

Appendix D. Raptor Nest Studies

Raptor Nest Survey for the High Plains Wind Energy Facility Laramie and Carbon Counties, Wyoming



Prepared for:

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INTRODUCTION

PacifiCorp Energy (PacifiCorp) has developed two adjacent wind-energy facilities of 99 megawatts (MW) and 88.5 MW nameplate capacity in Albany and Carbon Counties, Wyoming. The High Plains Wind Energy Facility (HPWEF) is located approximately two miles (3.2 kilometers [km]) east of McFadden, Wyoming (Figure 1) in an area composed primarily of grassland. PacifiCorp Energy (PacifiCorp) contracted Western EcoSystems Technology, Inc. (WEST) to conduct raptor nest surveys at the HPWEF to compare to preconstruction data on nesting raptors in the project area.

STUDY AREA

The HPWEF is located in Carbon and Albany Counties, in southeastern Wyoming, approximately five miles (8.0 km) southwest of the town of Rock River and two miles (3.2 km) east of the town of McFadden (Figures 1 and 2). The HPWRA is used for ranching and consists of open land with rolling hill topography (Figure 2).

According to National Land Cover Data (USGS NLCD 2001), approximately 96.7% of the nearly 10,557-acre (16.51 square mile [mi²]; 42.76 square km [km²]) area is composed of scrub-shrub (Figure 3). Although much of the area is classified as scrub-shrub, shrub cover is relatively low on much of the study area and it more closely resembles grassland than scrub-shrub. The next most common habitat is emergent wetland, which comprises only 1.7% of the HPWEF, or 177.11-acres (0.28 mi²; 0.72 km²). Areas classified by the NLCD as grasslands cover 0.6% of the wind resource area, and developed open space covers 0.4%. All other habitat types cover 0.3% of the area or less (Figure 3).

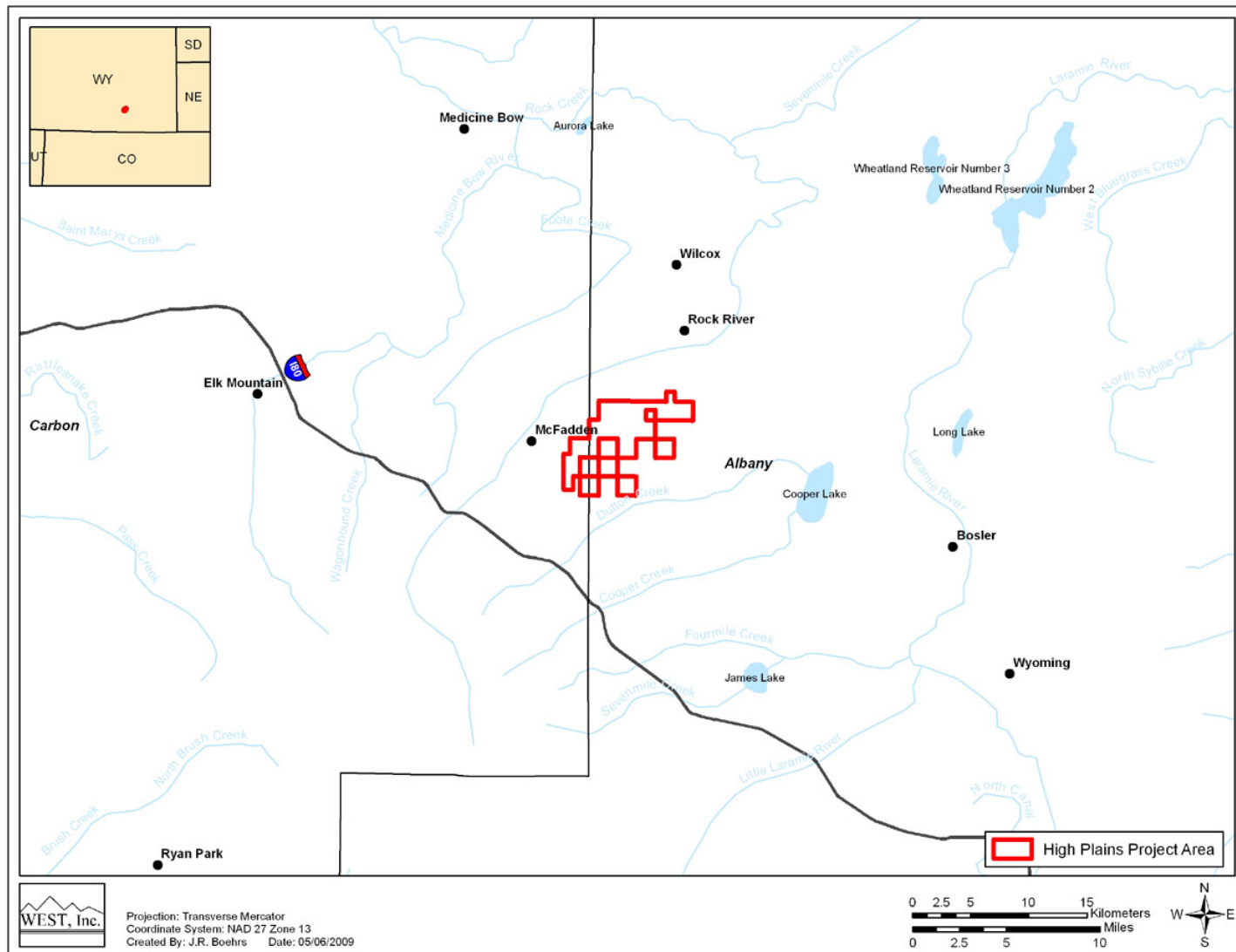


Figure 1. Location of the High Plains Wind Resource Area.

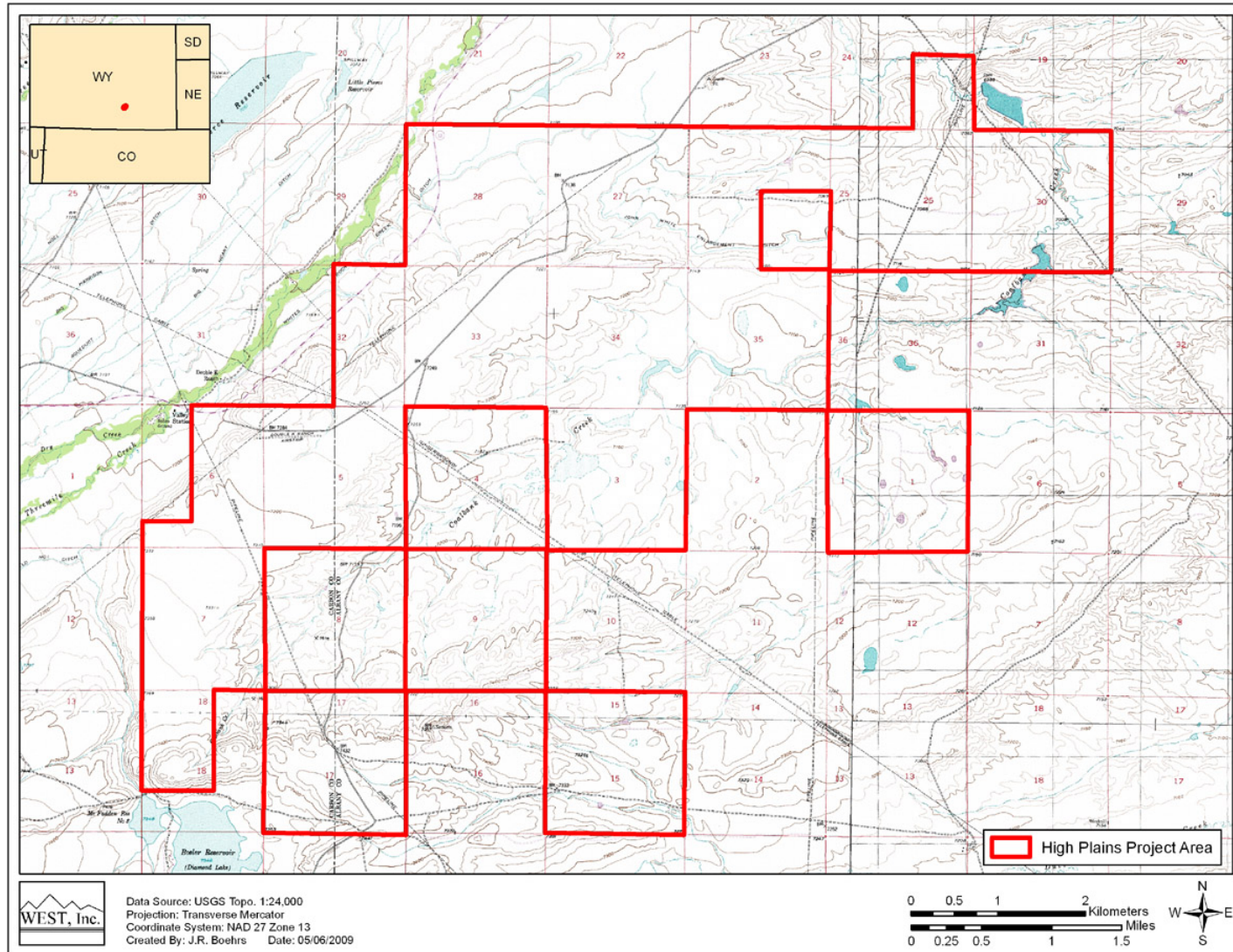


Figure 2. Elevation and topography of the High Plains Wind Resource Area.

