so, at what level. In accordance with USFWS Region 6 Recommendations, the eagle fatality estimate for Phase I was completed after application of the avoidance and minimization measures described in chapter 6.0.

7.1 Results of Eagle Fatality Modeling

USFWS uses a Bayesian model to predict the number of eagle fatalities for a wind energy facility. *See USFWS 2013d*. The USFWS model estimates annual eagle fatalities as the product of the rate of eagle exposure to wind turbine hazards (exposure rate), the probability that eagle exposure will result in a collision with a wind turbine (collision probability), and an expansion factor that scales the resulting fatality rate to the project-specific affected potential exposure area and time. Within a Bayesian framework, USFWS defines prior distributions for the exposure rate and collision probability. The expansion factor is constant. Using site-specific data, the USFWS model calculates the exposure posterior distribution using the observed data. The number of predicted annual fatalities is estimated as the expanded product of the posterior exposure distribution and collision probability prior. *See USFWS 2013d.*

Both PCW and USFWS used the USFWS model to predict the number of eagle fatalities for Phase I; however, by analyzing the data in different ways and varying specific assumptions, as described below, PCW and USFWS developed differing fatality estimates. Both fatality estimates are described in this Phase I ECP along with their assumptions to provide context for each estimate. Even though PCW has presented its own fatality estimate, PCW has developed the compensatory mitigation in this Phase I ECP based on the USFWS fatality predictions described in section 7.1.1.

7.1.1 USFWS Fatality Predictions

The USFWS Bayesian modeling approach is flexible and allows for modification, which is advantageous because the USFWS model can be updated as additional information becomes available about eagle fatalities at wind energy facilities. The development of the USFWS fatality prediction for Phase I is detailed in Appendix I and is summarized below for reference.

[25] The ECP Guidance calls for a review and update of the fatality estimate every five years based on monitoring results. *See USFWS 2013a.*

Assumptions

The USFWS model allows for a number of assumptions to account for uncertainty and to incorporate variability. For purposes of the Phase I fatality prediction analysis, the USFWS model assumes the following:

1. The USFWS model uses a prior distribution on eagle exposure and a prior distribution on collision risk that is developed from monitoring data at other wind facilities. It is assumed that this prior distribution is representative of expected impacts of Phase I.
2. The USFWS model uses pre-construction eagle use data to estimate eagle exposure. The model assumes that these data are spatially and temporally representative and are homogenous within the Phase I portion of each WDA.
3. The USFWS model assumes that the hazardous area is the 3-dimensional rotor-swept volume around a wind turbine or proposed wind turbine from the ground surface to 200 meters above the ground surface with a width equal to the rotor diameter.
4. The USFWS model assumes the eagle population present in Phase I is open (infinite), and therefore assumes the replacement of an eagle with another eagle occurs immediately after a fatality event.
5. The USFWS model assumes that eagles are only at risk of colliding with wind turbines during daylight hours.
6. The USFWS model assumes that the daylight hours used to calculate exposure rate for Phase I are accurately represented by a mean value for each wind turbine across the entire year.
7. The USFWS model assumes that risk of fatality across Phase I is the same across the year and across all seasons.
8. The USFWS model sums the total eagle minutes observed at each survey location whether they were multiple minutes from a single eagle or single minutes for multiple eagles. These sums are combined into a single datum for each portion of the Phase I WDAs, which removes any dependency structure in the dataset.

Using the assumptions listed above, the USFWS model output is a probability distribution of predicted eagle fatalities on an annual basis. USFWS has chosen the 80% upper credible interval (UCI) as the basis for interpretation. The interpretation of the 80% UCI value is that there is an 80% chance of causing fewer fatalities than predicted and a 20% chance of causing more fatalities than predicted.

Data

As described in Appendix I, two datasets were used in USFWS's fatality model. The 2011-2012 long-watch raptor survey data was used to help inform the prior distribution with site-specific information, and the 1-hour 800-meter raptor count surveys conducted at 40 and 60 locations between August 2012 and August 2013 were used in the USFWS predictive fatality model for Phase I.

The 2011 to 2012, long-watch raptor survey data were collected across Phase I to better understand patterns of eagle use. Long-watch raptor surveys were designed to map flight paths and behaviors for purposes of identifying important eagle use areas. The long-watch raptor survey observation points were located on promenades and ridgelines that often had relatively higher eagle use than the surrounding landscape. Data collected included eagle minutes that were attributed to flight paths extending up to 4,000 meters surrounding each long-watch raptor survey point. *See Chapter 5.0.* The long-watch raptor survey data were used to update the USFWS model prior distribution for the Phase I fatality estimates. However, because the USFWS model relies upon 800-meter raptor count data, USFWS used only those eagle observations within 800 meters of each long-watch raptor survey point.

The 2012 to 2013, 800-meter raptor count surveys were specifically designed to provide data for use in the USFWS predictive fatality model. Data collection protocols were developed in cooperation with USFWS and are consistent with the ECP Guidance and USFWS model assumptions. *See Chapter 5.0. See Appendix B.* The 2012 to 2013, 800-meter raptor count survey locations were distributed in a spatially-balanced random manner across Phase I and are spatially representative of expected eagle use within Phase I. In addition, survey events were scheduled to ensure that surveys were spread evenly across all daylight hours and all seasons at each of the sampling locations and, as a result, are representative of temporal eagle use.

Model Results

On May 27, 2014, USFWS finalized the Summary Document for Review of Eagle Use Data and Eagle Fatality Prediction Analysis for the Chokecherry and Sierra Madre Wind Energy Project Phase I. *See Appendix I.* As described above and in Appendix I, USFWS used a Bayesian model to evaluate the potential impacts of Phase I on eagles. Phase I will use a mixed fleet of wind turbines with varying rotor sizes. Currently, PCW is evaluating wind turbines with rotor diameters between 103 meters and 120 meters. To capture the potential range of impacts, the USFWS model was run for both 103-meter and 120-meter wind turbine rotor diameters which resulted in the following fatality estimate ranges for Phase I:

- At the 80% UCI, the USFWS model predicts 10-14 golden eagle fatalities and 1.4-2 bald eagle fatalities annually for Phase I. *See Appendix I.*
- At the average (50% UCI), the USFWS model predicts 6.8-9.2 golden eagle fatalities and 0.9-1.3 bald eagle fatalities annually for Phase I. *See Appendix I.*

7.1.2 PCW Fatality Predictions

PCW retained an expert, Dr. Joshua Millspaugh of the University of Missouri, to conduct an independent assessment of eagle fatalities for Phase I. Dr. Millspaugh used the USFWS model to calculate estimated fatalities with certain modifications to the assumptions that he determined were appropriate. *See Appendix J.* Specifically, the adjustments include:

1. The USFWS model was modified to directly consider the abundance of eagles present across Phase I and to make the number of fatalities a function of the number of eagles present across Phase I. The modification assumes that 30 golden eagles and 8 bald eagles are present across Phase I on an annual basis. *See Appendix J.*
2. The USFWS model was modified to address how curtailment of wind turbines surrounding occupied eagle nests is modeled. Eagle use data were modified to exclude eagle minutes and observation hours from 800-meter raptor counts immediately adjacent to golden eagle nest #162 during the curtailment season (February 1 to April 30). *See Section 6.3.1.*
3. Input data used to estimate fatalities were adjusted by calculating an average bias associated with rounding minutes up and then applying an appropriate correction factor.
4. The input data used to estimate fatalities were modified to use only those eagle minutes from 800-meter raptor count locations that fall within 800 meters of a wind turbine location.
5. The USFWS model was run separately for each season to account for seasonally explicit risk.

After applying the modifications described above, Dr. Millspaugh ran the USFWS model for a 120-meter diameter wind turbine rotor (the maximum proposed) which resulted in the following fatality estimates for Phase I:

- At the 80% UCI, with Dr. Millspaugh's modifications, the USFWS model predicts 9 golden eagle fatalities and 2 bald eagle fatalities annually for Phase I. *See Appendix J.*
- At the average (50% UCI), with Dr. Millspaugh's modifications, the USFWS model predicts 7 golden eagle fatalities and 1 bald eagle fatality annually for Phase I. *See Appendix J.*

Additional detail on Dr. Millspaugh's assessment of eagle fatalities for Phase I and the support for the modifications he made to the assumptions used in the USFWS model are included in Appendix J.

7.2 Other Eagle Risk Assessment

PCW has completed an assessment of other risks to eagles, including potential disturbance take, for Phase I in accordance with the ECP Guidance and USFWS Region 6 Recommendations. Phase I was designed to avoid and minimize impacts to eagle nests and other important eagle use areas to the extent practicable such that any remaining take (including disturbance take) of bald eagles and golden eagles is unavoidable. *See Chapter 6.0*. In addition to its application for a programmatic ETP for Phase I, PCW has applied to USFWS for a standard ETP for disturbance take that may occur during Phase I construction. *See Chapter 1.0.* Any disturbance take that may occur during Phase I operation would be covered under the programmatic ETP.

7.2.1 Eagle Nests

This section describes PCW's evaluation of potential disturbance to eagle nests within 800 meters (0.5 mile) of Phase I, as recommended by USFWS. *See USFWS 2014b.* Based on the eagle nest surveys described in section 5.2.2, there are 5 nests within 800 meters (0.5 mile) of Phase I. *See Figure 7.1.* These nests are located proximate to the Phase I infrastructure, specifically the Phase I Haul Road, transmission line, and Road Rock Quarry. As described in detail in section 6.4, the Phase I infrastructure located within 800 meters (0.5 mile) of a nest was carefully sited to avoid and minimize impacts, but due to siting constraints this infrastructure could not be relocated.

Of the five nests located within 800 meters (0.5 mile) of Phase I infrastructure, one golden eagle nest is located approximately 160 meters (0.1 mile) from the Road Rock Quarry, one bald eagle nest is located approximately 160 meters (0.1 mile) from the North Platte Water Extraction Facility and access road, and three golden eagle nests are located 100 meters (0.06 mile), 160 meters (0.1 mile), and 640 meters (0.4 mile) from the Phase I Haul Road and transmission line. These five eagle nests are within Turbine No-Build Areas; thus, any potential for disturbance associated with wind turbine construction and operation has been avoided.

Sources of potential disturbance to the five nests located within 800 meters (0.5 mile) of Phase I consist of noise, human activity, and traffic during construction and operation of Phase I, with the risk of disturbance primarily occurring during construction due to increased activity levels. PCW will implement a monitoring program for these nests as described in chapter 9.0.[26] Should any of these nests become occupied, PCW will consult with USFWS to evaluate the potential for disturbance take. *See Section 9.3.5.* Each eagle nest within 800 meters (0.5 mile) of Phase I is described in additional detail below.

[26] For the first year of construction, if construction is not underway by February 1 PCW will postpone the monitoring program until one week prior to the commencement of construction provided that construction activities will occur during the nesting season.

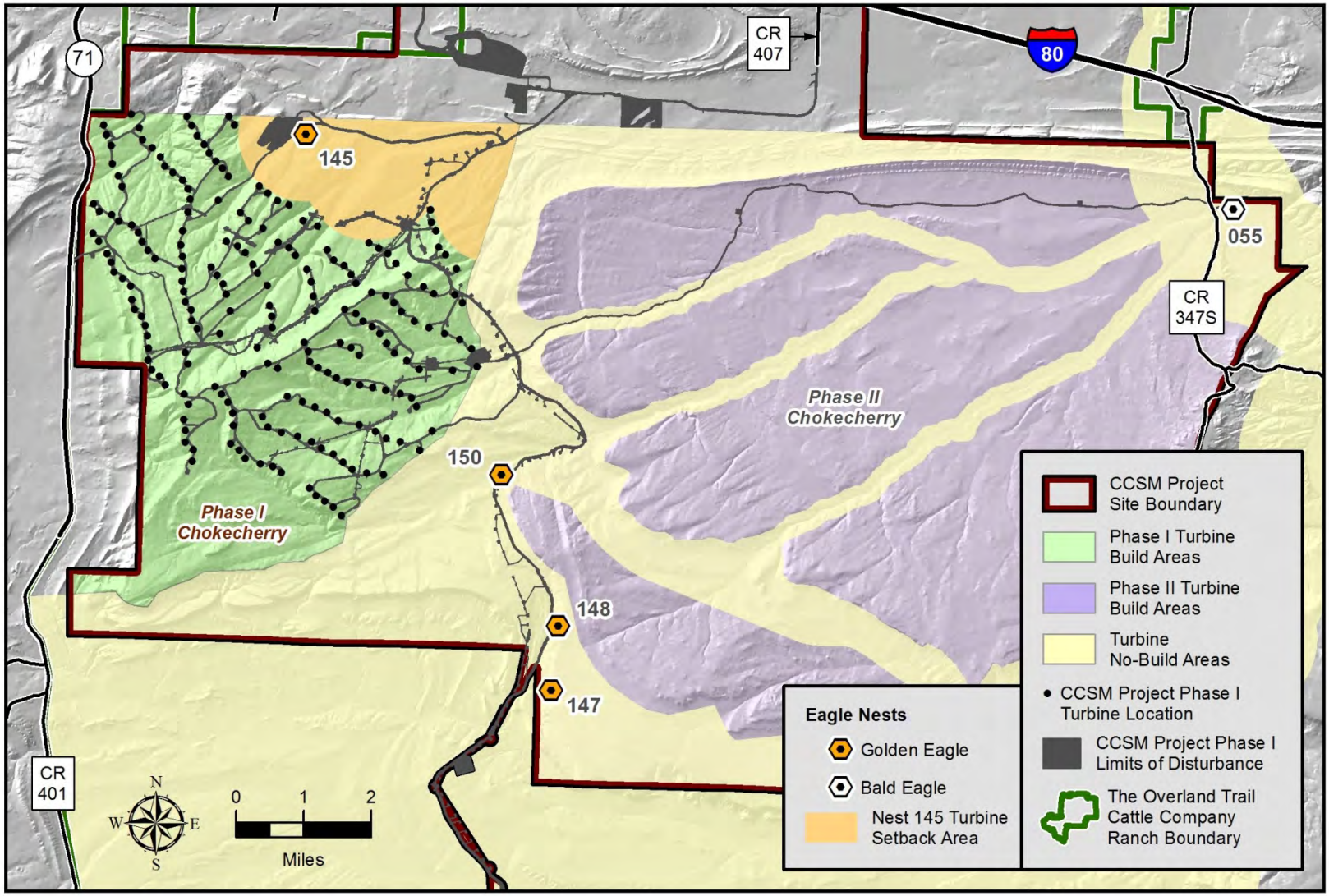

Figure 7.1. Eagle Nests within 800 meters (0.5 mile) of Phase I.