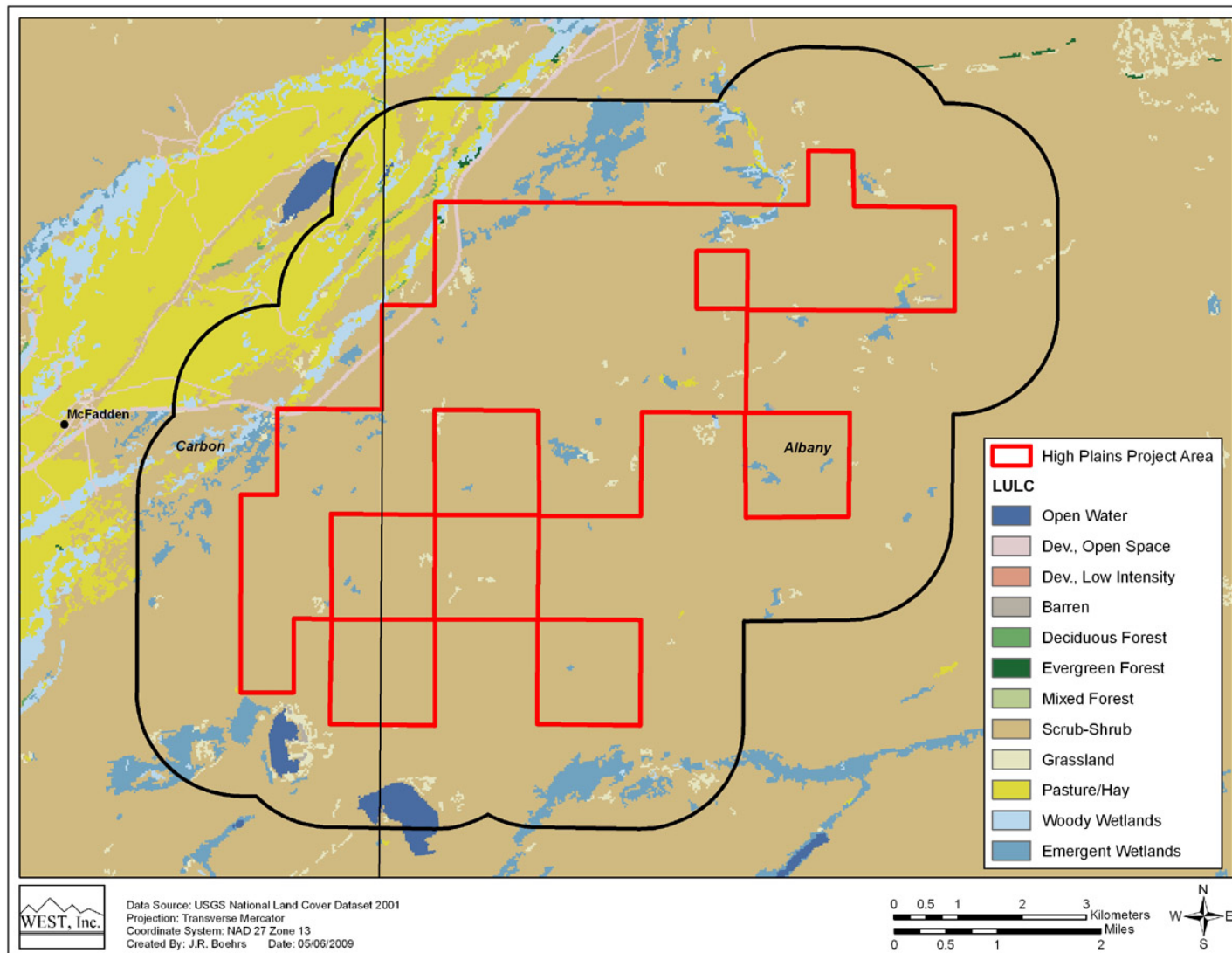


Figure 3. Land cover types and coverage within the High Plains Wind Resource Area.

METHODS

The entire HPWEF, as well as a 2-mile buffer around the study area, were searched for active raptor nests. The objective of the raptor nest surveys was to determine the presence of active raptor nests in and near the study area to compare to preconstruction data on nesting raptors obtained during the 2007 and 2008 baseline study (Johnson et al. 2009). The survey area was systematically searched by foot and by vehicle for active raptor nests. Trees, cliffs, rock outcrops and other potential nest structures such as wind mills and utility poles were searched. Universal Transverse Mercator (UTM) coordinates, as well as nesting substrate and current status (inactive, active, incubating, young in nest) were recorded for each nest located. All nests identified during the baseline studies in 2007 and 2008 were revisited in 2011. However, the baseline survey only encompassed an area within a 1-mile (1.6 km) buffer of the HPWEF, while the 2011 survey encompassed an area within a 2-mile buffer. Raptor nest surveys were conducted on July 11, 2011.

RESULTS

In 2007 and 2008, the only active raptor nest found on or within one mile of the HPWRA was a bald eagle (*Haliaeetus leucocephalus*) nest located along Rock Creek approximately 0.25 miles (400 m) north of the project area. Three inactive ferruginous hawk (*Buteo regalis*) nests were located on a powerline approximately one mile (1.61 km) east of the project area, and three additional inactive stick nests were located in or near the project area (Figure 4).

In 2011, the same bald eagle nest was again active in a cottonwood tree, with at least one chick in the nest. An active Swainson's hawk (*Buteo swainsonii*) nest with two fledged young perched next to the nest was also located in a cottonwood tree approximately 0.5 miles (0.8 km) north of the project area. One inactive golden eagle nest and an inactive buteo nest, both in cottonwood trees, were located approximately 1.5 miles (2.4 km) north of the project area, and another inactive nest (likely a ferruginous hawk) was located on a power pole in the northeastern portion of the HPWEF (Figure 5).

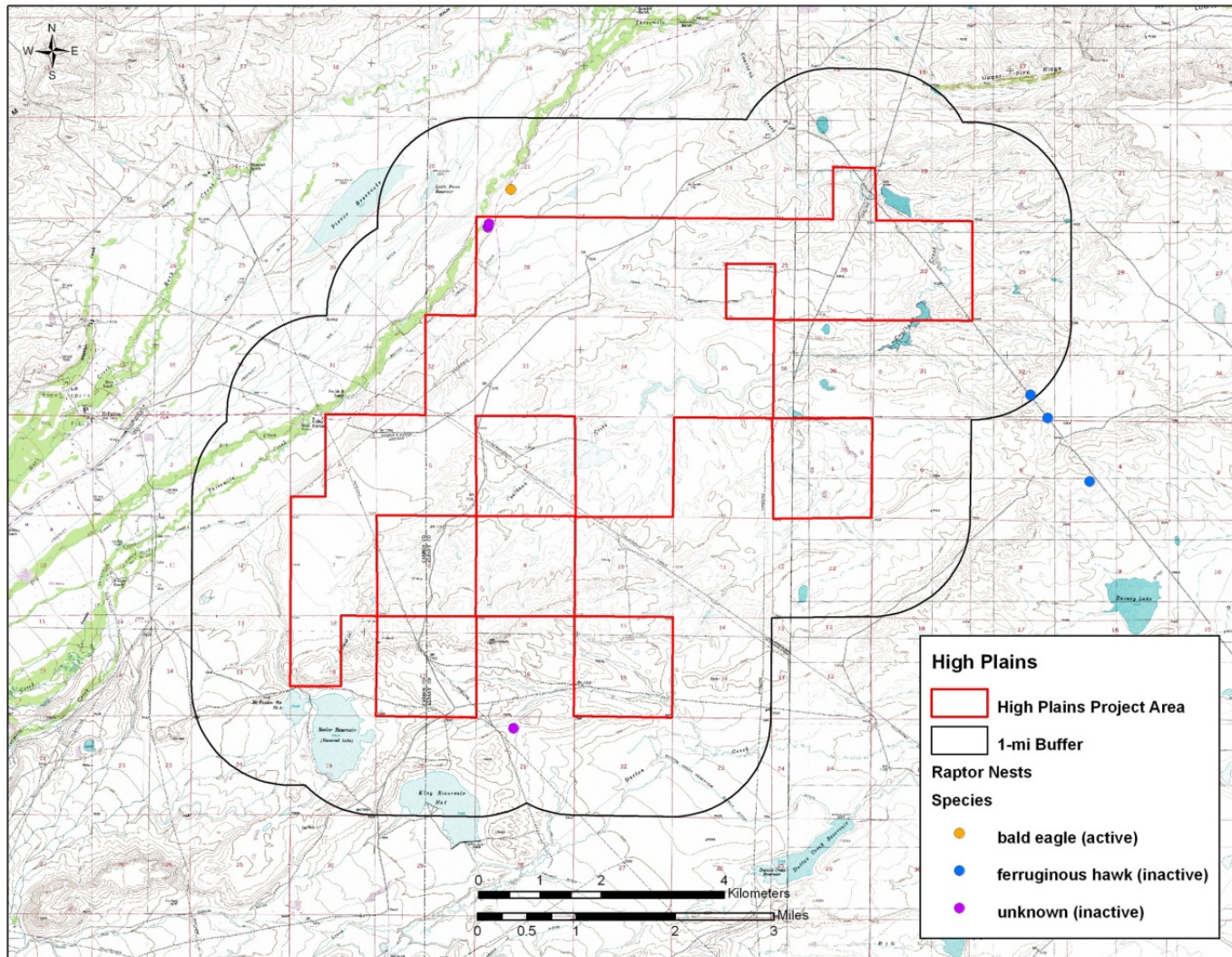


Figure 4. Location of active and inactive raptor nests found on or within one mile of the High Plains Wind Resource Area during the preconstruction 2007 and 2008 raptor nest survey.

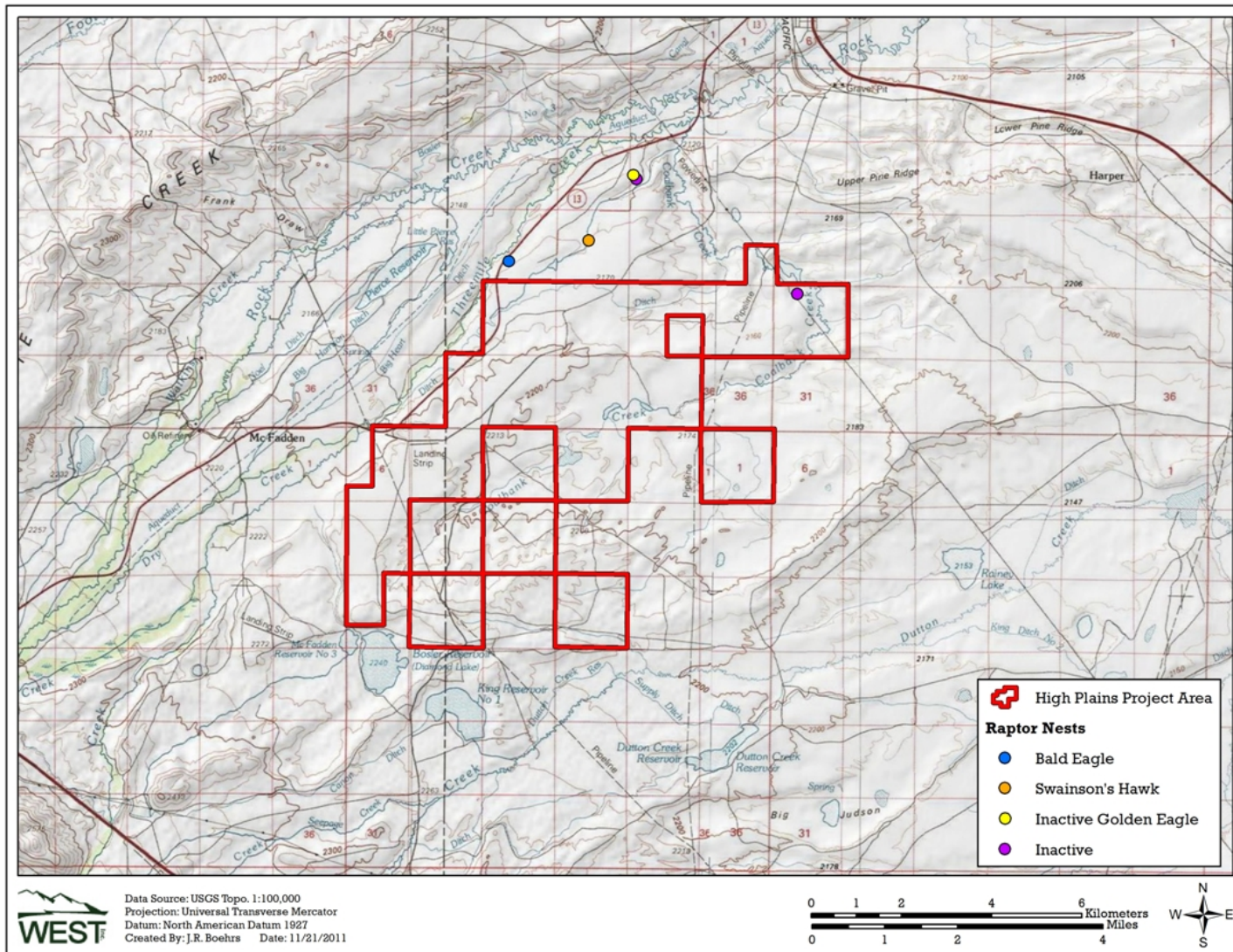


Figure 5. Location of active and inactive raptor nests found on or within two miles of the High Plains Wind Energy Facility in 2011.

DISCUSSION

The bald eagle nest has been active for many years at this same location. It was first observed while conducting raptor nest surveys for the Foote Creek Rim Wind Resource Area in 1995 (Johnson et al. 2000). It was also active during the baseline study in both the springs of 2007 and 2008. In addition to the bald eagle, a Swainson's hawk nest located 0.5 miles north of the HPWEF successfully fledged two young in 2011. The available data do not indicate a decline of nesting raptors in the vicinity of the HPWEF compared to preconstruction baseline data.

LITERATURE CITED

- Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000. Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. <http://www.west-inc.com> and http://www.west-inc.com/reports/fcr_final_baseline.pdf
- Johnson, G.D., K. Bay, and J. Eddy. 2009. Wildlife Baseline Studies for the High Plains Wind Resource Area, Carbon and Albany Counties, Wyoming. Prepared for CH2M HILL by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming.
- US Geological Survey (USGS) National Land Cover Database (NLCD). 2001. Land Use/Land Cover NLCD Data. USGS Headquarters, USGS National Center. Reston, Virginia.



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TECHNICAL MEMORANDUM

DATE: September 19, 2012

TO: PACIFICORP

FROM: WEST, Inc.

RE: High Plains & McFadden – Raptor Nest Memo 2012

The following memorandum (memo) presents findings of raptor nest surveys completed at the High Plains and McFadden Wind Energy Facilities (HPWEF). Aerial raptor nest surveys were conducted on April 23, 2012, with follow-up ground surveys completed on May 5 and 9, 2012.

Raptor Nest Surveys

The objective of the aerial raptor nest survey was to locate raptor and owl nests that are within the HPWEF and 2-mile turbine buffer (Figure 1) and classify activity. Based on guidelines provided by the USFWS, nests were classified as occupied or unoccupied and active or inactive. Nests were classified as *Occupied* when indicators of use (e.g., bird present, feathers, whitewash) were observed. Nests were classified as *Active* when indications of nesting activity were observed (e.g., bird on nest, eggs, or chicks). The nest did not have to be successful to be designated as Active.

Surveys were conducted from a helicopter on April 23 and via foot on May 5 and 9. Results from previous surveys were reviewed to identify known nest locations. Search paths were recorded with a real-time differentially-corrected Trimble GEO XT global positioning system (GPS) unit at 5-second intervals. The coordinates were set as Universal Transverse Mercator (UTM) North American Datum (NAD) 83.

Six raptor or owl nests were located within the HPWEF during the raptor nest surveys, including three red-tailed hawk (*Buteo jamaicensis*) nests, one golden eagle (*Aquila chrysaetos*) nest, one great horned owl (*Bubo virginianus*) nest, and one ferruginous hawk (*Buteo regalis*) nest (Figure

1). All nests were identified as occupied – active, except the golden eagle nest. An eagle was observed in the nest tree during the aerial survey; however, follow-up ground surveys did not identify use indicators (e.g., no feather, whitewash, or birds present). Most of the nests were located in the riparian area west of the HPWEF.

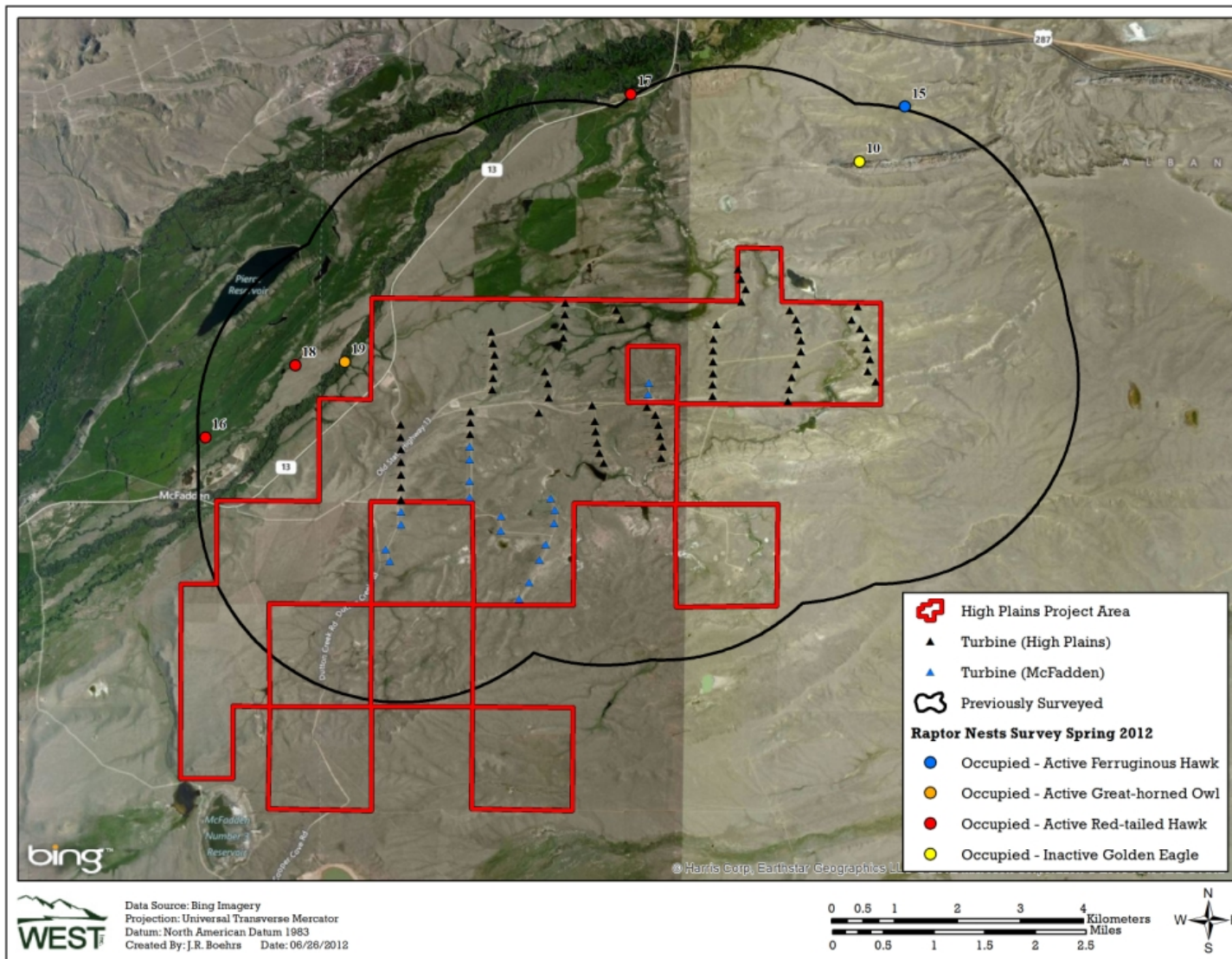


Figure 1. 2012 Raptor Nest Survey Results at the High Plains and McFadden Ridge Wind Energy Facilities.



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TECHNICAL MEMORANDUM

DATE: November 1, 2013

TO: PACIFICORP

FROM: WEST, Inc.

RE: High Plains & McFadden – Raptor Nest Memo 2013

The following memorandum (memo) presents findings of raptor nest surveys completed at the High Plains and McFadden Wind Energy Facilities (HPWEF). Ground surveys to determine eagle nest occupancy were initiated in late March/early April 2013. Aerial raptor nest surveys were conducted on May 10, 2013, with follow-up ground surveys completed on May 17 and 24 and June 8, 2013.

Raptor Nest Surveys

Based on guidelines provided by the USFWS, nests were classified as occupied or unoccupied and active or inactive. Nests were classified as *Occupied* when indicators of use (e.g., bird present, feathers, whitewash) were observed. Nests were classified as *Active* when indications of nesting activity were observed (e.g., bird on nest, eggs, or chicks). The nest did not have to be successful to be designated as Active. The objective of initial ground surveys was to determine occupancy for eagle (bald and golden) nests. An aerial raptor nest survey was also performed to identify nesting activity for all raptor and owl nests that are within the HPWEF and approximate 2-mile turbine buffer (Figure 1).

Initial occupation surveys were completed in late March/early April. The surveys targeted previously identified eagle nests. Aerial surveys were conducted from a helicopter on May 10, 2013. Aerial surveys were originally planned for late April; however, inclement weather required surveys to be postponed. Results from previous surveys were utilized to check known nest locations. Raptor nest databases received from the BLM were also utilized to check historic nest sites.

Additional nest searches and follow up checks were completed in mid and late May and early July. The follow up checks in May and July targeted bald eagle, ferruginous hawk, and red-tailed hawk nests identified as active during the aerial survey.

Occupation surveys in 2013 identified one occupied bald eagle nest. Seven raptor or owl nests within the HPWEF were determined to be active during the 2013 nesting surveys, including three red-tailed hawks (*Buteo jamaicensis*), one bald eagle (*Haliaeetus leucocephalus*), one great horned owl (*Bubo virginianus*), one ferruginous hawk (*Buteo regalis*), and one Swainson's hawk (*Buteo swainsoni*; Figure 1). During the aerial survey one chick was observed in the bald eagle nest. No other nests could be identified as successful due to birds incubating/brooding tight on nests. One occupied/active golden eagle nest was identified outside of the survey area approximately three miles from the HPWEF.