Bald Eagle Nest #055

Bald eagle nest #055 is located within WGFD's Fort Steele/Rochelle Public Access Area where public fishing and hunting activities occur along the banks of the North Platte River surrounding the nest. There are a number of existing sources of disturbance within 800 meters (0.5 mile) of bald eagle nest #055. There is a public road approximately 210 meters (690 feet) east of the nest and Carbon County Road 374S is approximately 450 meters (1,490 feet) to the west. There is also a private Ranch road approximately 45 meters (490 feet) west of the nest. In addition, numerous boats using the area for recreation pass this nest on a daily basis during the nesting season. *See BLM 2013a.*

Bald eagle nest #055 is located 160 meters (0.1 mile) from the North Platte River Water Extraction Facility and access road. The water extraction facility is the primary water supply for Phase I. Potential sources of disruption to bald eagle nest #055 from Phase I include noise, human activity, and traffic during construction and operation of the water extraction facility, with the risk of disturbance primarily occurring during construction due to increased activity levels. As described in chapter 6.0, Phase I has been sited and designed to minimize impacts to bald eagle nest #055. *See Section 6.4.* Once constructed, the facility will not be regularly attended and traffic will be minimal. In addition, the design of the water extraction facility includes measures to reduce noise and other impacts including the placement of the pump in a below-grade wet well.

The water extraction facility cannot safely and feasibly be shut down for long periods of time once operational; however, the design of the facility eliminates most of the noise and traffic. Due to the design of the facility and the autonomous operation, the sources of disturbance from the water extraction facility are not expected to be significant. Further, in conjunction with the existing level of activity, the Phase I activities are not expected to significantly affect the potential for disturbance of bald eagle nest #055. PCW has committed to the monitoring described in chapter 9.0 for potential disturbance take at bald eagle nest #055. In the event that potential disturbance take is detected, PCW will consult with USFWS.

Golden Eagle Nest #145

Golden eagle nest #145 is located approximately 400 meters (0.25 mile) east of an existing quarry. The existing quarry has been operated intermittently at varying intensities over the past 100 years. The area surrounding the quarry has been substantially altered as part of past mining operations and there are a number of access and service roads. Phase I includes a quarry operation at the location of the existing quarry. Surface disturbance associated with operation of the Phase I quarry will occur within 160 meters (0.1 mile) of the nest. As described in chapter 6.0, the quarry is an existing quarry that will be operated to avoid and minimize impacts to eagles. *See Section 6.4.* Potential sources of disruption from Phase I include noise, human activity, and traffic during operation of the quarry (concurrent with construction of Phase I). Following completion of Phase I construction, mining operations at the quarry will cease; therefore, any effects are temporary.

Quarry operation is critical to the construction of Phase I and cannot be suspended. In fact, suspending operation of the quarry would likely lengthen the construction schedule and increase the traffic associated with Phase I causing additional adverse impacts. PCW has committed to the monitoring described in chapter 9.0 for potential disturbance take at golden eagle nest #145. In the event that potential disturbance take is detected, PCW will consult with USFWS.

Golden Eagle Nest #147

Golden eagle nest #147 is located in a side canyon 640 meters (0.4 mile) from an existing well-traveled Ranch road. The nest faces south to southeast and has limited, if any, visibility of the road. As described in chapter 6.0, the Phase I Haul Road and transmission line follow the existing Ranch road in this location to minimize impacts to eagles and other resources. *See Section 6.4.* Potential sources of disruption to golden eagle nest #147 from Phase I include noise, human activity, and traffic during construction and operation, with the risk of disturbance primarily occurring during construction due to increased activity levels. Noise from construction of the haul road and transmission line near golden eagle nest #147 will be short-lived. During construction of the remainder of Phase I, increased traffic levels will be present. During operation, traffic will be significantly reduced consisting only of the traffic associated with the permanent workforce.

The haul road provides critical access for personnel to all areas of Phase I. The haul road cannot feasibly be shut down or re-routed. While Phase I will increase the amount of traffic on the road near golden eagle nest #147, disturbance is already present due to the existing road and the nest will have limited visibility of Phase I. PCW has committed to the monitoring described in chapter 9.0 for potential disturbance take at golden eagle nest #147. In the event that potential disturbance take is detected, PCW will consult with USFWS.

Golden Eagle Nests #148 and #150

Golden eagle nests #148 and #150 are located 160 and 100 meters (0.1 and 0.06 mile), respectively, from an existing well-traveled Ranch road. As described in chapter 6.0, the Phase I Haul Road and transmission line follow the existing Ranch road in this location to minimize impacts to eagles and other resources. *See Section 6.4.* Potential sources of disruption to golden eagle nests #148 and #150 from Phase I include noise, human activity, and traffic during construction and operation, with the risk of disturbance primarily occurring during construction due to increased activity levels. Noise from construction of the haul road and transmission line near golden eagle nests #148 and #150 will be short-lived. During construction of the remainder of Phase I, increased traffic levels will be present. During operation, traffic will be significantly reduced consisting only of the traffic associated with the permanent workforce.

The haul road provides critical access for personnel to all areas of Phase I. The haul road cannot feasibly be shut down or re-routed. While Phase I will increase the amount of traffic on the road near golden eagle nests #148 and #150, some disturbance is already present due to the existing road. PCW has committed to the monitoring described in chapter 9.0 for potential disturbance take at golden eagle nests #148 and #150. In the event that potential disturbance take is detected, PCW will consult with USFWS.

7.2.2 Other Important Eagle Use Areas

There are no eagle communal roost locations, migration corridors, or migration stopover sites in Phase I. *See Chapter 5.0.* Impacts to potential areas of concentrated prey resources and other important eagle use areas were avoided or minimized. *See Chapter 6.0*. Therefore, impacts to other important eagle use areas have been avoided or minimized to the extent practicable such that any remaining take (including disturbance take) of bald eagles and golden eagles is unavoidable.

7.3 Assessment of Programmatic Take

USFWS is required to evaluate and consider the effects of programmatic ETPs on eagles at the eagle management unit and local-area population scales, including cumulative effects, as part of its permit application review process. *See 50 C.F.R. §22.26 (f)(1); USFWS 2009*. As part of the assessment of cumulative impacts to both bald and golden eagles at the local area population scale, USFWS Region 6 will review all available internal records on known eagle mortalities within the local-area populations. This review will consider eagle mortality records from all sources of known mortality. Known causes of eagle fatalities in the western United States include vehicle collision, powerline electrocution or collision, wind turbine collision, lead poisoning, and unknown or natural causes. Other factors that may impact eagles, eagle habitat, and prey base within the local-area population are urbanization and land conversion, increased fire frequency, energy development, residential development, transportation related impacts (road construction, vehicle and train collisions, etc.), illegal poisoning or shooting, prey-base control (e.g., prairie dog control measures), and other forms of non-purposeful take. *See USFWS 2009; Kochert and Steenhof 2002*. Climate change is also reported to impact eagles, eagle habitat and prey base. *See USFWS 2009*. USFWS will present its analysis of effects on eagle management unit populations, local-area populations, and cumulative effects, in its EIS to evaluate potential issuance of ETPs for Phase I.

7.4 Risk Assessment Following Stage 3

Following completion of the Stage 3 risk assessment, PCW characterized 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.

The ECP Guidance further states that a project is in Category 2 if it:

1. Has an important eagle use area or migration concentration site within the project area but not in the project footprint; or
2. Has an annual eagle fatality estimate between 0.03 eagles per year and 5% of the estimated local-area population size; or
3. Causes cumulative annual take of the local-area population of less than 5% of the estimated local-area population size.

Through the avoidance and minimization process described in chapter 6.0, PCW has avoided important eagle use areas within Phase I. PCW has also avoided and minimized the risk to eagles to the extent possible and has committed to reasonable compensatory mitigation, as set forth in chapter 8.0, to offset unavoidable take from Phase I such that there is no net loss to the golden eagle population. Based upon the information presented in this ECP, PCW believes that Phase I meets the criteria for a Category 2 project. However, the UFWS will evaluate the risk categorization for Phase I following its assessment of potential programmatic take in the EIS.

8.0 Additional Avoidance and Minimization of Risks, Advanced Conservation Practices, and Compensatory Mitigation (ECP Guidance Stage 4)

This chapter describes conservation measures, Best Management Practices (BMPs), and experimental Advanced Conservation Practices (ACPs) for Phase I. When implemented with the avoidance and minimization measures described in chapter 6.0, the conservation measures, BMPs and experimental ACPs described in this chapter will further reduce risk to eagles and result in decreased fatalities. After application of these measures, PCW will provide the compensatory mitigation described in section 8.5. The compensatory mitigation will offset the predicted unavoidable take such that the no-net-loss standard established by USFWS is achieved. *See USFWS 2013a.* Finally, it is expected that over the life of Phase I, additional BMPs and experimental ACPs will become available. As such, adaptive management is essential and will be employed to ensure that risk to eagles continues to be minimized and take remains unavoidable. The adaptive management approach and framework that will be used for Phase I is described in section 8.7.

8.1 Conservation Measures

PCW has developed conservation measures to avoid and minimize impacts to eagles from Phase I. These measures will reduce impacts to eagles by removing threats from wind turbines and other infrastructure, as well as risks that could be associated with changes in the availability of the prey base within Phase I. The following measures and practices have been integrated into Phase I:

1. Land Management

   PCW's affiliate, TOTCO, currently manages an agricultural operation consisting primarily of cattle grazing and hay production within the Phase I Development Area and in adjacent portions of the Ranch. TOTCO uses active livestock management to minimize impacts of grazing activities on wildlife and wildlife habitat. PCW and TOTCO have entered into an agreement to promote and maintain through collaborative efforts the availability and use of high quality habitat to sustain and enhance terrestrial and aquatic wildlife populations on the Ranch in conjunction with various land uses, including the continuation of ranching and other agricultural operations as well as development of the wind energy resource. *See PCW 2014a. See Appendix K*. The commitments made by PCW and TOTCO in the Conservation Plan and Landowner Agreement include but are not limited to continuing active management of the Ranch with a goal of meeting the Wyoming Standards for Healthy Rangeland, implementing reclamation with the objective of ecosystem reconstruction, and implementing appropriate weed management. These commitments and the other measures described in the Conservation Plan and Landowner Agreement will be implemented in coordination with BLM and WGFD and will reduce impacts to eagles by conserving or enhancing habitat, as well as by protecting important eagle foraging, breeding, and nesting habitat for the life of the CCSM Project, including Phase I.

2. Conservation Easement

PCW will forego installing wind turbines on about 27,500 acres of private land owned by TOTCO, much of which had been proposed for wind energy development and is subject to a wind energy development agreement between PCW and TOTCO. Instead, in conjunction with the commencement of commercial operation of Phase I, PCW will join with TOTCO to place this land into a conservation easement. The conservation easement will prohibit in perpetuity wind development activities on the lands subject to the easement. While the conservation easement will be placed on the 27,500 acres of private land owned by TOTCO on which PCW has wind development rights, the easement will also effectively prevent wind energy development on the interspersed sections of federal land due to the checkerboard land ownership pattern. Therefore, the easement essentially protects approximately 48,000 acres of land. The easement will include important eagle use areas and high-quality eagle foraging habitats adjacent to key nesting locations along the North Platte River and in other areas with documented eagle use. *See Figure 8.1.* By prohibiting wind energy development in these important eagle use areas, risk to eagles and their habitats from wind energy development will be eliminated in perpetuity.

3. Prey Base (Greater Sage-grouse) Conservation

PCW has implemented a Sage-Grouse Conservation Plan that provides for monitoring of greater sage-grouse within the Ranch and adjacent areas. *See BLM 2012a, App. B at App. N.* PCW's Sage-Grouse Conservation Plan includes conservation measures that will improve habitat and minimize and/or reduce potential threats to greater sage-grouse and other wildlife species. The measures included in the Sage-Grouse Conservation Plan are designed to conserve greater sage-grouse populations and habitat; however, they also have direct benefits to eagles by maintaining contiguous habitat patches, conserving and promoting prey base populations, and improving habitat quality throughout the Ranch.