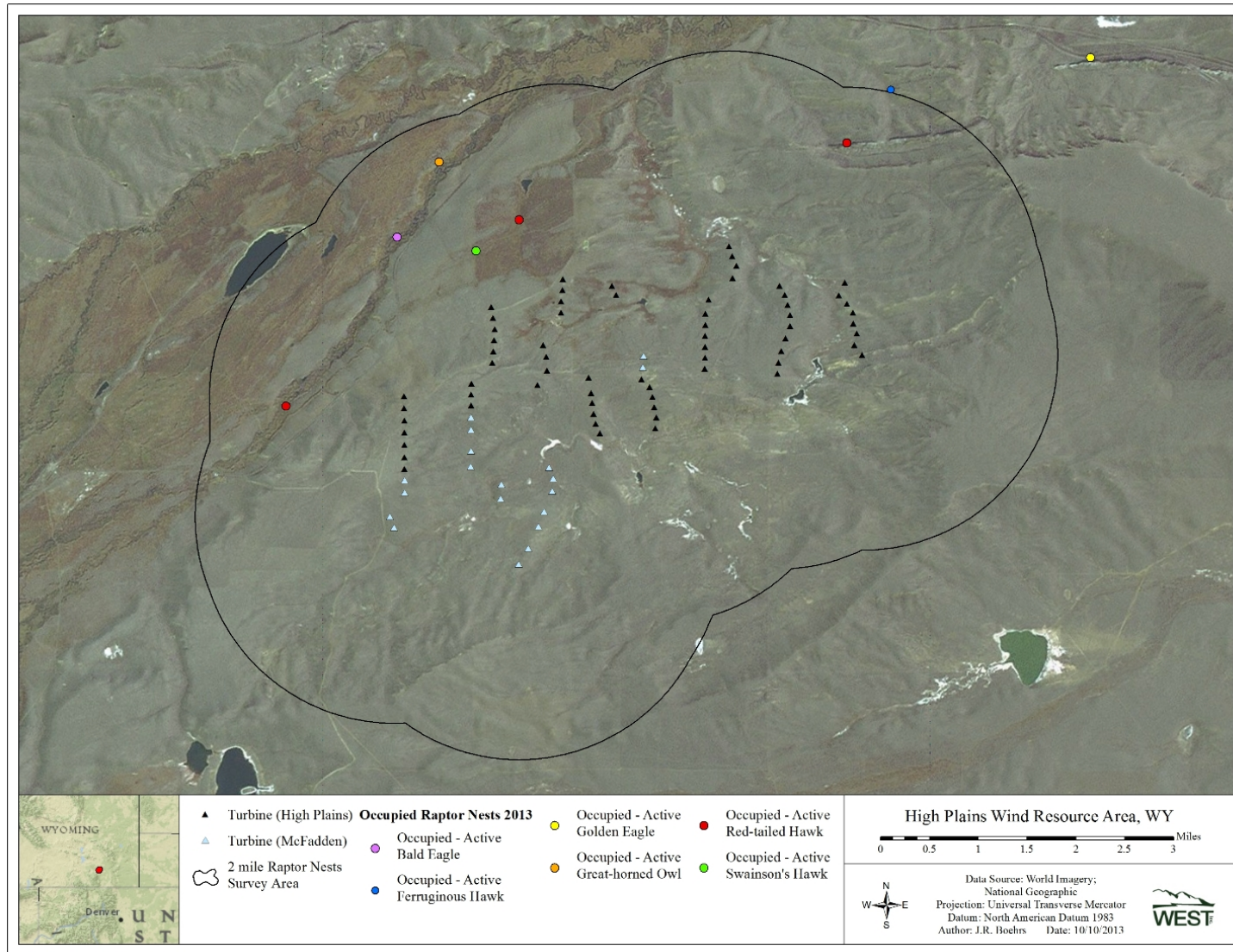


Figure 1. 2013 Raptor Nest Survey Results at the High Plains and McFadden Ridge Wind Energy Facilities.



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TECHNICAL MEMORANDUM

DATE: December 11, 2014

TO: PACIFICORP

FROM: WEST, Inc.

RE: High Plains/McFadden Ridge – Raptor Nest Memo 2014

The following memorandum (memo) presents findings of the 2014 raptor nest surveys completed at the High Plains/McFadden Ridge Wind Energy Facility (HPWEF). Aerial (helicopter) raptor nest surveys were conducted on April 11 and May 2, 2014. Follow up ground surveys were completed on May 20 and 23 and June 19, 2014. The survey area was defined as a 2.5 mile buffer from project turbines (Figure 1).

Raptor Nest Surveys

The USFWS drafted the *Eagle Conservation Plan Guidance Module 1 – Land-based Wind Energy (Version 2; 2013)*. In this document the following definitions are provided (note: no definition is provided for Active nest, only a reference to occupied nest):

Occupied nest – a nest used for breeding in the current year by a pair of eagles. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current year's mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a nest yet never lay eggs; such nests are considered occupied.

Unoccupied nest – those nests not selected by raptors for use in the current nesting season. See also inactive nest.

Inactive nest – a bald eagle or golden eagle nest that is not currently being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days immediately prior to, and including, at present. An inactive nest may become active again and remains protected under the Eagle Act.

The Region 6 USFWS has provided further guidance in the *Region 6 Recommendations for Avoidance and Minimization of Impacts to Golden Eagles at Wind Energy Facilities, April 11, 2013*:

An occupied nest is a nest used for breeding in the current year by a pair of eagles. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current year's mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a nest yet never lay eggs; such nests are considered occupied (Eagle Conservation Plan Guidance [ECPG1] 2012, p. 32). For purposes of these recommendations, we define occupied GOEA nests as nest sites that were occupied at least once during the last five years or last five years of field surveys. Because GOEAs will often use the same nest in multiple years (Kochert and Steenhof 2012), there is a high likelihood that these nests could be occupied again during the life of the project. Nests form the center of activity during the breeding season and are often centers of activity during the non-breeding season as well (Marzluff et al. 1997). Buffering or otherwise protecting eagle nests should substantially decrease the probability of lethal take, as well as disturbance take, of eagles. Other raptors using the same nesting habitats as GOEA (e.g., prairie falcon) will also benefit from protection of GOEA nest sites.

We define unoccupied GOEA nests as those nests not selected by raptors for use in the current nesting season (ECPG 2012, p. 33). For purposes of these recommendations, we define unoccupied GOEA nests as nest sites that were not occupied during the last five years or last five years of field surveys. It should be noted that occupied nests can be incorrectly assigned as unoccupied if the nests are not repeatedly surveyed during the same nesting season. Even if a nest was unoccupied in one or more years, it is still possible that eagles could reuse that nest in future years (Kochert and Steenhof 2012), especially since the intervals between nest reuse can be lengthy (Kochert and Steenhof 2012, Slater et al. 2013). Given that the anticipated life of a wind project is 30 years (though repowering could extend that indefinitely) it is likely that some unoccupied nests will become occupied during the life of the project. In addition, nests usually occur in areas of historical eagle use (due to topographic features and prey resources) and represent areas where eagles are expected to return in the future.

Based on guidance provided by the USFWS, 2014 raptor nests at HPWEF were classified as occupied – active or occupied – inactive. Follow up ground checks were conducted to determine fledge success. Nests were named by the Township, Range, Section and unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901).

Two occupied – active bald eagle nests were identified during the 2014 aerial nest surveys (20771101 and 20772101; Figure 1). Follow-up ground surveys (May 20) observed two chicks at each bald eagle nest. Surveys completed on June 19 confirmed fledge success, as no chicks were observed.

Table 1 lists the turbine closest to each bald eagle nest and the distance to that turbine.

Table 1. High Plains 2014 Bald Eagle Nests and Turbine Distance

Nest ID	Closest Turbine	Distance to Closest Turbine (miles)
20771101	HP-39	2.41
20772101	HP-11	1.20

Other Raptors

One ferruginous hawk nest (20761701), one great-horned owl nest (20771601), and four red-tailed hawk nests (20763201, 20772102, 20772201, and 20761801) were identified as occupied-active during the 2014 nest surveys. Follow up ground surveys did not identify chicks in the ferruginous hawk nest. Two chicks were observed in the great-horned owl nest. The red-tailed hawk nests were not monitored further. Red-tailed hawk nest 20761801 was identified as an occupied-inactive golden eagle nest in 2012, but has been occupied by a red-tailed hawk in 2013 and 2014.

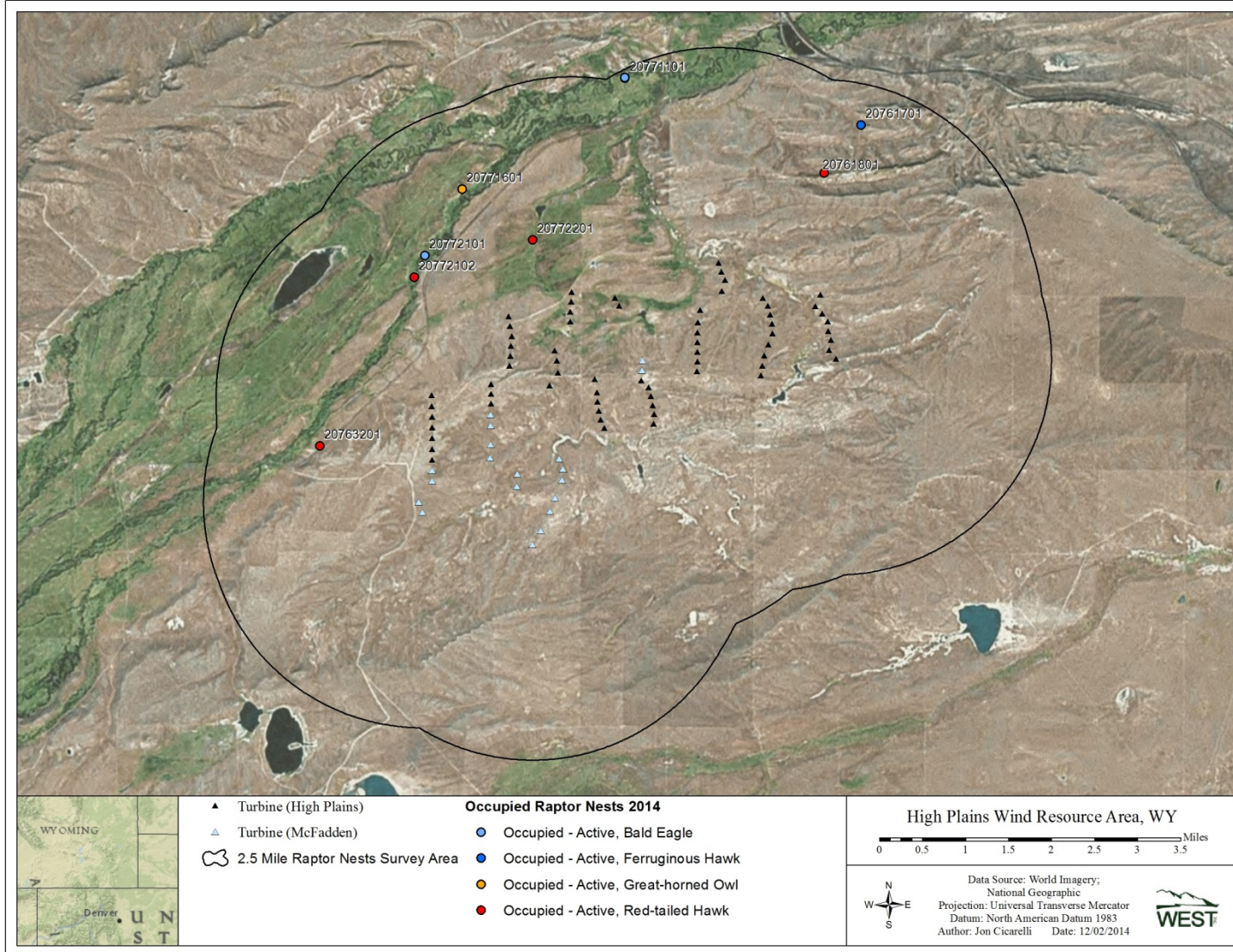


Figure 1. HPWEF – 2014 Nest Surveys



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TECHNICAL MEMORANDUM

DATE: October 23, 2015

TO: PACIFICORP

FROM: WEST, Inc.