Greater sage-grouse are a known prey item of bald and golden eagles in the vicinity of the CCSM Project. Greater sage-grouse tags have been recovered from golden eagle and bald eagle nests, and recovered carcasses often have evidence of mortality caused by eagles. *J. Kehmeier, personal communication.* The conservation measures that will be implemented for the CCSM Project, including Phase I, include the minimization or removal of some existing threats to greater sage-grouse survival and productivity (e.g., removal and marking of fences, water development projects, and riparian/wetland habitat enhancement). The Greater Sage-Grouse Conservation Plan also includes the identification of additional conservation projects that will serve to achieve conservation goals. *See BLM 2012a, App. B at App. N.*

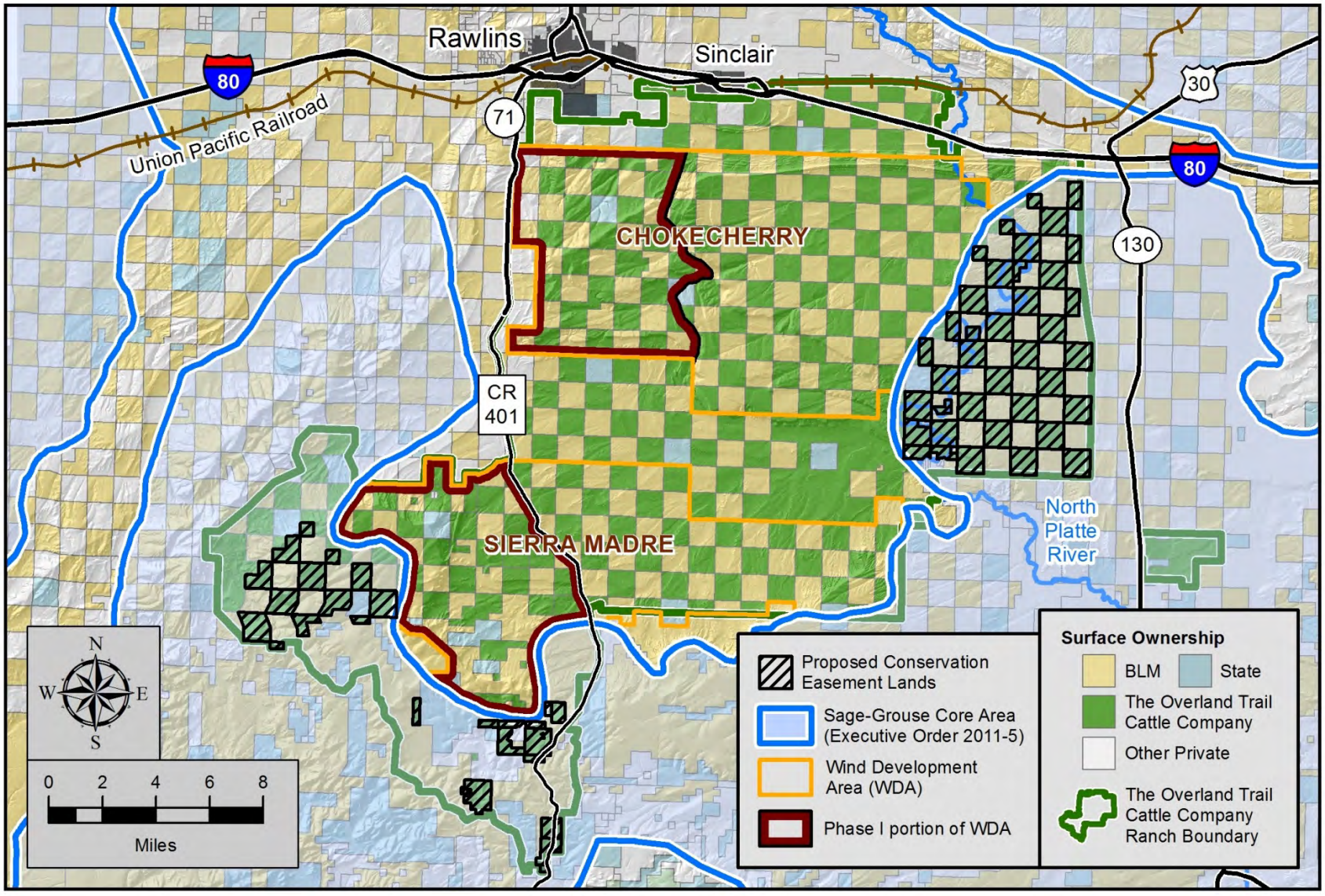

Figure 8.1. Conservation Easements Proposed by PCW in Coordination with TOTCO.

4. Sequencing

BLM analyzed mitigation measure GEN-1 in its FEIS. GEN-1 states:

> "Limit surface disturbance to areas where turbines would be constructed within 12 months with a goal to mitigate impacts from surface disturbance to wildlife, soils, water, and vegetation (e.g., weeds)."

Sequencing construction to minimize the duration of surface disturbance minimizes impacts to habitats used by eagles, other avian species, and their potential prey. In addition, sequencing construction minimizes the area being constructed at any given time; thus, minimizing disruption and fragmentation.

5. Mesic Habitat Improvement

PCW has committed to implement mesic habitat improvement projects on the Ranch. The primary objective of PCW's proposed mesic habitat improvement projects is to modify water sources to create and enhance natural free-flowing water and wet meadow habitats that are used by eagle prey species. Habitat improvement projects may include installation of upland "bubblers" and water diversions to create and enhance natural free-flowing water, enhance wet meadow habitat, and flood bottomland draws. "Bubblers" may be supplied with water from both artesian wells and other wells actively pumped by windmills. Other habitat improvement project may include development of additional water sources through water diversion pipelines from existing reservoirs and stock tank pipeline networks. Habitat improvement projects will be completed in a manner to minimize standing water and discourage use by mosquitoes, which might carry West Nile virus. Improving mesic habitat for eagle prey species will provide additional foraging opportunities for eagles and enhance overall eagle habitat quality.

6. Relic Agricultural Field Enhancements

There are approximately 2,023 acres of relic agricultural fields in the eastern portion of the Ranch outside Phase I that are currently dominated with either monocultures of cheatgrass (*Bromus tectorum*), crested wheatgrass (*Agropyron cristatum* sp.) or other introduced species. These relic agricultural fields currently provide little value for wildlife. The primary objective of the relic agricultural field enhancement projects is to establish conditions suitable for year-round use by wildlife species including eagle prey species. To achieve these objectives, as appropriate, PCW will plant additional sagebrush/shrub cover and/or establish high-value forage and cover sources in the relic agricultural fields. Relic agricultural field enhancements will improve prey base availability in areas outside Phase I, providing new foraging locations for eagles.

7. Wildfire Emergency Stabilization and Burned Area Rehabilitation

Wildfire, particularly in low-elevation Wyoming big sagebrush systems, has resulted in significant habitat loss primarily because of subsequent invasion by cheatgrass (*Bromus tectorum*) and other invasive species. *See BLM 2011a*. PCW will work with BLM to prioritize stabilization and burned area revegetation projects on the Ranch to: (1) maintain unburned intact sagebrush habitat when at risk from adjacent threats; (2) stabilize soils; (3) re-establish hydrologic function; (4) promote biological integrity; (5) promote plant resiliency; (6) limit expansion or dominance of invasive species; and (7) re-establish native species. For example, in 2010, a 170-acre wildfire occurred within the Chokecherry WDA. Following the fire, PCW and TOTCO seeded portions of the burned area to stabilize soils, reduce the risk of non-native plant invasion, and encourage use by wildlife species, including eagle prey species. Rehabilitating burned areas and conserving intact unburned habitats reestablishes habitat function and use by eagle prey species resulting in benefits to eagle populations.

8. Water Tank Escape Ramps

PCW collaborated with the Saratoga High School chapter of the Future Farmers of America to construct and install metal mesh avian escape ladders in water tanks on the Ranch. Escape ramps reduce the risk of drowning to all avian species as well as other wildlife species. *See Lafón 2006*. PCW will continue to install escape ramps in water tanks across the Ranch where there is an identified risk to wildlife resulting in benefits to eagle prey species and eagles.

9. Elimination of Greater Sage-grouse Hunting

TOTCO has indefinitely suspended access for hunting of greater sage-grouse on all of its private land and other areas under its control, thereby reducing direct mortality of greater sage-grouse, a prey species for eagles. Suspension of greater sage-grouse hunting access will continue throughout the life of the CCSM Project, including Phase I, or as otherwise agreed to between PCW, TOTCO and WGFD. Elimination of greater sage-grouse hunting removes any potential carcasses that would be created from injured or unrecovered birds shot by hunters. This removes a potential source of carrion containing lead shot that might otherwise attract eagles. This measure will reduce eagle fatalities resulting from lead shot ingestion. Studies have concluded that elevated blood lead levels are prevalent and quantifiable in both bald and golden eagles, and may have a significant impact on eagle populations. *See Allison 2012; Cochrane et al. 2015*. In addition, reduction of mortality to greater sage-grouse, a potential eagle prey species, will enhance prey availability and benefit eagles.

10. Carcass Removal and Handling

All operation and maintenance staff will be trained to appropriately handle, remove, and dispose of all large animal carcasses that are encountered within the CCSM Project Site, including Phase I. Disposal protocols will be developed in coordination with USFWS and WGFD to ensure compliance with relevant state and federal wildlife statutes. Disposal areas will be located outside of the Phase I Development Area to avoid attracting eagles and other species. Preferred disposal areas might include the conservation easement east of the North Platte River; this would add foraging opportunities for eagles in important eagle use areas.

11. Winter Access

Roads will be maintained in winter in accordance with PCW's Winter Access Plan, attached as an appendix to the site-specific PODs for Phase I. *See PCW 2014b; 2014c; 2014d; 2015b*. PCW's Winter Access Plan specifies that where roads are plowed, breaks will be created in any snow banks alongside roads to allow for passage of ungulates across the landscape. This will minimize the likelihood of concentrated ungulate use along roads that may result in increased vehicle collisions that could attract eagles or other predators/scavengers.

12. Environmental Training Program

As part of the Environmental Compliance and Monitoring Plan for Phase I, PCW will implement an Environmental Training Program to support compliance with environmental permits, including permit requirements and conservation measures outlined in this Phase I ECP. *See PCW 2014b; 2014c; 2014d; 2015b*. The training program will be designed to consistently communicate requirements for Phase I to every individual working on-site so that both managers and workers understand PCW's expectations, the permit requirements, and how to incorporate them into their daily work activities. All personnel working on Phase I will be required to attend environmental training prior to working on-site. PCW will maintain environmental training attendance records through the end of construction. Elements of the training will follow the APLIC recommendations training course format and will incorporate site-specific training modules to minimize risks to avian species, including eagles. *See APLIC 2006; 2012.*

In addition to the specific measures listed above, PCW will adhere to all avoidance, minimization, and mitigation measures identified in the site-specific PODs and the BLM ROW grant for Phase I. These include measures identified in BLM's ROD for the CCSM Project as well as numerous ACMs. *See Appendix K.* Adherence to timing and spatial stipulations will benefit eagles and eagle prey species by either preventing or limiting disturbance in critical areas at critical times of the year. The measures described in chapter 6.0 are the design measures that have been used to place wind energy facilities to avoid and minimize risk to eagles, such that take is unavoidable.

8.2 Construction and Operation

In accordance with chapter 7 of the Wind Energy Guidelines, PCW has incorporated best management practices for construction and operation into Phase I. *See USFWS 2012a.* The use of these best management practices will reduce potential impacts to eagles. The following best management practices recommended by USFWS in the Wind Energy Guidelines benefitting eagles have been incorporated into Phase I: [27]

1. PCW has minimized, to the extent practicable, the area disturbed by pre-construction site monitoring and testing activities and installations.

2. PCW has avoided locating wind energy facilities in areas identified as having a demonstrated and unmitigatable high risk to eagles. *See Chapter 6.0.*

3. PCW has used available data from state and federal agencies, specifically BLM, WGFD and USFWS, to identify sensitive resources and establish the layout of roads, power lines, fences, and other infrastructure.

4. PCW has minimized, to the extent practicable, roads, power lines, fences, and other infrastructure. Where appropriate, PCW will use wildlife compatible design standards for fencing.

5. PCW will use native species when seeding or planting during reclamation in compliance with the Reclamation Plans for Phase I. *See PCW 2015b.*

6. PCW has located collection system power lines underground to the extent practical. All overhead power lines for Phase I are designed to meet APLIC recommendations. *See APLIC 2006; 2012*.

7. All permanent meteorological and communication towers for Phase I will be self-supporting, i.e. not guyed. *See PCW 2015b.*

8. PCW has designed Phase I to include the minimum number of permanent meteorological towers necessary.

9. PCW will use construction and management practices that minimize activities that may attract prey and predators. *See Appendix K.*

[27] The numbering of this list corresponds to the numbering of the BMPs in chapter 7 of the Wind Energy Guidelines. *See USFWS 2012a.*

10. Lighting of Phase I wind turbines will meet FAA requirements and will likely consist of medium intensity synchronized red LED lights. Only a portion of the wind turbines will be lit. *See PCW 2015b.*

11. Exterior lighting at operation and maintenance facilities and substations for Phase I will be shielded downward and is designed to use a combined switch and motion-detection system for exterior lights to minimize the time the lights are on while providing adequate safety for personnel. All internal wind turbine nacelle and tower lighting will be used only when personnel are inspecting or maintaining the wind turbine. *See PCW 2014c; 2015b.*

12. PCW has designed Phase I to comply with the spatial and timing stipulations required by BLM in the ROD. These stipulations address sensitive habitats and species. *See Appendix K.*

13. PCW has designated Turbine No-build Areas to provide sufficient flight/movement corridors for eagles. *See Chapter 6.0.*

14. PCW has created an Erosion Control Plan and a preliminary Stormwater Pollution Prevention Plan for Phase I. *See PCW 2014b; 2014c; 2014d; 2015b*.

15. PCW will use tubular wind turbine towers to reduce ability of birds to perch and to reduce risk of collision. *See PCW 2015b.*

16. PCW has agreed to work with BLM and TOTCO to close unnecessary roadways and reclaim such roads where practicable. *See Appendix K.*

17. PCW has minimized the number, size, and length of Phase I roads to the extent practicable. *See Appendix K.*

18. PCW has designed Phase I to minimize impacts to wetlands and waters of the US. *See Appendix K.*

19. PCW will instruct personnel to drive at appropriate speeds, be alert for wildlife, and use additional caution in low visibility conditions.

20. All employees, contractors, and site visitors will receive a site orientation during which they will be instructed to avoid harassment and disturbance of wildlife. *See PCW 2014b; 2014c; 2014d; 2015b*.

21. PCW will comply with fire prevention standards and will develop a fire safety plan to reduce fire hazard from vehicles and human activities. The health and safety plan will address measures to be taken in the event of a wildfire. *See Appendix K.*

22. PCW will develop a hazardous material management plan as part of the health and safety plan. This plan will address employee training and spill response procedures. *See Appendix K.*

23. PCW has developed a weed management plan for Phase I that will reduce the introduction and spread of invasive species. *See PCW 2014b; 2014c; 2014d; 2015b*.

24. PCW will comply with all applicable rules and regulations for invasive species control.

25. PCW has developed a waste management plan for Phase I that includes appropriate good housekeeping procedures. *See PCW 2014b; 2014c; 2014d; 2015b*.

26. PCW will promptly remove large animal carcasses.

27. PCW has proposed wildlife habitat enhancements located outside of Phase I. *See Section 8.1.*

8.3 Decommissioning

In accordance with chapter 7 of the Wind Energy Guidelines, PCW has incorporated best management practices for decommissioning and reclamation into Phase I. *See USFWS 2012a.* The use of these best management practices will reduce potential impacts to eagles. The following recommended best management practices benefitting eagles have been incorporated into Phase I: [28]

1. PCW will decommission Phase I to minimize new surface disturbance and minimize the removal of native vegetation, to the extent practicable. *See PCW 2014b; 2014c; 2014d; 2015b*.

2. PCW will remove the pedestal portion of the wind turbine foundations. *See PCW 2015b.*

3. PCW has developed a Reclamation Plan for Phase I that addresses removal and storage of topsoil, as well as appropriate revegetation. *See PCW 2015b.*

4. PCW has developed a Reclamation Plan for Phase I that addresses soil stabilization and revegetation. *See PCW 2015b.*

[28] The numbering of this list corresponds to the numbering of the BMPs in chapter 7 of the Wind Energy Guidelines. *See USFWS 2012a.*

5. PCW has developed a Reclamation Plan for Phase I that addresses landscape restoration, including hydrology. *See PCW 2015b.*

6. PCW has developed weed control plans that address the monitoring and control of noxious weeds. *See PCW 2014b; 2014c; 2014d; 2015b*. In addition, the Reclamation Plan for Phase I includes monitoring during revegetation until reclamation standards are achieved. *See PCW 2015b.*

7. At the end of the CCSM Project, PCW will decommission unnecessary overhead power lines, including poles. *See PCW 2015b.*

8. PCW will install and monitor erosion control measures during reclamation in accordance with the Reclamation Plan for Phase I until reclamation standards are achieved. *See PCW 2015b.*

9. At the end of the CCSM Project, PCW will remove any unnecessary fencing. *See Appendix K.*

10. PCW has developed preliminary Spill Prevention Control and Countermeasures Plans for Phase I to address petroleum product releases. *See PCW 2014b; 2014c; 2014d; 2015b*. These plans will be finalized prior to the commencement of Phase I construction. In addition, the Reclamation Plan and Waste Management Plan for Phase I address the proper disposal of unsuitable soil, including contaminated soil. *See PCW 2015b.*

8.4 Advanced Conservation Practices

Advanced Conservation Practices (ACPs) are defined as "scientifically supportable measures that are approved by the [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*. As described in the ECP Guidance, USFWS has not currently approved any ACPs for wind energy projects; therefore, ACPs will be implemented at wind energy facilities on an "experimental" basis. *See USFWS 2013a at p. iv*. To further the goals of USFWS to develop and evaluate ACPs for wind energy projects, PCW and USFWS will review and apply experimental ACPs for Phase I as part of the adaptive management process described in section 8.7. In fact, PCW has already agreed to seasonal curtailment for specific Phase I wind turbines as described in chapter 6.0. As indicated in Appendix E of the ECP Guidance, seasonal and daily shut-downs (curtailment) are examples of measures that may be considered as experimental ACPs by USFWS.

8.5 Compensatory Mitigation

USFWS manages bald eagles roughly by USFWS Region. *See USFWS 2009 at p. 25.* Phase I falls within the USFWS Region 6 Bald Eagle Management Unit which has an estimated population of 5,385 bald eagles. *See USFWS 2009 at Figure 3; 2013a*. USFWS has determined that predicted recurring bald eagle take does not exceed the calculated bald eagle management unit take thresholds; therefore, no compensatory mitigation is required for bald eagles at this time. *See USFWS 2009; 2013a.* If in the future, the recurring take of bald eagles exceeds the bald eagle management unit take thresholds, PCW will provide compensatory mitigation for Phase I as required by USFWS.

USFWS uses Bird Conservation Regions (BCRs) to manage populations of golden eagles. Phase I is located within the Northern Rockies BCR (BCR 10). As described in section 7.3, USFWS will conduct an analysis of impacts to the local area population of golden eagles in accordance with the ECP Guidance. According to the ECP Guidance, the local area population for golden eagles is calculated by buffering Phase I by 16 kilometers (10 miles) to capture potential nesting territories surrounding Phase I and then buffering that area by 230 kilometers (140 miles) to account for the average natal dispersal distance of golden eagles. Using these distances, the local area population analysis area for Phase I overlaps 4 different BCRs (BCRs 10, 16, 17, and 18) in three states (central and south-central Wyoming, north-central and northwest Colorado, and a small portion of northeast Utah). *See Figure 8.2.* USFWS has estimated that collectively, these 4 BCRs support a population of 18,822 golden eagles. *See USFWS 2013a.*

For golden eagles, USFWS determined that golden eagle populations throughout the United States might not be able to sustain any additional unmitigated mortality, and set the take thresholds for this species at zero for BCR-level populations in all regional management units. *See USFWS 2009.* This means that any new authorized take of golden eagles must be at least equally offset by compensatory mitigation, i.e. specific conservation actions to replace or otherwise make up for the loss of each eagle associated with a project. *See USFWS 2009; 2013a.* Therefore, PCW will provide compensatory mitigation as required by USFWS to offset the predicted unavoidable golden eagle take from Phase I such that the no-net-loss standard is achieved. *See USFWS 2013a.* If golden eagle populations increase to levels where take does not exceed the management unit take thresholds, PCW and USFWS will evaluate changes to the compensatory mitigation required to offset take associated with Phase I in accordance with the adaptive management process described in section 8.7.

Consistent with the ECP Guidance, compensatory mitigation will initially be based on the 80% UCI of the predicted mean annual fatality rate over a five-year period and will be adjusted in consultation with USFWS for future years based on the observed fatality rate over the initial five-year post-construction monitoring period. *See USFWS 2013a.* PCW's compensatory mitigation may be implemented anywhere within the four BCR's included in the local area population analysis area to ensure that the mitigation benefits the affected eagle populations; however, it is PCW's preference to implement compensatory mitigation as close to Phase I as practicable.

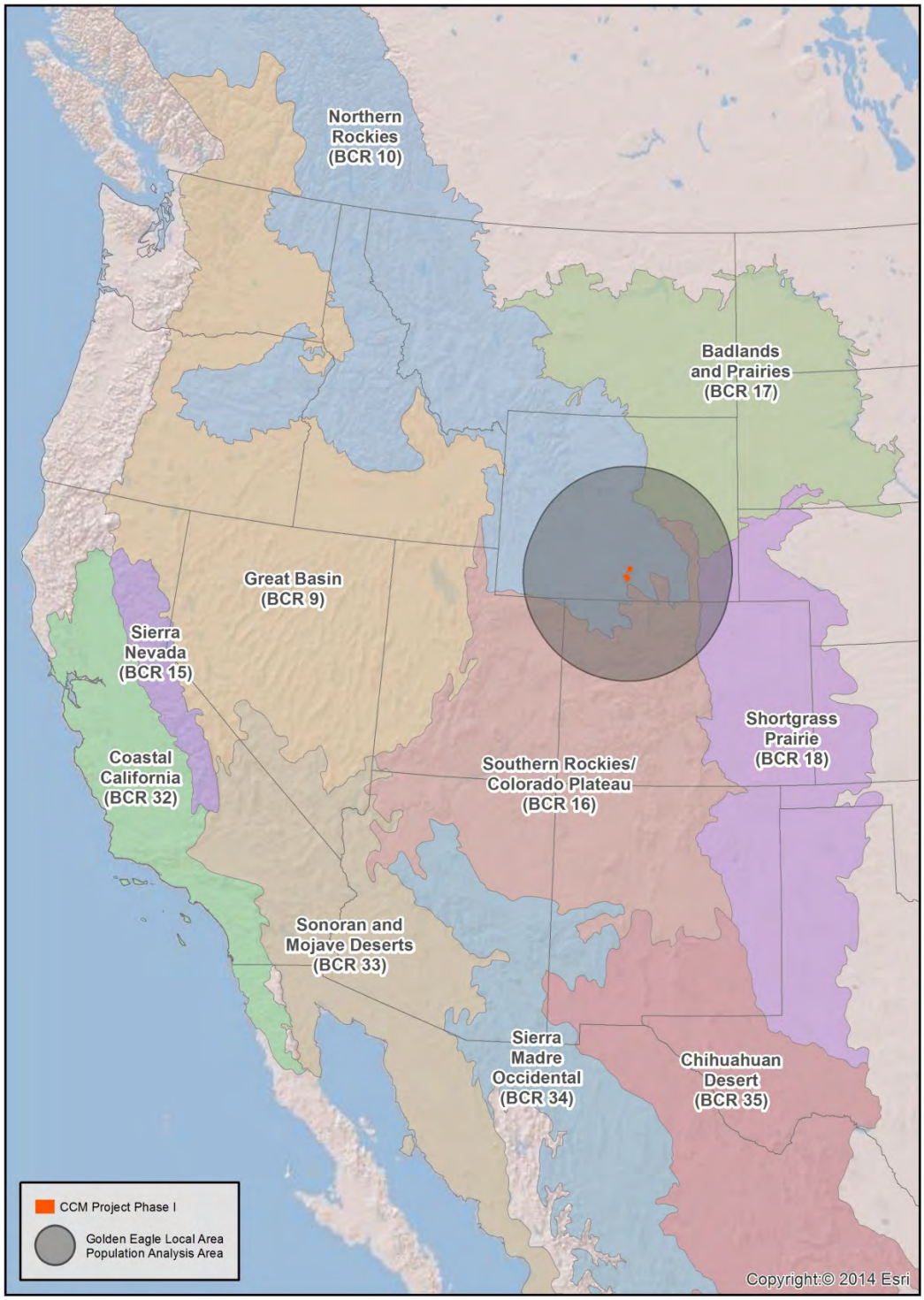

Figure 8.2. Phase I Local-Area Population Analysis Area and Bird Conservation Regions in the Western United States.

The following sections describe the compensatory mitigation measures that PCW will employ, in conjunction with the issuance of the programmatic eagle take permit, to offset unavoidable take from Phase I such that there is no net loss to the golden eagle population. As utility power pole retrofits are currently the only USFWS-approved compensatory mitigation, PCW has identified utility power pole retrofits as the primary method to compensate for unavoidable take. However, alternative, experimental approaches for compensation of unavoidable take are discussed below. Should USFWS approve these or other methods in the future, they may be considered in conjunction with or in place of utility power pole retrofits through the adaptive management process for Phase I. *See Section 8.7.*

8.5.1 Causes of Golden Eagle Mortality

A compilation of the causes of 4,300 bald and golden eagle deaths during the early 1960s to mid-1990s found that humans caused more than 70% of recorded deaths, with accidental trauma (e.g., collisions with vehicles, power lines, and other structures) being the primary factor (27%), followed by electrocution (25%), illegal shooting (15%), and poisoning (6%). *See Franson et al. 2002.* These threats continue to affect golden eagles today.

Collisions and electrocutions from power lines have accounted for numerous bald and golden eagle deaths over a 30-year period. *See Lehman, et al. 2007.* Studies have reported that golden eagles, particularly immature birds, are the most commonly electrocuted raptor in the United States. *See Harness and Wilson 2001; Lehman et al. 2007; Lehman et al. 2010.* Many power pole designs place conductors and ground wires close enough together that a large bird like a golden eagle can touch them simultaneously with its wings or other body parts causing electrocution. *See Lehman et al. 2007.* The majority of electrocutions are associated with low-voltage power lines or transformers, rather than high-voltage transmission lines. *See Lehman 2001; Lehman et al. 2007.* Most eagle (and other bird) electrocutions occur on distribution lines (35 kV or less). Transmission lines of 69 kV and above pose a very low electrocution risk to eagles because the lines are designed with sufficient spacing between conductors (electric wires or lines) such that phase to phase or phase to ground contact is not generally possible. *See APLIC 2006.* Electric distribution lines carry lower voltages and have closer conductor spacing, which presents a greater electrocution hazard to eagles and other avian species. *See APLIC 2006.*

8.5.2 Utility Power Pole Retrofits

Utility power pole retrofits will be used by PCW as compensatory mitigation to offset unavoidable take of golden eagles from Phase I. *See USFWS 2013a.* Power pole retrofits were identified by USFWS as the primary compensatory mitigation mechanism to ensure that golden eagle fatalities are mitigated to meet the USFWS no-net-loss standard. *See USFWS 2013a.* The ECP Guidance indicates that an eagle permit holder may either contribute funds to a third-party-mitigation account, for example the National Fish and Wildlife Foundation's (NFWF's) Bald and Golden Eagle Protection Act account, or contract directly with a utility or utilities to complete the required number of retrofits. USFWS encourages project developers or operators to contract directly for retrofits as opposed to contributing $7,500 per

pole to a third-party-mitigation account.[29] PCW's preference is to contract with utilities directly to complete the retrofits.