RE: High Plains/McFadden Ridge – Raptor Nest Memo 2015

The following memorandum (memo) presents findings of the 2015 raptor nest surveys completed at the High Plains/McFadden Ridge Wind Energy Facility (HPWEF). Two rounds of aerial (helicopter) raptor nest surveys and follow up ground surveys were completed during the 2015 nesting season. The survey area was defined as a 2.5 mile buffer from project turbines (Figure 1).

Raptor Nest Surveys

Methods

The raptor nest surveys followed the guidelines provided below. PacifiCorp discussed the methods with the USFWS prior to implementation. The surveys methods included multiple ground and aerial surveys. The objectives of the surveys were to identify potentially occupied eagle nests, track nest status throughout the nesting season, and ultimately determine nest success.

January 1 – mid February: Informal checks were completed to verify potential territory occupation at known nest locations. A nest territory was considered potentially occupied if a pair of adults was observed in the general vicinity of the nest location. These checks were completed in coordination with other site activities (i.e., search efforts).

Mid-February – late-March: The first round of aerial surveys was conducted on March 5, 2015 from a helicopter. The goal of the survey was to document all eagle nests (potentially new and historic) and determine if the nests were occupied. Known owl nests were targeted during this survey. One qualified WEST biologist and the helicopter pilot flew the survey area (2.5-mile turbine buffer; Figure 1). Known nest data included previous WEST survey data and BLM nest

data. Features within the survey area where nests were likely to occur (e.g., rocky outcrops, trees, man-made structures) were investigated for potential new nests.

Late-March – April: Ground checks were completed at all used eagle nests (based on the results of the previous surveys). The goal of this survey was to identify occupied eagle nests with incubating adults. Ferruginous hawk nests (historic) were also surveyed during this effort to verify potential occupied nest status. Surveys were triggered by the presence of an incubating adult at a highly visible nest (e.g., eagle nest visible from public road).

May: The second round of aerial surveys were conducted from a helicopter on May 18, 2015. The goal of this survey was to identify chicks at occupied eagle nests (based on previous surveys) and the status of ferruginous hawk nests (assume incubating adults with eggs or chicks). This survey was conducted at least 60-days after the first aerial survey. Only eagle nests where an incubating adult was observed (unless property access did not allow a March-April check) were checked. All ferruginous hawk nests (historic and potentially new) were checked. Other raptor species were checked during this aerial survey and the nest status (i.e., incubating adult, eggs, chicks) were documented.

June – August: Ground checks were completed at eagle and ferruginous hawk nests that remained active (i.e., eggs or chicks) during previous surveys. The goal of this survey was to identify eagle and ferruginous hawk fledge success. Surveys were triggered by the fledge confirmation at a highly visible nest (e.g. eagle or ferruginous hawk nest visible from a public road).

Nests were named by the Township, Range, Section and unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901). Nest IDs remained the same for nests identified in 2014.

Results

The 2015 raptor nest survey results at HPWEF are provided below:

January 1 – mid-February: An adult bald eagle pair was observed near nest 20772101. Activity was not noted at the other known bald eagle nest (20771101).

Mid-February – late-March (aerial survey on 3/5/15): Three eggs were observed at bald eagle nest 20772101. No activity was observed at bald eagle nest 20771101.

Late-March – April (ground surveys on 3/24/15; 4/22/15): An adult was observed incubating on bald eagle nest 20772101 in late-March. In April, one adult and at least one downy young was observed at bald eagle nest 20772101. An adult was observed incubating on ferruginous hawk nest 20761701.

May (aerial survey on 5/18/15): Two bald eagle chicks were observed on nest 20772101. An adult ferruginous hawk was observed incubating on nest 20761701. Five eggs were observed on

ferruginous hawk nest 20762101. This ferruginous hawk nest was new in 2015. Four red-tailed hawk nests were observed with either eggs or chicks (4 eggs – 20772102; 1 egg – 20772202; 3 eggs – 20771401; 2 chicks – 20772201).

June – August (ground survey on 7/8/15; 7/10/15; 8/11/15): One bald eagle fledgling was observed near nest 20772101. No activity was observed at ferruginous hawk nest 20761701. Two adults were observed soaring in the general vicinity. At least two chicks were observed at ferruginous hawk nest 20762101.

Summary

One bald eagle nest (20772101) successfully fledged two young. One ferruginous hawk nest (20762101) successfully fledged two young. Additionally, one ferruginous hawk nest (20761701) had an incubating adult; however, it is assumed the nest failed as no chicks were observed. Four red-tailed hawk nests were identified as active. Follow up surveys were not completed at the red-tailed hawk nests.

Table 1. High Plains and McFadden Ridge 2015 Bald Eagle Nest Summary

Nest ID	Occupied	Successful	Comments
20772101	Yes	Yes	2 chicks observed; one fledgling confirmed, the second fledgling was assumed
20771101	No	No	No activity observed in 2015

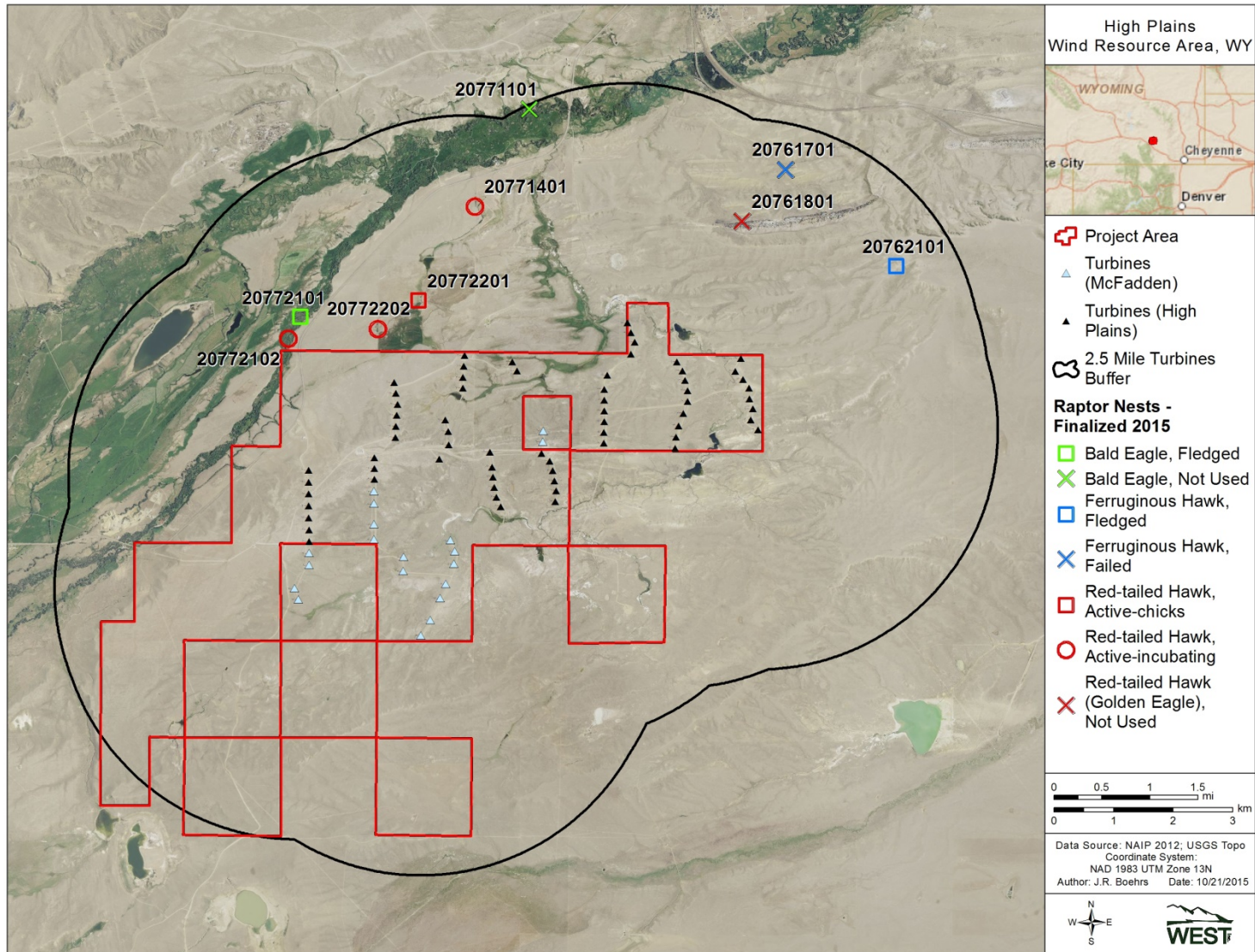


Figure 1. HPWEF – 2015 Nest Surveys



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TECHNICAL MEMORANDUM

DATE: November 18, 2016

TO: PACIFICORP

FROM: WEST, Inc.

RE: High Plains/McFadden Ridge – Raptor Nest Memo 2016

The following memorandum (memo) presents findings of the 2016 raptor nest surveys completed at the High Plains/McFadden Ridge Wind Energy Facility (HPWEF). Two rounds of aerial (helicopter) raptor nest surveys and follow up ground surveys were completed during the 2016 nesting season. The survey area was defined as a 2.5 mile buffer from project turbines (Figure 1).

Raptor Nest Surveys

Methods

The raptor nest surveys followed the guidelines provided below. PacifiCorp discussed the methods with the USFWS prior to implementation. The surveys methods included multiple ground and aerial surveys. The objectives of the surveys were to identify potentially occupied eagle nests, track nest status throughout the nesting season, and ultimately determine nest success.

January 1 – mid February: Informal checks were completed to verify potential territory occupation at known nest locations. A nest territory was considered potentially occupied if a pair of adults was observed in the general vicinity of the nest location. These checks were completed in coordination with other site activities (i.e., search efforts).