APLIC has developed guidance documents identifying minimization methods for avian electrocutions and collisions. APLIC also released national Avian Protection Plan Guidelines (APP Guidelines) in conjunction with USFWS in 2005. *See APLIC 2005.* In addition, APLIC provides electric utilities, wildlife agencies, and other stakeholders with guidance for reducing bird electrocutions and collisions with power lines based on the most current information, including its Suggested Practices for Avian Protection of Power Lines: State of the Art in 2006 (2006 Suggested Practices) and Mitigating Bird Collisions with Power Lines: The State of the Art in 2012 (Collision Manual). *See APLIC 2006; 2012.* Together, implementing the measures outlined in the APP Guidelines, the 2006 Suggested Practices and the Collision Manual to retrofit utility power poles mitigates risks to eagles.

PCW will work with electric utilities, including investor owned utilities, electric cooperatives and their members, and/or public power districts, to retrofit power poles to meet APLIC recommendations to offset potential take from Phase I. As part of its power pole retrofit program, PCW may also consider rebuilding entire existing electric lines to meet APLIC recommendations if USFWS appropriately credits the long-term benefit of the rebuild. In the Western United States, electric lines may remain in service for 50 years or more; therefore, rebuilding an existing line to current APLIC recommendations should provide a long-term benefit to eagles. *See Morell 2008.*

USFWS will assess compensatory mitigation in 5-year increments regardless of permit tenure. *See 50 C.F.R. §22.26(h).* PCW has initiated conversations with a number of utilities throughout Wyoming and Colorado to explore the feasibility of completing retrofits on power poles that are non-APLIC compliant for the first five-year period of a programmatic ETP. Each of these utilities and cooperatives have given PCW assurances that they have more than enough power poles in need of initial or updated retrofitting to cover the first five-year compensatory mitigation period for Phase I, and likely for subsequent five-year periods. Given that nine Rural Utilities Services (RUS) members own approximately 39,000 kilometers (24,000 miles) of distribution lines in Wyoming alone, and Colorado has at least as many kilometers of distribution lines, PCW expects there will be ample power poles in need of retrofits to cover the initial five-year compensatory mitigation period and any additional mitigation required in subsequent five-year periods. *See RUS 2013.*

Subject to a decision by USFWS to issue a programmatic ETP, PCW will have contracts in place with electric utilities to implement the compensatory mitigation required for the initial five-year programmatic ETP period. Following finalization of the contract(s), PCW will provide a power pole retrofit implementation plan to USFWS. To develop this plan, PCW and its utility partners will identify power poles that pose potential risks to eagles. Such potential risks may include: (1) power poles that are non-APLIC compliant; (2) power poles in or near favorable habitat; (3) power poles with known eagle

29 USFWS believes that $7,500 represents a reasonable estimate for the current cost to retrofit a power pole in the United States. *See USFWS 2013a, App. G at page 90.*

incidents; or (4) other quantifiable risks as established by best available scientific information. The power pole retrofit implementation plan will describe the agreed upon retrofit program including the number of power poles to be retrofit for each utility, the location of the retrofits, the schedule for completion, and the monitoring and maintenance obligations. To ensure the timely completion of power pole retrofits, PCW may give preference to mitigation projects that can be rapidly permitted and implemented.

Following completion of the retrofits, PCW and its utility partners will monitor and maintain retrofit power poles as provided for in the plan to ensure that the measures taken remain effective. Power poles retrofit in accordance with the Suggested Practices should require infrequent follow-up monitoring. *See APLIC 2006.* Most utilities conduct regular line inspections, which are generally sufficient to ensure that the retrofits remain in place and are serviceable.

As stated above, compensatory mitigation for Phase I will occur within the four BCRs included in the golden eagle local area population analysis area. While it is PCW's preference to implement compensatory mitigation as close to Phase I as practicable, the location of the mitigation is ultimately dependent upon the willingness of individual electric utilities to enter into contracts with PCW to complete the power pole retrofit program.

8.5.3 Calculation of Necessary Compensatory Mitigation

USFWS uses Resource Equivalency Analysis (REA) to quantify the number of power pole retrofits needed to offset the take of golden eagles at a wind project. *See USFWS 2013a, App. G.* Within the context of the ECP Guidance, REA is a methodology used to compare the injury to or loss of eagles caused by wind facilities (debit) to the benefits from projects designed to improve eagle survival or increase productivity (credits). Compensation is evaluated in terms of eagles and their associated services instead of by monetary valuation methods.

In its 30-year permit rule, USFWS stated that it will assess fatality estimates in 5-year increments regardless of permit tenure. At the end of the first 5-year period, actual take will be compared with predicted take, and if actual take is different, adjustments to the compensatory mitigation requirements may be made. As discussed in section 7.1.1, USFWS estimates that up to 14 golden eagle fatalities a year may result from Phase I (80% UCI). Extrapolated over a five year period, this would result in the take of 70 golden eagles under the USFWS assumptions. *See Appendix I.*

USFWS also prepared an initial estimate of the credit owed for a 5-year permitted take of golden eagles for Phase I based on the REA. *See Appendix I.* According to USFWS calculations, for a permitted take of 70 golden eagles (up to 14 golden eagles per year over a 5-year period), the number of power poles to be retrofit to achieve the no-net-loss standard for golden eagles would be either: (1) 3,889 poles assuming the measures used to retrofit poles last for 5 years (i.e., 5 years of avoided loss); or (2) 2,088 poles assuming the measures taken to retrofit poles lasts for 10 years (i.e., 10 years of avoided loss). The estimated number of power pole retrofits required is subject to change based upon factors such as the final wind turbine rotor diameter, the longevity of the power pole retrofits, or the timing of power pole retrofit implementation. Regardless, in conjunction with the issuance of the programmatic ETP, PCW agrees to offset unavoidable take from Phase I to meet the USFWS no-net-loss standard by retrofitting the requisite number of power poles as agreed to with USFWS. *See USFWS 2013a.*

8.5.4 Alternate Compensatory Mitigation Measures

There are a number of potential compensatory mitigation measures that may eventually provide an alternative to power pole retrofits; however, USFWS has not yet quantified the benefit of these measures. PCW is willing to consider one or more of these measures, either in place of or in addition to power pole retrofits, if USFWS quantifies the benefit to eagles of the mitigation measure and approves the use of these measures as mitigation for Phase I. The scientific challenge associated with using these potential measures for compensatory mitigation is providing a credible prediction of the numerical effects of these mitigation measures on eagle survival or productivity, especially when the empirical data needed for making these predictions are currently unavailable.

Carcass Removal

In the United States, a known cause of mortality to eagles, both bald and golden, is vehicle collisions. *See Lutmerding, et al. 2012; Millsap, et al. 2004*. Eagles are susceptible to being struck by vehicles while feeding on carcasses along roadsides, particularly in areas of the United States where large numbers of ungulates concentrate seasonally (e.g. winter, breeding season, etc.). According to the ECP Guidance, a project developer or operator may decide to collect data (or use existing data if it is available) on the annual number of eagle mortalities that result from vehicle collisions in a specified geographic area or along a specific stretch of roadway. These data could then be used to generate an estimate of the number of eagle mortalities that could be prevented in the same area by removing carcasses from roadsides. If there was sufficient evidence that this was a valid compensatory mitigation strategy (i.e., quantifiable and verifiable), the project developer or operator could contract to have these roadsides "cleaned" of carcasses during the time of year that ungulates concentrate and eagles are known to be struck. The credible estimate of eagle mortalities that would be avoided through carcass removal would be the value of the compensatory mitigation achieved.

This alternate compensatory mitigation measure is currently being evaluated in relation to the Mohave County Wind Farm in Arizona. *See BLM 2013b at Attachment 2.* If appropriate and approved by USFWS as quantifiable compensatory mitigation, PCW would work with USFWS and state and local highway departments to identify appropriate carcass removal protocols, including the frequency of carcass removals. Carcasses removed from area highways would be disposed of away from Phase I.

Habitat Improvements or Modifications

Habitat loss, encroachment from urbanization, and conversion of habitat to agricultural uses has negatively impacted golden eagles. *See Kochert et al. 2002*. Golden eagle breeding territories were less successful in areas lacking a mosaic of native vegetation since the habitat was unable to support abundant jackrabbit populations, their preferred prey. *See Thompson et al. 1982*. Good *et al.* (2007) noted that factors that could cause population declines such as habitat loss are increasing. In some areas, especially in southern California and the Colorado Front Range, urbanization and human population growth have made areas historically used by golden eagles unsuitable for breeding. *See Boeker 1974; Scott 1985*. Widespread agricultural development in portions of the golden eagle range

has contributed to a reduction of jackrabbit populations and has been a factor in rendering areas less suitable for nesting and wintering eagles. *See Beecham and Kochert 1975; U.S. Department of Interior 1979; Craig et al. 1986*.

The increasing number, frequency, and intensity of wildfires also may affect golden eagle habitat. *See Dennison et al. 2014.* In the Intermountain West, fires have caused large-scale losses of shrubs and jackrabbit habitat in areas used by golden eagles. More than 98,000 acres of shrub lands were consumed by wildfires between 1981 and 1987 in the Snake River Birds of Prey National Conservation Area, and adversely affected nesting populations. Nesting success at burned territories declined after major fires. *See Kochert et al. 1999.* Kochert *et al.* (1999) documented that burned territories abandoned by the original nesting pair were taken over by neighboring pairs increasing the size of their territories. This resulted in a decreased number of nesting pairs in the initial area. Between 2001 and 2006, fire burned approximately 566,800 acres within the range of the golden eagle in the lower 48 States. *See USFWS 2009*.

The fires affecting golden eagle populations in the Snake River Birds of Prey National Conservation Area were associated with the presence of cheatgrass. *See Kochert et al. 1999.* There is evidence that the widespread abundance of cheatgrass, red brome (*Bromus rubens*), and other non-native annual grasses has led to the establishment of a frequent annual grass/fire cycle in areas that had relatively low fire frequency prior to their invasion. *See Whisenant 1990; Brooks et al. 2004; Link et al. 2006.* The interval of natural fires in sagebrush shrub habitat has been shortened via invasions of annual non-native grasses. *See Crawford et al. 2004*.

Empirically-derived declines in populations of prairie dogs, a prey species for golden eagles, have been suggested as a habitat-related factor affecting golden eagle populations. *See Kochert et al. 2002.* Most of the remaining prairie dogs in the southern grasslands are associated with playas (seasonally wet depressions or dry lake beds), which are small and dispersed. While apparent declines in white-tailed and black-tailed prairie dogs may not currently be sufficient to result in listing of either species under the ESA, prey abundance can affect golden eagle populations and breeding success. *See Smith and Murphy 1979; Bates and Moretti 1994; Watson 1997; McIntyre and Adams 1999*.

Destruction or adverse modification of eagle habitat or their prey base reduces eagle populations; therefore, modification or improvement of eagle habitat or their prey base could be a potential compensatory mitigation measure. For instance, if an artificial or natural habitat type is identified as attracting prey for eagles or other large raptors, then re-creating that habitat type may establish new or improved important eagle use areas. Artificial perch and nesting structures may also be constructed in areas with little or no current or possible future development creating “safe” zones for eagles. These artificial structures could be placed in areas with adequate prey to minimize the likelihood that eagles using those structures would overlap with development areas.

Habitat enhancements could be used to increase prey base populations. Where prey base populations have been removed or reduced as part of past land management activities, prey base reintroductions to create new foraging areas may be effective to create important eagle use areas. WTPD and other prey base species could be reintroduced in suitable areas.

Fire prevention and control, and restoration of habitats impacted by fire may also sustain and improve eagle populations. Programs to prevent fires in important eagle use areas, such as removal or prevention of spread of cheatgrass, may provide a benefit to eagles.

As documented in section 8.1, PCW has already implemented a number of habitat improvement and modification measures that benefit bald and golden eagles, such as fence marking and removal, water tank escape ramps, revegetation of burn areas, prey base enhancement, and Ranch management practices that meet healthy rangeland standards.

If the conservation uplift resulting from habitat improvement and modification can be quantified in a manner accepted by USFWS, perhaps through a resource equivalency analysis model, then these conservation measures could be used as compensatory mitigation. If appropriate and approved by USFWS as quantifiable compensatory mitigation, PCW would work with USFWS to implement habitat improvement and modification measures.

Conservation Easements

Conservation easements, either in conjunction with habitat improvement and modification or as a standalone measure, could be used as compensatory mitigation. Permanent protection of important eagle use areas would preserve nesting territories, foraging areas, concentration areas and other areas important to the life cycle needs of eagles. As described in section 8.1, approximately 27,500 acres of private land on the Ranch will be placed in a conservation easement ensuring that wind development activities will not occur on much of the area surrounding the CCSM Project, including Phase I. If appropriate and approved by USFWS as quantifiable compensatory mitigation, PCW would work with USFWS to establish additional conservation easements.

Lead Abatement

Lead shot and bullet fragments in the carcasses and viscera of game and other animals can pose a hazard to raptors including eagles. Diurnal raptors are one of the main avian groups affected by lead toxicosis, and lead poisoning accounts for an estimated 10% to 15% of the recorded post-fledging mortality in bald eagles and golden eagles in Canada and the United States. *See Miller et al. 2002; Scheuhammer and Norris 1996.* Craig *et al.* (1990) noted that 12 of 16 (75%) eagles found in Idaho during a 9-year period had lead exposure and suggested that lead poisoning in golden eagles may be a greater problem than previously believed. Bald eagles and golden eagles admitted to The Raptor Research Center at the University of Minnesota had a 17.5% incidence of lead poisoning before the 1991 federal ban on lead shot for hunting waterfowl and a 26.8% incidence of lead poisoning after the ban. *See Kramer and Redig 1997*. Lead poisoning is a concern for eagles in most parts of their western range.

In Washington, blood tests detected elevated lead levels in more than half of 14 birds tested, with four of the birds having lead levels indicative of toxicosis. *See Watson and Davies 2009*.

Lead shot, bullet abatement, and hunter education programs may reduce eagle fatalities through decreasing the number of incidents of lead poisoning. Cochrane *et al*. (2015) identified methods to account for lead abatement in the USFWS Resource Equivalency Analysis that is currently used to quantify necessary levels of compensatory mitigation. If appropriate and approved by USFWS as quantifiable compensatory mitigation, PCW would work with USFWS to implement programs designed at reducing lead and bullet shot usage or reducing gut-piles left by hunters in areas accessible to eagles. PCW would also work with TOTCO to reduce or eliminate the use of lead shot and bullets and to remove gut piles.

Wind-Wildlife Research Mitigation Fund

If appropriate and approved by USFWS as quantifiable compensatory mitigation, PCW would work with USFWS to develop and implement a wind-wildlife research and mitigation fund. Monies placed in this fund could be used to pay for enhancing eagle and prey base habitat or other appropriate measures to conserve eagle populations. Monies could also be used to research and develop additional conservation and mitigation measures to benefit eagles or to fund research related to wind energy impacts on golden eagles. Funding amounts for this research mitigation fund would be determined by PCW in consultation with USFWS if it is determined that this is an appropriate compensatory mitigation measure.

8.6 Effectiveness Monitoring

PCW will monitor the effectiveness of the conservation measures, BMPs, experimental ACPs, and avoidance and minimization measures described throughout this Phase I ECP. PCW commits to conduct post-construction monitoring as detailed in chapter 9.0. The purpose of post-construction monitoring is to quantify fatalities that occur in Phase I, to evaluate the effectiveness of existing avoidance and minimization measures, and to identify appropriate additional avoidance and minimization measures through the adaptive management process to further minimize risks that contribute to fatalities. *See Section 8.7 & Chapter 9.0*. Additional monitoring for other resources (greater sage-grouse, water resources, etc.) and other issues (reclamation, stormwater, etc.) will follow the procedures and protocols identified in each of the resource or issue-specific monitoring plans.

8.7 Adaptive Management

As described in the ECP Guidance, USFWS's "long-term approach is to implement eagle take permitting in a formal adaptive management framework." *See USFWS 2013a at p.xi.* In fact, USFWS "recognizes that adaptive management is a normative concept in modern ecological decision-making (Callicott *et al.* 1999), and embraces it as a fundamental tool." *See USFWS 2013a, App. A.* Adaptive management is a process that implements specific management practices, assesses the outcomes of those practices, and then makes adjustments to the practices to better manage outcomes. In the context of wind energy, USFWS has identified four specific sets of decisions that will be approached through adaptive

management: (1) adaptive management of wind project operations; (2) adaptive management of wind project siting and design recommendations; (3) adaptive management of compensatory mitigation; and (4) adaptive management of population-level take thresholds. *See USFWS 2013a at p 28.*

Adaptive management for Phase I has two primary components: (1) the USFWS five-year permit review established by regulation; and (2) PCW's voluntary Phase I Annual Review that provides a more frequent opportunity for PCW and USFWS to review the Phase I post-construction monitoring results and the observed take in the context of the predicted take

8.7.1 Five-year Permit Review

In keeping with the adaptive management approach, the USFWS programmatic eagle take permit is structured in discreet review periods of five years. During each five-year review, USFWS will reassess post-construction monitoring, fatality rates, effectiveness of measures to reduce take, the appropriate amount and effectiveness of compensatory mitigation, and the status of the eagle population. *See 50 C.F.R. §22.26(h).* Following its review, USFWS may make changes to a programmatic ETP as necessary. *See 50 C.F.R. §22.26(h).*

USFWS recognizes that "The adaptive management process will depend heavily on pre- and post-construction data from individual projects." *See USFWS 2013a at p. xi.* In support of the USFWS adaptive management approach to eagle take permitting, PCW has collected a robust pre-construction data set and has also designed an intensive post-construction monitoring program for Phase I. *See Chapters 5 & 9.* Further, PCW has developed an adaptive management program for Phase I (the Phase I Annual Review) to use these data to proactively incorporate adaptive management into Phase I operation on a more frequent basis than the USFWS five-year permit review.

8.7.2 Phase I Annual Review

The intent of the Phase I Annual Review is to provide a more frequent adaptive management process in which the uncertainty related to the factors that influence the Phase I collision risk can be monitored, evaluated, and minimized to the extent practicable. While the goal of this Phase I ECP is to avoid eagle mortality, it is anticipated that some level of unavoidable take will occur even though experimental ACPs are being implemented. As a result, the Phase I Annual Review is intended to adjust post-construction monitoring protocols, conservation measures, BMPs, and/or experimental ACPs as warranted. According to the ECP Guidance, "the purpose of adaptive management of operations is to reduce mortality of eagles while also reducing the impact of conservation measures and ACPs on power generation at wind facilities." *See USFWS 2013a, App. A.*

The Phase I adaptive management process will be implemented as follows:

1. PCW will implement the post-construction monitoring protocols, conservation measures, BMPs, and/or experimental ACPs set forth in this Phase I ECP and any programmatic ETP issued by USFWS.

2. At least annually, PCW and USFWS will meet to complete the Phase I Annual Review during which the Phase I post-construction monitoring results and the observed take will be reviewed in the context of the predicted take.

3. Following review of the post-construction monitoring results and the observed take, PCW and USFWS will consider adjustments to the post-construction monitoring protocols, conservation measures, BMPs, and/or experimental ACPs as warranted.

4. PCW will implement the adjustments to the post-construction monitoring protocols, conservation measures, BMPs, and/or experimental ACPs deemed necessary during the Phase I Annual Review.

Implementation of the Phase I adaptive management process will provide a more frequent opportunity for USFWS to provide PCW with feedback on the implementation of the monitoring protocols and avoidance and minimization measures included in this Phase I ECP.

8.8 Risk Assessment Following Stage 4

Following completion of the Stage 4 risk assessment, PCW believes Phase I is a Category 2 project because, although it has a risk of ongoing take of eagles, this risk can be minimized as PCW has documented in this Phase I ECP. As a Category 2 project, Phase I is, 1) reasonably likely to take eagles at a rate greater than is consistent with maintaining stable or increasing populations, but 2) the risk has been reduced to an acceptable level through a combination of conservation measures and reasonable compensatory mitigation outlined in this Phase I ECP. *See USFWS 2013a.*

PCW has implemented each of the four stages of the ECP Guidance to assess and address the risk to eagles from the CCSM project, including Phase I, over a period of approximately 7 years.

First, PCW performed landscape-scale screening of and broad characterization of the Ranch prior to finalizing the CCSM Project Site. Although initial planning and siting efforts for the CCSM Project were completed prior to the issuance of the ECP Guidance, PCW's early site analysis, BLM's data gathering and preparation of the EIS, and coordination with USFWS ensured that initial project design efforts used the best available information regarding eagle use patterns including the location of potential eagle nesting habitats, foraging areas, roost locations, and other areas that could potentially be used by eagles.

Second, PCW developed and implemented scientifically rigorous surveys, monitoring, assessment, and research designs resulting in the identification of important eagle use areas including nesting and foraging locations. These data gathering efforts were developed and completed in close coordination with USFWS and other federal and state agencies. The collection of thousands of hours of avian use data including those collected as part of long-watch raptor surveys, 800-meter raptor count surveys, raptor nest surveys, prey base surveys, avian radar surveys, breeding bird surveys, and migratory bird surveys have identified the important eagle use areas in Phase I including nesting habitats, potential foraging habitats, potential roost locations, and other eagle use areas. The data collected as part of Stage 2 were used to substantially redesign the CCSM Project, including Phase I, to avoid and minimize impacts to bald and golden eagles to the extent practicable.

Third, USFWS used this data in its eagle fatality model to predict eagle fatalities that would occur as a result of the construction and operation of Phase I. The data collected as part of Stage 2 were appropriate for use in the eagle fatality model and resulted in estimation of potential eagle fatalities that could occur as a result of construction and operation of Phase I. At the 80% UCI, USFWS predicts 10-14 golden eagle fatalities and 1.4-1.9 bald eagle fatalities annually for Phase I.

Fourth, PCW used the data to avoid and minimize risks to eagles to the extent practicable such that any remaining take is unavoidable and is offset by appropriate compensatory mitigation. PCW's close coordination with USFWS to substantially redesign Phase I was informed by the information that was collected and evaluated as part of Stages 1, 2, and 3 of the ECP Guidance. The avoidance and minimization efforts completed for Phase I demonstrate that impacts within important eagle use areas including nesting habitats, foraging habitats, potential roost sites, and other eagle use areas have been avoided and minimized to the extent practicable such that any remaining take is unavoidable. PCW's compensatory mitigation plan, post-construction monitoring program, and adaptive management approach created as part of Stage 4 provide the measures necessary to offset any remaining take that occurs. PCW has proposed adequate compensatory mitigation for up to 14 golden eagles fatalities per year as estimated by USFWS. As a result of these avoidance and minimization efforts and PCW's compensatory mitigation plan and associated monitoring, PCW believes Phase I is a Category 2 project with impacts that have been effectively avoided, minimized, or mitigated to ensure that project activities are consistent with the USFWS goal of maintaining stable or increasing populations of bald and golden eagles.

In sum, this Phase I ECP documents PCW's: (a) identification of important eagle use areas; (b) the comprehensive actions it has already taken and those it has committed to in the future to avoid and minimize adverse effects to eagles, as well as its commitment to compensatory mitigation; and (c) the procedures it will employ to monitor for impacts to eagles during construction and operation of Phase I such that PCW believes Phase I meets the standards in 50 C.F.R. §22.26 for issuance of ETPs.

9.0 Post-construction Monitoring (ECP Guidance Stage 5)

Post-construction monitoring is required for all programmatic ETPs. *See 50 C.F.R. §22.26(c)(2).* Consistent with Stage 5 of the ECP Guidance, PCW will conduct post-construction monitoring for eagle fatalities and disturbance effects at Phase I. While the ECP Guidance notes that post-construction monitoring for eagles can be combined with monitoring for other wildlife species, PCW has developed an eagle-specific post-construction monitoring program for Phase I. The purpose of post-construction monitoring is to generate empirical data for comparison with the pre-construction risk-assessment fatality and disturbance predictions. *See USFWS 2013a at p.22.* Post-construction monitoring has two basic components when applied to eagle take: (1) estimating the mean annual fatality rate to ensure that the permitted level of eagle take is not exceeded; and (2) assessing possible disturbance effects on neighboring nests and communal roosts. Further, as described in the ECP Guidance, the USFWS adaptive management approach to programmatic ETPs depends heavily on pre- and post-construction data from individual projects. *See USFWS 2013a at p. xi.*

This chapter describes the Phase I post-construction monitoring program for eagles and the methods that will be used to assess and quantify site-specific and eagle-specific sampling biases and sources of error. Eagle-specific searcher efficiency and carcass persistence trials will be conducted to identify potential sampling biases, characterize variability of datasets used for fatality modeling, and reduce uncertainty in model estimates. Implementation of these methods takes into consideration the relative rarity of eagle collisions with wind turbines and will provide defensible, science-based estimates of post-construction eagle fatalities for comparison with the USFWS fatality model estimates and permitted take.

9.1 Eagle Fatality Monitoring

According to the ECP Guidance, all wind facilities that are permitted to take eagles must conduct fatality monitoring to ensure compliance with regulatory requirements. The primary objectives of fatality monitoring are to: (1) estimate eagle fatality rates for comparison with the model-based predictions prior to construction; and (2) determine whether there are any patterns of fatalities within Phase I such that factors associated with those fatalities can be identified and addressed, if possible, through adaptive management and the application of additional conservation measures and experimental ACPs. *See Section 8.7.*

PCW will complete eagle fatality monitoring for Phase I using current, scale-modified protocols to document take. The ECP Guidance recognizes that site-specific characteristics should be accounted for in the design of post-construction fatality monitoring protocols for eagles. *See USFWS 2013a, App. H.* Accounting for site-specific differences in vegetation cover and height, snow cover, season, and carcass persistence reduces many of the inherent biases and sampling errors that affect eagle fatality model estimates. The Phase I eagle fatality monitoring program addresses the potential influence of these factors and identifies approaches to optimize eagle fatality monitoring while maintaining appropriate levels of certainty that permitted take is not exceeded. *See Péron et al. 2013.*

Consistent with the ECP Guidance, to reduce sampling biases and potential sources of error, PCW's eagle fatality monitoring program accounts for:

1. Potential variability of fatality rates by year, season, and location;
2. Effects of carcass removal by scavengers;
3. Variable searcher efficiency;
4. Site-specific conditions including vegetation, topography, and snow cover; and
5. Undetected fatalities or injured birds that occur outside of monitoring plots.

As provided for in this Phase I ECP, PCW and USFWS will review the results of the Phase I eagle fatality monitoring program at least once annually and, if deemed appropriate, the fatality monitoring program may be modified as approved by USFWS through the adaptive management process described in section 8.7.