Mid-February – late-March: The first round of aerial surveys was conducted on March 8, 2016 from a helicopter. The goal of the survey was to document all eagle nests (potentially new and historic) and determine if the nests were occupied. Known owl nests were targeted during this

survey. One qualified WEST biologist and the helicopter pilot flew the survey area (2.5-mile turbine buffer; Figure 1). Known nest data included previous WEST survey data and BLM nest data. Features within the survey area where nests were likely to occur (e.g., rocky outcrops, trees, man-made structures) were investigated for potential new nests.

Late-March – April: Ground checks were completed at all used eagle nests (based on the results of the previous surveys). The goal of this survey was to identify occupied eagle nests with incubating adults. Ferruginous hawk nests (historic) were also surveyed during this effort to verify potential occupied nest status. Surveys were triggered by the presence of an incubating adult at a highly visible nest (e.g., eagle nest visible from public road).

May: The second round of aerial survey was conducted from a helicopter on May 21, 2016. The goal of this survey was to identify chicks at occupied eagle nests (based on previous surveys) and the status of ferruginous hawk nests (assume incubating adults with eggs or chicks). This survey was conducted at least 60-days after the first aerial survey. Only eagle nests where an incubating adult was observed (unless property access did not allow a March-April check) were checked. All ferruginous hawk nests (historic and potentially new) were checked. Other raptor species were checked during this aerial survey and the nest status (i.e., incubating adult, eggs, chicks) were documented.

June – August: Ground checks were completed at eagle and ferruginous hawk nests that remained active (i.e., eggs or chicks) during previous surveys. The goal of this survey was to identify eagle and ferruginous hawk fledge success. Surveys were triggered by the fledge confirmation at a highly visible nest (e.g. eagle or ferruginous hawk nest visible from a public road).

Nests were named by the Township, Range, Section and unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901). Nest IDs we initiated in 2014 and have remained the same for 2016.

Results

The 2016 raptor nest survey results at HPWEF are provided below:

January 1 – mid-February: Bald eagle activity was observed near nests 20772101 and 20771101. Both nests were assumed to be occupied in 2016.

Mid-February – late-March (aerial survey on 3/8/16): Two eggs were observed at bald eagle nest 20771101. An incubating adult bald eagle was observed at nest 20772101.

Late-March – April (ground surveys on 4/25/16): Adult bald eagles were observed at both nests (20772101 and 20771101). No chicks were visible, but it appeared adults were brooding. An adult was observed incubating on ferruginous hawk nests 20761701 and 20762101. Three eggs were also observed at nest 20762101.

May (aerial survey on 5/21/16): Two bald eagle chicks were observed on nest 20771101. One bald eagle chick was observed at nest 20772101. Three ferruginous hawk chicks were observed on nest 20761701. No ferruginous hawk activity was observed at nest 20762101. A red-tailed hawk was observed incubating at nests 20772201 and 20761801. Two Swainson's hawk nest also had activity with one egg observed at nest 20772202 and an incubating adult at nest 2077103. One great-horned owl nest (20771102) also had two young observed.

June – August (ground survey on 7/17/16): Bald eagle nest 20771101 successfully fledged two young, while bald eagle nest 20772101 successfully fledged one young. Three young successfully fledge from ferruginous hawk nest 20761701.

Summary

Two bald eagle nests (20772101 and 20771101) successfully fledged young. One ferruginous hawk nest (20762101) successfully fledged young. Two red-tailed hawk nests, two Swainson's hawk nests, and one great-horned owl nest were identified as active in 2016.

Table 1. High Plains and McFadden Ridge 2016 Bald Eagle Nest Summary

Nest ID	Occupied	Successful	Comments
20772101	Yes	Yes	1 young successfully fledged
20771101	Yes	Yes	2 young successfully fledged

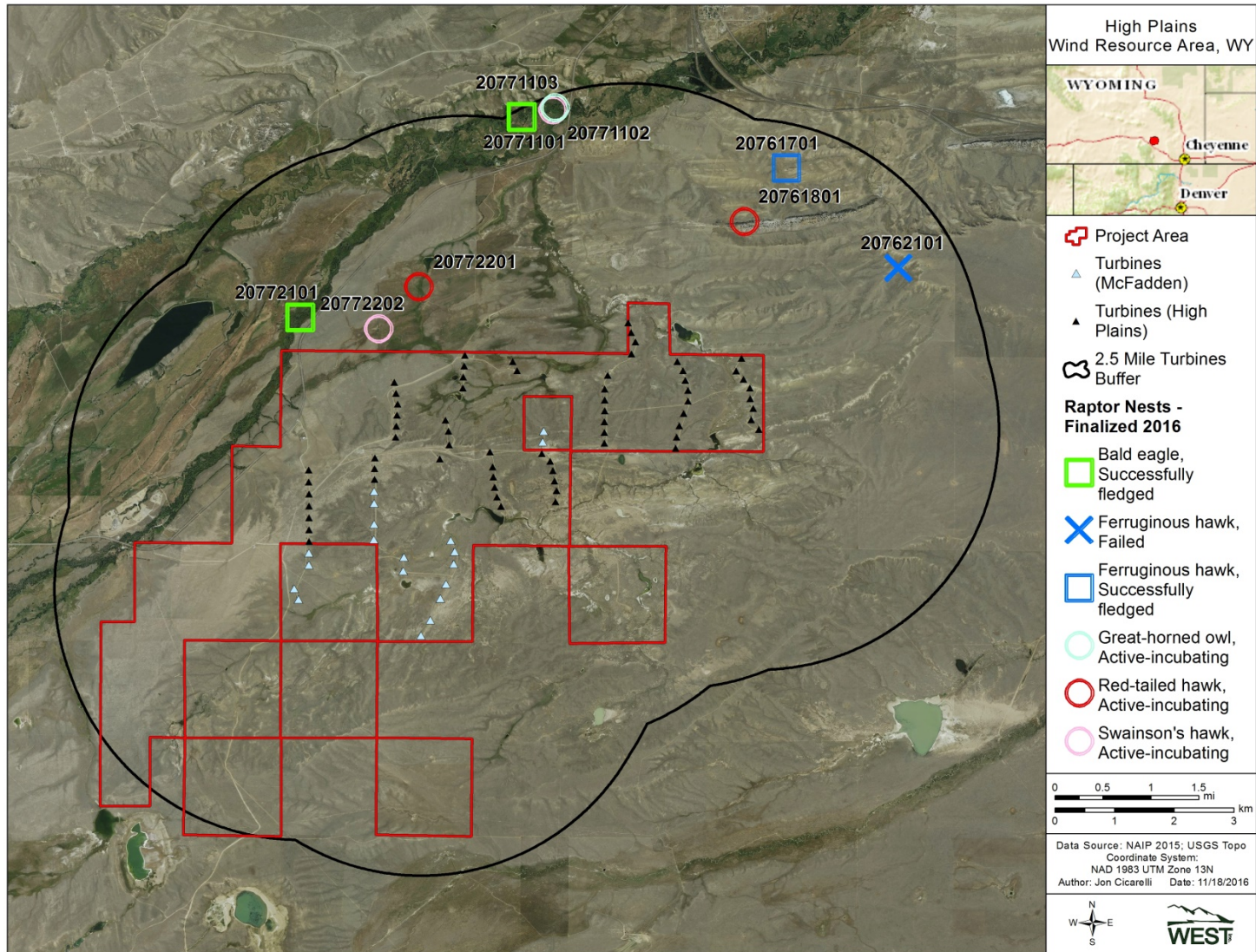


Figure 1. HPWEF – 2016 Nest Surveys



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TECHNICAL MEMORANDUM

Date: December 5, 2017

To: Travis Brown; PacifiCorp

From: Luke Martinson and Terri Harvey; WEST, Inc.

Subject: High Plains/McFadden Ridge I – 2017 Raptor Nest Survey

Introduction

The following memorandum (memo) presents findings of the 2017 raptor nest surveys completed at the High Plains/McFadden Ridge I Wind Energy Facility (HPWEF). Two rounds of aerial (helicopter) raptor nest surveys and follow up ground surveys were completed during the 2017 nesting season. The survey area was defined as a 2.5-mile buffer from project turbines (Figure 1). The objectives of the surveys were to identify potentially occupied eagle nests, track nest status throughout the nesting season, and ultimately determine nest success.

Raptor Nest Surveys

Methods

The raptor nest surveys followed the guidelines provided below. PacifiCorp discussed the methods with the USFWS prior to implementation. The surveys methods included multiple ground and aerial surveys and are described in more detail below:

January 1 – mid-February: Informal checks were completed to verify potential territory occupation at known nest locations. A nest territory was considered potentially occupied if a pair of adults was observed in the general vicinity of the nest location. These checks were completed in coordination with other site activities (i.e., search efforts).

Mid-February – late-March: The first round of aerial survey was conducted on March 3 and 9, 2017 from a helicopter. The goal of the survey was to document all eagle nests (potentially new and historic) and determine if the nests were occupied. Known owl nests were also targeted during

this survey. Two qualified WEST biologist and the helicopter pilot flew the survey area (2.5-mile turbine buffer; Figure 1). Known nest data included previous WEST survey data and BLM nest data. Features within the survey area where nests were likely to occur (e.g., rocky outcrops, trees, man-made structures) were investigated for potential new nests.

Late-March – April: Ground checks were completed at all used eagle nests (based on the results of the previous surveys). The goal of this survey was to identify occupied eagle nests with incubating adults. Ferruginous hawk nests (historic) were also surveyed during this effort to verify potential occupied nest status. Surveys were triggered by the presence of an incubating adult at a highly visible nest (e.g., eagle nest visible from public road).

May: The second round of aerial survey was conducted from a helicopter on May 8, 2017. The goal of this survey was to identify chicks at occupied eagle nests (based on previous surveys) and the status of ferruginous hawk nests (assume incubating adults with eggs or chicks). This survey was conducted at least 60 days after the first aerial survey. Only eagle nests where an incubating adult was observed (unless property access did not allow a March-April check) were checked. All ferruginous hawk nests (historic and potentially new) were checked. Other raptor species were checked during this aerial survey and the nest status (i.e., incubating adult, eggs, chicks) were documented.

June – August: Ground checks were completed at eagle and ferruginous hawk nests that remained active (i.e., eggs or chicks) during previous surveys. The goal of this survey was to identify eagle and ferruginous hawk fledge success. Surveys were triggered by the fledge confirmation at a highly visible nest (e.g. eagle or ferruginous hawk nest visible from a public road).

Nests were named by the Township, Range, Section and unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901). Nest IDs were initiated in 2014 and have remained the same for 2017.

Results

The 2017 raptor nest survey results at HPWEF are provided below:

January 1 – mid-February: Bald eagle activity was observed near nests 20772101 and 20771101. Both nests were assumed to be occupied in 2017.

Mid-February – late-March (aerial survey on 3/3/17 and 3/9/17): An adult bald eagle was observed sitting on nest 20772101. An adult bald eagle was observed incubating on nest 20771101.