9.1.1 Eagle Fatality Monitoring Duration

USFWS anticipates that in most cases, intensive post-construction eagle fatality monitoring to estimate the annual fatality rate will be conducted for at least the first two years after issuance of the programmatic ETP, followed by less intense monitoring for up to three years after the expiration date of the programmatic ETP, in accordance with the monitoring requirements at 50 C.F.R. §22.26(c)(2). *See USFWS 2013a at p. ix.* PCW will conduct fatality searches following the protocols set forth in this Phase I ECP for the first 24 months following commencement of commercial operation. After the first 24 months of commercial operation, PCW will consult with USFWS through the adaptive management process described in section 8.7 to develop appropriate fatality survey methods for the remaining permit term.

9.1.2 Eagle Fatality Monitoring Protocol

During the first 24 months following commencement of commercial operation of Phase I, each of the 500 wind turbines in Phase I will be searched once per month.[30] This initial frequency was determined to be appropriate to account for carcass scavenging rates in northeastern Utah and northwestern Colorado. *See Lehman et al. 2010.* Following initial survey and carcass persistence trial results, the frequency of searches may be adjusted based on site-specific scavenging rates. *See Sections 9.1.3 & 9.1.4.*

[30] Note that searches will not be performed when weather conditions make wind turbines inaccessible or unsafe to access in a standard road vehicle.

In shrub-dominated habitats or other habitats with some level of lateral visual obstruction, initial searches will be conducted using 10-meter transect widths (approximately 33 feet on either side of the transect). *See Figure 9.1.* In barren/sparsely vegetated or grassland/hay meadow habitats, searches will be conducted using 20-meter transects (approximately 66 feet on either side of the transect). *See Figure 9.2 & Figure 9.3.* Wider transect spacing in these habitats is warranted because of the relatively large size of eagle carcasses and the high visibility in these habitats. Following initial surveys and searcher efficiency trials, transect widths for surveys may be adjusted to reflect site-specific searcher efficiency by major habitat type (shrub, grassland, barren, etc.). *See Section 9.1.4.*

Figure 9.1. Representative Shrub-dominated Habitat (10-meter monitoring spacing).

Figure 9.2. Representative Barren/Sparsely-vegetated Habitat (20-meter monitoring spacing).

Figure 9.3. Representative Grassland/Hay Meadow Habitat (20-meter monitoring spacing).

All searches will be conducted within square plots oriented such that the largest distance searched (i.e., the diagonal of the square) will be aligned in the direction of prevailing winds as described by Erickson *et al.* (2003). Based on scientific literature, factors specific to Phase I, and the estimated wind turbine size, a search plot size of 240 meters by 240 meters (approximately 787 feet by 787 feet) will be used for each wind turbine location. *See Hull and Muir 2010*. Using results of the carcass persistence and searcher efficiency trials described in the following sections, the number of wind turbines searched, the interval between searches, transect spacing, and search plot size may be adjusted as necessary through the adaptive management process described in section 8.7 to optimize the sampling design and meet the fatality estimate certainty goals described in section 9.1.5. *See Péron et al. 2013*. *See Sections 9.1.3 & 9.1.4.*

PCW will collect the following information for each eagle fatality monitoring survey:

1. Date
2. Start time
3. End time
4. Interval since last search
5. Searcher name
6. Which wind turbine plot was searched (including decimal-degree latitude longitude or UTM coordinates and datum)
7. Habitat and vegetation characteristics, site topography, and any noticeable changes in conditions since previous visit (i.e., fire, increased or decreased herbaceous canopy height or cover, etc.)

8. Weather data for each search, including wind speed or Beaufort wind scale precipitation, snow cover, cloud cover, or other relevant weather condition
9. GPS track of the search path

When an eagle fatality is discovered, the searcher will mark the carcass with a flag. After completing the search of that wind turbine, the searcher will immediately return to the flagged carcass to collect carcass data as described below, which follows the recommendations set forth in the ECP Guidance and Wind Energy Guidelines. *See USFWS 2013a.* All carcasses, parts, or feathers will be photo-documented. All potential injuries or lack thereof, signs of scavenging, and identifying characteristics will be documented. The preferred method of recording data will be electronically using a data recording device (such as a field computer or notepad), but the searcher may also record information on a paper form. The searcher will record the following information for each fatality:

1. Date
2. Species
3. Age and sex, if possible
4. Band number and notation if wearing a radio-transmitter or auxiliary marker
5. Observer name
6. Wind turbine number or other identifying characteristic
7. Distance of the carcass from the wind turbine
8. Azimuth of the carcass from the wind turbine
9. Decimal-degree latitude longitude or UTM coordinates of the wind turbine and carcass
10. Habitat surrounding the carcass
11. Condition of the carcass (entire, partial, scavenged)
12. Description of the carcass
13. A rough estimate of the time since death (e.g., <1 day, > a week), and how estimated
14. A series of digital photographs of the carcass and landscape surrounding the location
15. Information on carcass disposition and a tag number as provided by USFWS

The information collected (including photographs) will be included in each quarterly report submitted to USFWS under section 9.1.6. PCW will notify the USFWS Office of Law Enforcement (OLE) of any eagle fatality or injuries as soon as practicable, but no later than 24 hours following discovery. While searchers are not trained or qualified to investigate or evaluate evidence of criminal activity associated with an eagle carcass, if in the judgment of the searcher criminal activity is suspected or observed, the carcass will be left in place and a USFWS Law Enforcement Officer will be notified immediately. Handling and disposition of carcasses will be as provided for under section 9.6.

9.1.3 Carcass Persistence Trials

As recommended in the ECP Guidance, PCW will conduct carcass persistence trials during eagle fatality monitoring. Carcass persistence trials will be conducted once each season for the first 24 months of eagle fatality monitoring.[31] Eagle carcasses will not be made available by USFWS for carcass persistence trials; therefore, PCW will use the best available suitable surrogates for eagles (i.e., raptors of similar size and color). PCW will revisit carcasses placed as part of carcass persistence trials on days 1 through 7, 14, 21, and 28. *See Erickson et al. 2003; Young et al. 2003*. If carcasses are still present on day 28, they will be visited by PCW weekly until they are scavenged or for 90 days, whichever is sooner. Seasonal carcass persistence trials will account for the effects of weather, differential carcass decay/desiccation rates, scavenger densities, and scavenger behavior across seasons. When appropriate, carcasses placed for searcher efficiency trials will be used to conduct the carcass persistence trials and will follow the same placement and visitation schedule described above.

The data from the carcass persistent trials will be used in a suitable statistical estimator (e.g., Péron and Hines 2014, Huso 2011, Huso *et al.* 2012, and Shoenfeld 2004) to account for imperfect carcass detectability and to produce unbiased estimates of fatality. *See Section 9.1.5.* The data may also be used to adjust the post-construction fatality search interval and sampling coverage as approved by USFWS through the adaptive management process described in section 8.7.

9.1.4 Searcher Efficiency Trials

As recommended in the ECP Guidance, PCW will conduct searcher efficiency trials during eagle fatality monitoring. Searcher efficiency trials will be conducted once each season for the first 24 months of eagle fatality monitoring.[31] Searcher efficiency will be calculated as the proportion of trial carcasses found by a searcher relative to the total number of carcasses placed for that searcher's trial. Searcher efficiency trials will be conducted blindly, without the knowledge of the searcher involved, and simultaneously with formal eagle fatality monitoring at a subset of the searched wind turbines. Each efficiency trial will be conducted using the same search protocols described above for eagle fatality monitoring. *See Section 9.1.2.* The trials will be conducted seasonally to account for different field conditions (e.g., vegetation growth, snow) that may affect the ability of the searchers to locate eagle carcasses.

Carcasses used for searcher efficiency trials will be determined in consultation with USFWS. These may include dark colored geese or turkeys although other surrogates (large raptors) may be used if available.[32] All carcasses will be individually marked to differentiate them from any carcasses that might

[31] For purposes of eagle fatality monitoring, carcass persistence trials, and searcher efficiency trials, seasons are defined as: (1) summer during the vegetation growing season; (2) late fall or early spring outside of the vegetation growing season (no snow present); and (3) in winter outside of the vegetation growing season (snow present).
[32] For purposes of the searcher efficiency trials, carcasses of a similar size and color to eagle carcasses are sufficient. However, these carcasses are not appropriate for use in the carcass persistence trials described in section 9.1.3 due to differences in scavenging rates that may be significant.

be present that are not part of the trial. The appropriate number of carcasses to use for searcher efficiency trials will be determined in coordination with USFWS and will take into account site-specific carcass persistence rates in Phase I. *See Section 9.1.3.* Currently available fatality models (e.g. Huso 2011, Huso *et al.* 2012, Shoenfeld 2004) require that a minimum of 10 carcasses be placed for each fatality group parameter and searcher (e.g., 10 per season per searcher per model covariate). However because detectability and carcass persistence for eagles is expected to differ from that of small-bodied passerines and other raptor species (as noted in Lehman *et al.* 2010) and because newly developed fatality estimators may become available, PCW will work with USFWS to identify the appropriate number of carcasses required to achieve desired results.

For each searcher efficiency trial, carcasses will be placed during the morning (on the same day as eagle fatality monitoring searches) before searches are conducted. The person conducting the blind test (the tester) will place the carcasses at randomly generated locations within the survey plot and drop the carcasses from waist level to ensure the carcasses land in a random position and location. The location of the placed carcasses and vegetation type will be recorded by the tester with a handheld Global Positioning System (GPS) unit. To ensure the trials are blind, searchers will be unaware of the chosen date, the wind turbine plots selected, and the specific locations and number of carcasses placed for each trial. The tester will distinguish the placed carcasses with unique leg bands or other appropriate means to ensure the placed carcasses are distinguishable from carcasses potentially attributable to Phase I. The marking method used will not increase the visibility of the carcass to ensure that searcher efficiency trials are unbiased.

For analysis of searcher efficiency, placed carcasses discovered by the searcher will be compared to the total number of carcasses placed by the tester. Separate searcher efficiency rates will be calculated for each season, for each searcher, and for each covariate used in fatality model estimates. These rates will be coded into the observed fatality data for use in the adjusted fatality estimate analyses. *See Section 9.1.5*. The data may also be used to adjust transect spacing for fatality surveys, either seasonally or by vegetation type, as approved by USFWS through the adaptive management process described in Section 8.7.

9.1.5 Adjusted Eagle Fatality Estimates

PCW will coordinate with USFWS to identify an appropriate statistical estimator to calculate an adjusted fatality estimate for eagles using data from the eagle fatality monitoring program. Fatality estimates are based on observed carcasses found during eagle fatality monitoring, the probability that a searcher will miss a carcass (searcher efficiency correction factor), the probability that a carcass will be removed before a searcher can locate it (carcass persistence correction factor), the date of the last search at a particular search plot prior to finding a carcass (search interval), the proportion of wind turbines searched to the total number of wind turbines at the facility, and the proportion of searchable areas beneath each wind turbine (or similar search area correction). Categorical covariates (i.e., season, carcass type, sample area, searcher, vegetation attributes) that significantly improve the fit of the

searcher efficiency and carcass persistence models will be used, as applicable, in the adjusted eagle fatality estimate.

Adjusted fatality estimates will be compared to permitted take levels to ensure that there is a minimum of 80% certainty that permitted take has not been exceeded. While it is PCW's goal to achieve 95% certainty in fatality estimates for comparison to permitted take, this level of certainty may not always be achievable because of site-specific factors (i.e., proportion of area that can be safely searched, site-specific searcher efficiency, site-specific carcass persistence, etc.). If 95% certainty cannot be reasonably achieved, PCW will maintain a minimum of 80% certainty in fatality estimates at all times during the first 24 months of post-construction eagle fatality monitoring. To achieve the necessary certainty in the fatality estimates, PCW and USFWS may revise the eagle fatality monitoring protocol as needed in accordance with the adaptive management process described in section 8.7.

9.1.6 Reporting

During eagle fatality monitoring, PCW will electronically submit quarterly reports to USFWS detailing eagle fatality monitoring results. The quarterly reports will include all fatality data, including incidental records. The quarterly reports will be submitted within 30 days following the end of each calendar quarter.

Annual reports detailing the eagle fatality monitoring results and adjusted fatality estimates will be submitted to USFWS by February 15 of each year. The annual reports will discuss fatalities in the context of spatial and seasonal distribution, and, as warranted, will present recommendations for future monitoring, conservation measures, and/or adaptive management. All eagle fatality monitoring reports to USFWS will be considered confidential and not subject to public disclosure, as provided for under the Freedom of Information Act's exemption applying to confidential commercial information. *See U.S.C. § 552(b)(4).*

9.2 Eagle Nest Surveys

Consistent with the ECP Guidance, PCW will conduct eagle nest surveys to determine nest occupancy for all eagle nests within the Phase I mean inter-nest distance (MIND) throughout the term of the ETPs. *See Figure 9.4.* USFWS has calculated the MIND for golden eagles at 7,000 meters (4.3 miles) for the CCSM Project. *See Section 6.3.1.* PCW will use eagle nest surveys to identify occupied and unoccupied nests for purposes of: (1) applying appropriate eagle nest avoidance and minimization measures; and (2) evaluating potential disturbance take. *See Sections 6.3.1, 7.2, & 9.3.* If occupied nests are identified during nest surveys, PCW will conduct additional follow-up monitoring to determine nest success and productivity.

Ground-based nest surveys will begin on January 15 of each year from established observation points. Nests will be observed approximately once every three to four weeks through May 1 to identify occupied nests.[33] During construction and for the first two years (24 months) following commencement of commercial operation, PCW will also conduct one round of aerial nest surveys between April 1 and May 1 as weather allows. The purpose of the aerial surveys is to confirm ground observations. If a nest is not occupied by May 1 of any year, then it will be classified as unoccupied for that year and will not be checked further. After the first 24 months of commercial operation, PCW will consult with USFWS through the adaptive management process described in section 8.7 to evaluate the necessity and practicality of continued aerial surveys for the remaining permit term.

If a nest is occupied, PCW will continue to monitor the nest to determine nest success and productivity. Each occupied eagle nest will be evaluated using ground-based surveys once every four to six weeks post-hatch to identify approximate fledging/failure dates. Ground-based surveys of each occupied nest will continue until the nest surveys demonstrate that the nests are unoccupied.

Eagle nest survey and productivity data recorded during the year will be reported annually to USFWS as part of the annual eagle fatality monitoring reports. *See Section 9.1.6.* These annual reports will detail the eagle nest monitoring results, and, as warranted, will present recommendations for future monitoring, conservation measures, and/or adaptive management. Based upon the nest survey data, the eagle nest avoidance and minimization measures described in section 6.3.1 may be adjusted as approved by USFWS through the adaptive management process described in section 8.7. All eagle nest monitoring reports to USFWS will be considered confidential and not subject to public disclosure, as provided for under the Freedom of Information Act's exemption applying to confidential commercial information. *See U.S.C. § 552(b)(4).*

[33] Surveys will not be performed when weather conditions make nests inaccessible or unsafe to access in a standard road vehicle.

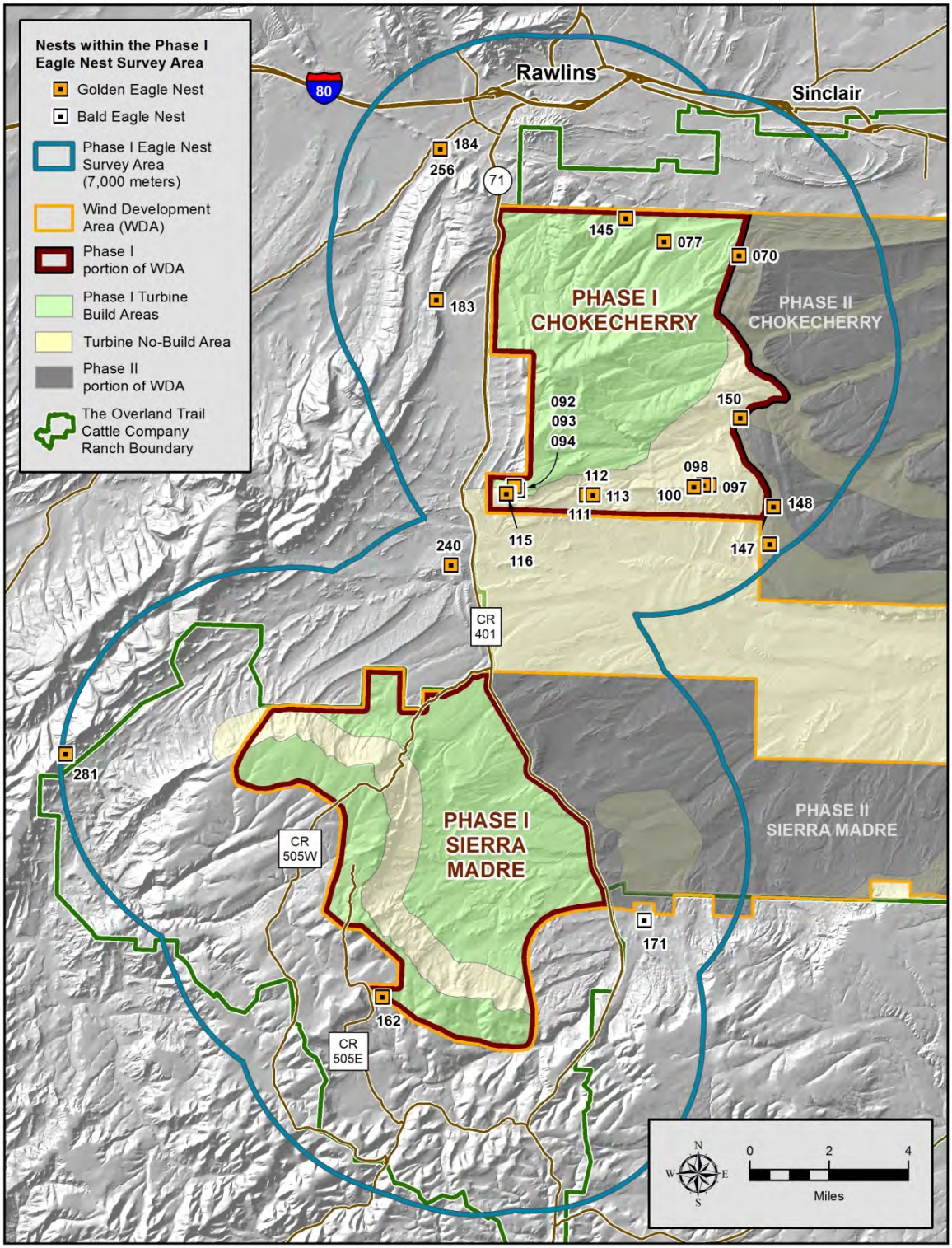

Figure 9.4. Phase I Post-construction Eagle Nest Survey Area.

9.3 Disturbance Monitoring

According to the ECP Guidance, project developers may be required to monitor eagle nesting territories and communal roost sites identified in the Stage 2 assessments as stated in the permit regulations at 50 C.F.R. §22.26(c)(2) for at least two years after project construction and for up to three years after the cessation of the permitted activity. The objective of such monitoring is to determine post-construction: (1) territory or roost occupancy rates; (2) nest success rates; and (3) productivity. On a project-by-project basis, changes in any of these reproductive measures may not be indicative of disturbance. However, patterns could become apparent when findings from many projects are evaluated in the context of a meta-analysis within the adaptive management framework. *See USFWS 2013a at p. 98.* Consistent with the ECP Guidance, PCW will conduct the eagle nest surveys as described in section 9.2 and disturbance monitoring as described below to identify potential disturbance effects and disturbance take from Phase I. If disturbance take is detected, it will be addressed as described in section 9.3.5.

9.3.1 Nest Disturbance Monitoring

PCW will conduct disturbance monitoring of all eagle nests within 800 meters (0.5 mile) of Phase I infrastructure during construction.[34,35] The nest survey protocol for eagle nest disturbance monitoring will be the same as that described in section 9.2. Generally, eagle nests within 800 meters of Phase I infrastructure are within the Phase I Eagle Nest Survey Area and will be monitored throughout the term of the ETPs as described in section 9.2. However, there is one eagle nest within 800 meters of the Phase I infrastructure (bald eagle nest #055) that falls outside of the Phase I Eagle Nest Survey Area. The nest is a located near the North Platte River approximately 160 meters (0.1 mile) from the access road leading to the North Platte River Water Extraction Facility. *See Section 6.4.* While this nest is outside of the Phase I Eagle Nest Survey Area, it will be monitored during construction due to the potential for disturbance.

9.3.2 Disturbance Monitoring of Communal Roosts

As detailed in chapter 5.0, there are no communal roosts within the Phase I MIND based on PCW's pre-construction survey data and BLM historical records. Therefore, no monitoring of communal eagle roosts is necessary.

9.3.3 Disturbance Monitoring of Other Important Eagle Use Areas

Other important eagle use areas not associated with nests include foraging and sheltering areas. Sheltering areas are primarily along cliff faces and edges. PCW's commitment to Turbine No-Build Areas

[34] Disturbance monitoring of eagle nests outside the Phase I Eagle Nest Survey Area will not be conducted post-construction because, as discussed in section 6.4, the potential for disturbance of nests within 800 meters of the Phase I infrastructure exists primarily during construction.

[35] For the first year of construction, if construction is not underway by January 15 PCW will postpone the monitoring program until one week prior to the commencement of construction provided that construction activities will occur during the nesting season.

and set-backs from geologic features such as the Bolten Rim and the Miller Hill Rim as described in chapter 6.0, avoids and minimizes potential impacts to eagle sheltering areas. In addition, following consultation with USFWS, PCW has located wind turbines outside important prey base and foraging areas which further avoids and minimizes potential impacts to eagles. *See Section 6.3.2.* Therefore, PCW will not conduct further monitoring of these areas. If through incidental observations PCW detects eagle behaviors within foraging and sheltering areas that may be indicative of disturbance, PCW will consult with USFWS and, through the adaptive management process described in section 8.7, additional conservation measures including experimental ACPs may be implemented.

9.3.4 Reporting

During eagle disturbance monitoring, PCW will submit annual reports to USFWS as part of the annual eagle fatality monitoring reports. *See Section 9.1.6.* These annual reports will detail the eagle disturbance monitoring results, and, as warranted, will present recommendations for future monitoring, conservation measures, and/or adaptive management. All eagle disturbance monitoring reports to USFWS will be considered confidential and not subject to public disclosure, as provided for under the Freedom of Information Act's exemption applying to confidential commercial information. *See U.S.C. § 552(b)(4).*

9.3.5 Actions to be Taken if Disturbance is Detected

If monitoring shows strong evidence of disturbance take from Phase I, PCW and USFWS will consider additional conservation measures and experimental ACPs to reduce effects using the adaptive management process described in section 8.7. Alternatively, USFWS may require additional compensatory mitigation to offset the estimated decreases in productivity to the extent necessary to meet the statutory requirement to preserve eagles. PCW has instituted numerous conservation measures, including conservation easements and prey base enhancements, that USFWS may consider in determining whether additional compensatory mitigation for disturbance is required. *See Section 8.1*. Further, PCW has identified additional conservation measures such as carcass removal, habitat improvements or modification, and lead abatement that also have the potential to provide a conservation benefit and uplift for eagles and that may be appropriate compensatory mitigation for disturbance take. *See Section 8.5.4*.

9.4 Eagle Use Monitoring

PCW has conducted extensive eagle use monitoring for Phase I, as described in chapter 5.0 of this Phase I ECP. The ECP Guidance states that the purpose of eagle use monitoring is to provide comparative information on post-construction eagle use. The robust post-construction fatality, disturbance and nest monitoring program for Phase I will enable a comprehensive comparison between pre- and post-construction eagle use. Post-construction avian point counts are not planned as part of PCW's post-construction monitoring.

9.5 Incidental Discoveries

All operation and maintenance personnel working on Phase I will be trained to identify eagle fatalities. Educational information concerning protection of eagles and identification of injured or dead eagles will be posted in the operation center. Instructions and procedures that personnel must follow in the event that an injured or dead eagle is discovered onsite shall be included with the educational information, including whom to notify and what actions must be taken.

Operations and maintenance personnel will not disturb any carcass, but will instead document the location of the eagle fatality and notify their supervisor as soon as possible. The supervisor will contact a qualified biologist to record the fatality following the procedures set forth in section 9.1.2. Upon notification, PCW's qualified biologist will also notify the USFWS OLE as soon as practicable, but no later than 24 hours following discovery, as set forth in section 9.1.2.

Any fatality discovered during times other than the formal eagle fatality surveys described in section 9.1 will be considered an incidental record. Incidental records will be provided to USFWS along with other post-construction monitoring results as described in section 9.1.6. Incidental observations that fall within the post-construction monitoring search areas will be replaced with a suitable surrogate such that it can be accounted for in post-construction fatality surveys to ensure that estimates of eagle fatality are not biased.

9.6 Disposition of Eagle Carcasses and Injured Eagles

PCW will notify the USFWS OLE of any eagle fatality or injury as soon as practicable, but no later than 24 hours following discovery. PCW will also report all discoveries to USFWS's migratory bird permit issuing office or as otherwise required in the ETPs. Eagle carcasses will not be moved until such notification occurs. If the necessary permits have been obtained (e.g., a Migratory Bird Special Purpose Utility Permit [SPUT] from the Migratory Bird Program), then following the collection of carcass-specific data, PCW (or other SPUT permit holder) will remove the carcass from the field to a secure location. Final disposition of eagle carcasses will be in accordance with ETP terms and conditions or USFWS direction.

If an injured eagle is encountered either during a survey or incidentally, PCW will notify USFWS. The location and time of the observation as well as the observed behavior and injury will be recorded. If directed by USFWS, a qualified biologist or other certified wildlife handler will attempt to capture the injured eagle unless such capture would cause additional injury or harm. Once the injured eagle has been captured, it will be transferred to an appropriately permitted rehabilitation center as directed by USFWS.

9.7 Adaptive Management for Post-Construction Monitoring

PCW and USFWS will review the Phase I post-construction monitoring program for effectiveness at least annually as described in section 8.7. The procedures, protocols, and/or schedule for post-construction monitoring may be modified by PCW and USFWS using the adaptive management process set forth in section 8.7 based on survey results, field experience, new scientific information, new technology or procedures, or other relevant information.

10.0 Wildlife Permits

In addition to the ETPs, PCW may need to obtain the following non-eagle permits related to avian and bat species from either USFWS or WGFD for Phase I:

- USFWS-issued permits:
    - Scientific Collection Permits
    - Migratory Bird Special Purpose Utility Permit. *See 50 C.F.R. §21.27.*

      A Special Purpose Utility Permit is necessary only if PCW plans to collect, transport, or possess dead migratory birds or parts or contract someone to conduct these activities on its behalf. More detailed information on the applicability of this permit and its requirements are set out in the Service's handout titled "What you should know about a Federal Migratory Bird Special Purpose Utility Permit" which can be accessed at: http://www.fws.gov/forms/3-200-81.pdf
- WGFD-issued permits:
    - Scientific collection permits for birds and bats
    - Greater sage-grouse scientific collection permit
    - Scientific collection permits for other species

The need for additional wildlife permits for Phase I, if any, will be identified as part of the adaptive management process. *See Section 8.7.*

USFWS will determine and provide ETP conditions as well as the conditions of any other permits issued by USFWS. State permit conditions will be determined and provided by WGFD.

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