Late-March – April (ground surveys on 4/11/17 and 5/1/17): On 4/11/17 an adult bald eagle was observed incubating at nest 20771101. On 5/1/17 an adult bald eagle was observed on nest 20772101 with one downy chick. A second adult flew in and fed the chick.

May (aerial survey on 5/8/17): Two bald eagle chicks were observed on nest 20771101. One bald eagle chick was observed at nest 20772101. A ferruginous hawk was observed incubating at nest 20761701. A red-tailed hawk was observed incubating at nest 20771204

June – August (ground surveys on 6/12/17, 6/14/17 and 7/20/17): On 6/12/17 an adult bald eagle was observed on nest 20772101 with a fully feathered young. The second adult was perched in a nearby tree. On 7/20/17 one adult was perched near nest. No young were observed. It is assumed that the young successfully fledged. On 6/14/17 a dead chick was observed at the base of the tree at bald eagle nest 20771101 and no other chicks were observed at the nest. It is not clear whether or not the second chick successfully fledged. On 7/20/17 there were no adults or young observed on or near the nest. No activity was observed at ferruginous hawk nest 20761701 on 6/14/17. This nest was deemed unsuccessful in 2017.

Summary

Bald eagle nest 20772101 successfully fledged one young. Two chicks were observed at bald eagle nest 20771101 during the nesting season. One chick was found dead below the nest; the status of the second chick is unknown. Ferruginous hawk nest 20761701 was occupied but unsuccessful. Red-tailed hawk nest 20771204 had an incubating adult.

Table 1. High Plains and McFadden Ridge I 2017 Bald Eagle Nest Summary

Nest ID	Occupied	Successful	Comments
20772101	Yes	Yes	One young assumed to have successfully fledged.
20771101	Yes	Unknown	One chick died; status of second chick unknown.

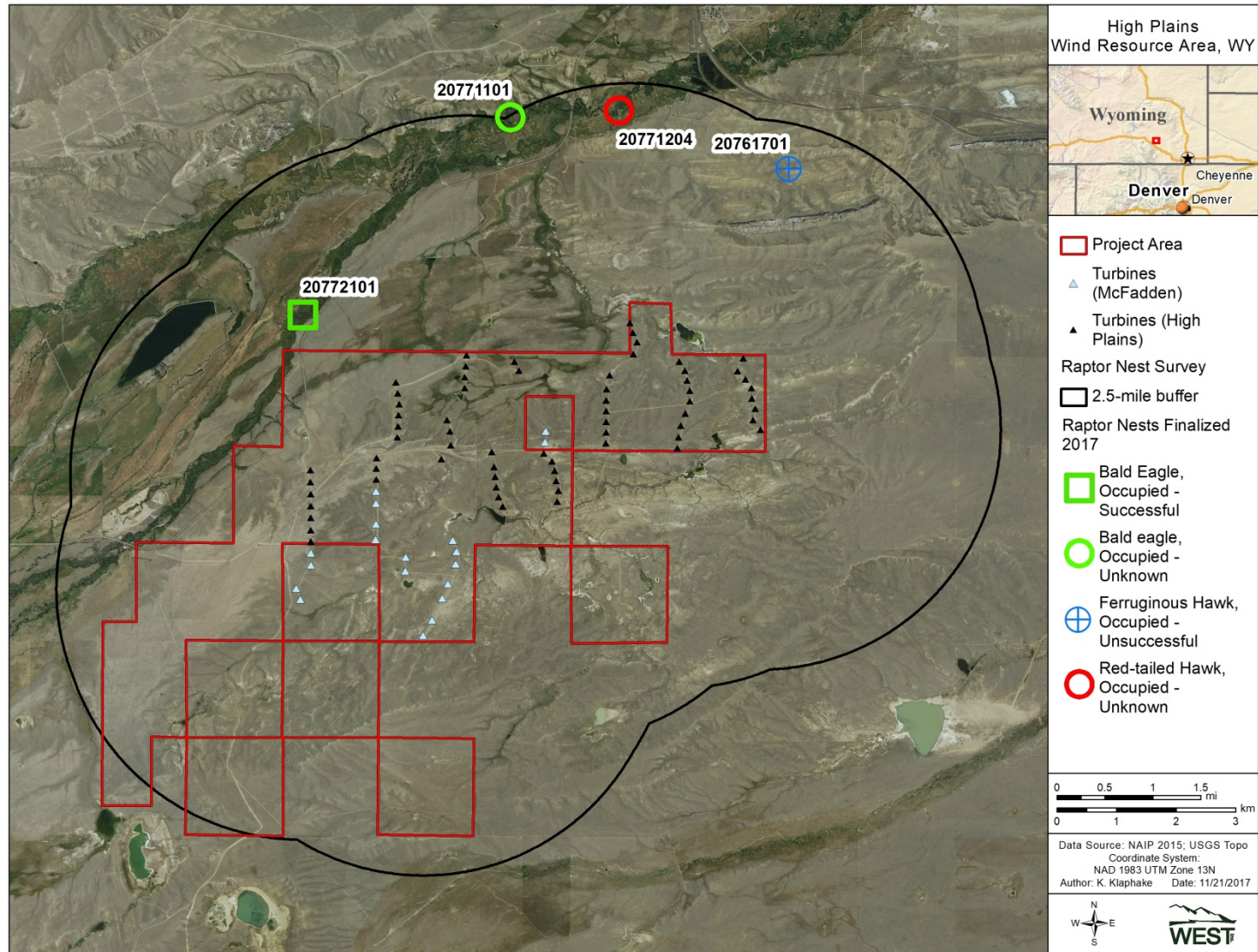


Figure 1. HPWEF – 2017 Raptor Nest Survey



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TECHNICAL MEMORANDUM

Date: December 21, 2018

To: Travis Brown; PacifiCorp

From: Jesse Hiler and Luke Martinson; WEST, Inc.

Subject: High Plains/McFadden Ridge I – 2018 Raptor Nest Survey

Introduction

PacifiCorp operates the High Plains/McFadden Ridge I Wind Energy Facility (HPWEF or Project) located in Albany County, Wyoming. PacifiCorp contracted Western EcoSystems Technology, Inc. (WEST) to conduct raptor nest surveys at the HPWEF during the 2018 nesting season. The survey protocol was developed in conjunction with the United States Fish and Wildlife Service (USFWS), WEST, and PacifiCorp. The survey area was defined as a 2.5-mile buffer of Project turbines. The following technical memorandum (memo) describes the methods and results of the 2018 raptor nest survey completed at the Project.

Raptor Nest Survey

Methods

The 2018 raptor nest survey was accomplished by conducting a series of aerial surveys and ground checks following the guidelines provided below. PacifiCorp discussed the methods with the USFWS and received approval prior to implementation. Surveys were conducted within a 2.5-mile buffer of turbines for raptors nests of all species (Figure 1). The primary objectives of the raptor nest surveys were to: 1) identify all eagle and ferruginous hawk (*Buteo regalis*) nests present in the defined survey area based on existing and publically available information; 2) locate potentially new eagle and ferruginous hawk nests during the current nesting season; 3) monitor the status of occupied eagle and ferruginous hawk nests throughout the nesting season (January 1 – August 31); and 4) determine the nest success and productivity for all occupied eagle nests. Survey efforts for other raptor species were limited to aerial surveys.

The following terms were defined to support the survey effort. Occupancy and Productivity determinations followed the guidance as outlined in the USFWS Eagle Conservation Plan (USFWS 2013) document:

“Occupied nest – a nest used for breeding in the current year by a pair. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years’ mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a nest yet never lay eggs; such nests are considered occupied.”

“Productivity – the number of juveniles fledged from an occupied nest, often reported as a mean over the sample of nests.”

Nest survey schedules were modified based on weather and logistic issues. At least two nest checks were made to determine occupancy. If a nest was determined through the nest checks to be unoccupied as of April 1 (or May if not accessible on the ground), then there was no further monitoring of the nest during the current nesting season. Likewise, if a nest was deemed occupied in February or March, but an incubating adult was not documented prior to April 1, the nest was not included in the checks for chicks or fledge success. Aerial surveys checked all known (historic) and potentially new nests during the current nesting season. Ground surveys only occurred at known nests or nests deemed occupied during previous surveys, where property access was granted. These methods will apply to eagle and ferruginous hawk nests. The full nest survey schedule is provided below.

January 1 – mid-February: Informal ground checks were completed on February 23, 2018 to verify potential occupation at known nest locations. A nest was considered potentially occupied if it met the definition provided above. These checks were completed in coordination with other site activities.

Mid-February – late-March: The first aerial survey was conducted from a helicopter March 6 – 7, 2018. The goal of this survey was to document all eagle nests (potentially new and historic) and determine if the nests were occupied. Ferruginous hawk nests were visited; however, based on the time of year, this species was not likely to be present. Two qualified WEST biologists and the helicopter pilot flew the survey within the 2.5-mile turbine buffer. Known nest data included previous WEST survey data and BLM nest data. Features within the survey area where nests are likely to occur (e.g., rocky outcrops, trees, man-made structures) were investigated for potential new nests.

Late-March – April: Ground checks were completed April 10 – 25, 2018 at all eagle nests deemed occupied during previous surveys. The goal of this survey was to identify occupied eagle nests with incubating adults. Ferruginous hawk nests (historic) were also surveyed during this effort to verify nest status. Surveys were triggered by the presence of an incubating adult at a highly visible nest (e.g., eagle nest visible from public road). One check was completed at each occupied nest if access was available.

May: The second aerial survey was conducted from a helicopter May 5 – 6, 2018. The goal of this survey was to identify chicks at eagle nests where incubating adults or eggs were observed on previous surveys and to determine the status of ferruginous hawk nests. This survey was conducted approximately 60-days after the first aerial survey as allowed by weather and logistic issues. All known/historic raptor nest locations were visited during this survey.

June – August: Ground checks were completed July 3 – 6 and July 24, 2018 at eagle and ferruginous hawk nests that continued to be occupied and eggs or chicks were directly observed or assumed to be present during previous surveys. The goal of this survey was to identify eagle and ferruginous hawk fledge success. One or more checks was completed at each nest where chicks were present until fledge success was confirmed. Surveys were triggered by the fledge success confirmation at a highly visible nest (e.g. eagle or ferruginous hawk nest visible from a public road).

Nests were named by the Township, Range, Section and a unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901).

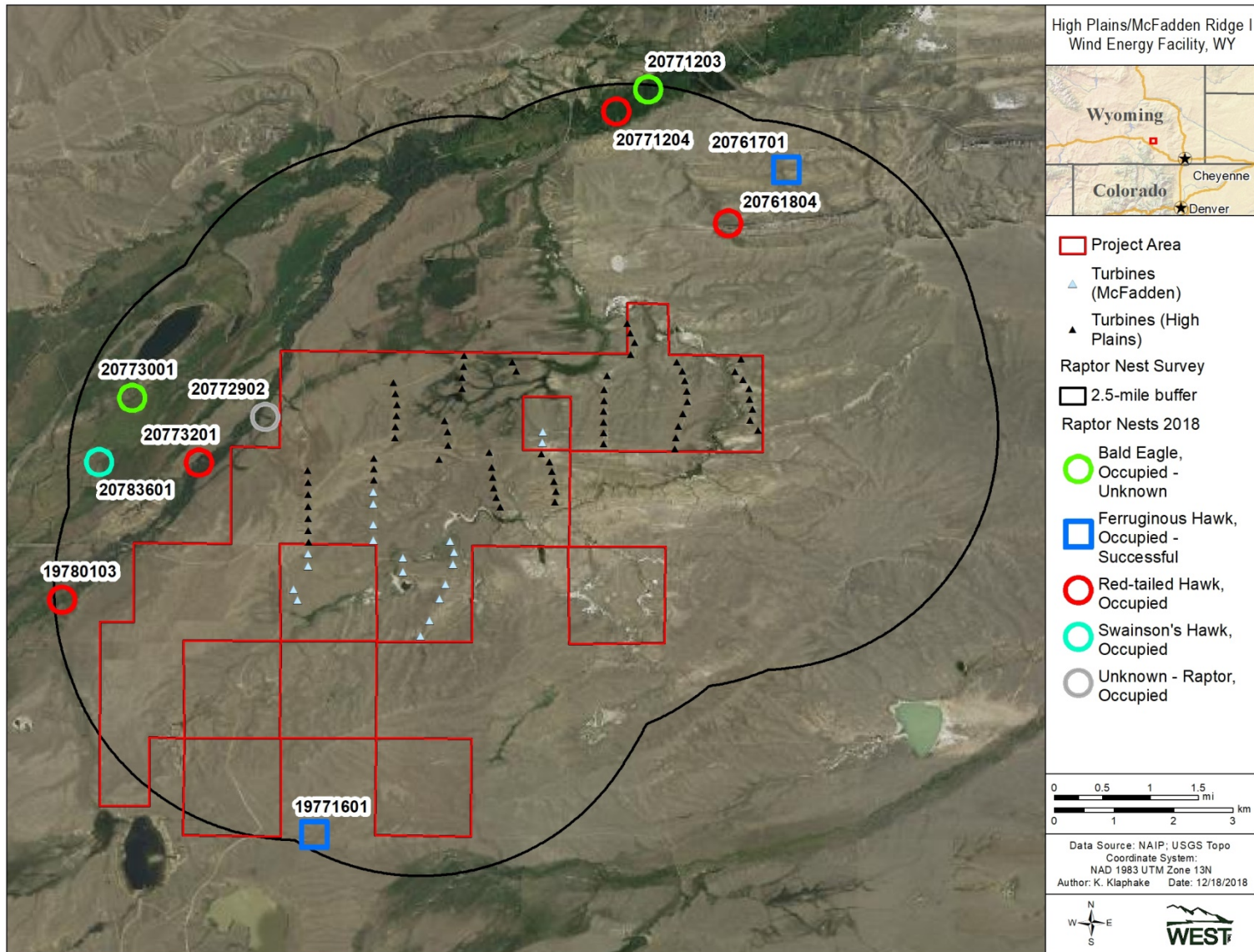


Figure 1. Results of the 2018 raptor nest survey conducted for the High Plains/McFadden Ridge I Wind Energy Facility located in Albany County, Wyoming.

Results

Two occupied bald eagle (*Haliaeetus leucocephalus*) nests were identified within the HPWEF survey area in 2018 (Figure 1; Table 1). Access was not available to conduct ground checks at these nests (20771203 and 20773001); therefore, nest success and productivity was unknown. During the second aerial survey, an incubating adult was observed at nest 20771203, and an adult with at least one chick was observed at nest 20773001 (Table 1). No nesting activity was observed at historic bald eagle nest 20771101 during early season surveys, and a Canada goose (*Branta canadensis*) was observed incubating at the nest on May 5, 2018. Historic bald eagle nest 20772101 was determined to be no longer suitable for use, as the tree containing the nest has fallen to the ground. Survey notes for all eagle nests are provided in Table 1.

Eight occupied non-eagle raptor nests were observed within the 2.5-mile turbine buffer in 2018 (Figure 1). These nests were assigned the following species for the 2018 nesting season: two ferruginous hawk nests, four red-tailed hawk (*Buteo jamaicensis*) nests, one Swainson’s hawk (*Buteo swainsoni*) nest, and one occupied raptor nest of unknown species at which eggs were observed with no adult raptors present at the time of survey. Ground checks were conducted at the occupied ferruginous hawk nests (19771601 and 20761701), allowing for a final estimate of nest success and productivity. Nest 19771601 successfully fledged two juveniles in 2018, and nest 20761701 was assumed to have successfully fledged at least one juvenile.

Table 1. High Plains/McFadden Ridge I Wind Energy Facility 2018 eagle nest summary.

Nest ID	Species	Status	Determination of Success	Minimum # of Fledged Chicks	Survey Notes
20772101	-	No Nest	-	-	Occupied bald eagle in 2017; Nest and tree on ground, no longer suitable for use
20771203	Bald Eagle	Occupied	Unknown	-	Adult tending 3/7/18; Adult incubating/brooding 5/5/18; Nest not visible from public land/road 7/5/18; No ground access
20773001	Bald Eagle	Occupied	Unknown	-	No activity 3/7/18; Adult and at least one chick, one week old 5/6/18; Two adults perched in the area, nest not visible from public land/road 7/6/18; No ground access
20771101	Canada Goose	Occupied	-	-	Occupied bald eagle in 2017; No activity 2/23/18 and 3/7/18; Canada goose incubating 5/5/18

Summary

During the 2018 nesting season, two occupied bald eagle nests (20771203 and 20773001) were identified within the survey area (Figure 1; Table 1). This was also the number identified in 2017; however, it was two different nests (20772101 and 20771101). No golden eagle (*Aquila chrysaetos*) nests were observed during raptor nest surveys conducted at the HPWEF. Two occupied ferruginous hawk nests (19771601 and 20761701) were identified within the 2.5-mile buffer, and both nests successfully fledged juveniles in 2018 (Figure 1). In addition, four red-tailed hawk nests, one Swainson's hawk nest, and one raptor nest of unknown species were classified as occupied in 2018 (Figure 1).

References

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. Executive Summary and frontmatter + 103 pp. Available online at:
<https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>



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TECHNICAL MEMORANDUM

Date: November 4, 2019

To: Travis Brown; PacifiCorp

From: Jesse Hiler and Luke Martinson; WEST, Inc.

Subject: High Plains/McFadden Ridge I – 2019 Raptor Nest Survey

Introduction

PacifiCorp operates the High Plains/McFadden Ridge I Wind Energy Facility (HPWEF or Project) located in Albany County, Wyoming. PacifiCorp contracted Western EcoSystems Technology, Inc. (WEST) to conduct raptor nest surveys at the HPWEF during the 2019 nesting season. The survey protocol was developed in conjunction with the United States Fish and Wildlife Service (USFWS), WEST, and PacifiCorp. The survey area was defined as a 2.5-mile buffer of Project turbines. The following technical memorandum (memo) describes the methods and results of the 2019 raptor nest survey completed at the Project.

Raptor Nest Survey

Methods

The 2019 raptor nest survey was accomplished by conducting a series of aerial surveys and ground checks following the guidelines provided below. PacifiCorp discussed the methods with the USFWS and received approval prior to implementation. Surveys were conducted within a 2.5-mile buffer of turbines for raptors nests of all species (Figure 1). The primary objectives of the raptor nest surveys were to: 1) identify all eagle and ferruginous hawk (*Buteo regalis*) nests present in the defined survey area based on existing and publically available information; 2) locate potentially new eagle and ferruginous hawk nests during the current nesting season; 3) monitor the status of occupied eagle and ferruginous hawk nests throughout the nesting season (January 1 – August 31); and 4) determine the nest success and productivity for all occupied eagle nests. Survey efforts for other raptor species were limited to aerial surveys.

Nests that fledged at least one juvenile were considered successful. Productivity is defined as the number of juveniles fledged from an occupied nest, and is often reported as a mean over the sample of nests. Occupancy determinations followed the guidance as outlined in the USFWS Eagle Conservation Plan (USFWS 2013) document:

“Occupied nest – a nest used for breeding in the current year by a pair. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years’ mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not uncommon for a pair of eagles to occupy a nest yet never lay eggs; such nests are considered occupied.”

Nest survey schedules were modified based on weather and logistic issues. At least two nest checks were made to determine occupancy. If a nest was determined, through the nest checks, to be unoccupied as of April 1 (or May if not accessible on the ground), then there was no further monitoring of the nest during the current nesting season. Likewise, if a nest was deemed occupied in February or March, but an incubating adult was not documented prior to April 1, the nest was not included in the checks for chicks or fledge success. Aerial surveys included visiting all known (historic) nest locations and searching for potential new nests. Ground surveys only occurred at known nests or nests deemed occupied during the current year’s surveys, where property access was granted. These methods will apply to eagle and ferruginous hawk nests. The full nest survey schedule is provided below.

January 1 – mid-February: Informal ground checks were completed to verify potential occupation at known nest locations. A nest was considered potentially occupied if it met the definition provided above. These checks were completed in coordination with other site activities.

Mid-February – late-March: The first aerial survey was conducted from a helicopter March 7 – 9, 2019. The goal of this survey was to document all eagle nests (potentially new and historic) and determine if the nests were occupied. Ferruginous hawk nests were visited; however, based on the time of year, this species was not likely to be present. Two qualified WEST biologists and the helicopter pilot flew the survey within the 2.5-mile turbine buffer. Known nest data included previous WEST survey data and BLM nest data. Features within the survey area where nests are likely to occur (e.g., rocky outcrops, trees, man-made structures) were investigated for potential new nests.

Late-March – April: Ground checks were completed on April 15, 2019 at all eagle nests deemed occupied during previous surveys. The goal of this survey was to identify occupied eagle nests with incubating adults. Ferruginous hawk nests (historic) were also surveyed during this effort to verify nest status. Surveys were triggered by the presence of an incubating adult at a highly visible nest (e.g., eagle nest visible from public road). One check was completed at each occupied nest if access was available.

May: The second aerial survey was conducted from a helicopter May 6 – 7, 2019. The goal of this survey was to identify chicks at eagle nests where incubating adults or eggs were observed on

previous surveys and to determine the status of ferruginous hawk nests. This survey was conducted approximately 60-days after the first aerial survey as allowed by weather and logistic issues. While the protocol only required eagle nests to be checked a third time if an incubating adult or eggs were observed during previous checks; an attempt was made to visit all known nest locations during the aerial survey. All ferruginous hawk nests (historic and potentially new) were checked.

June – August: Ground checks were completed June 17 and July 11, 2019 at eagle and ferruginous hawk nests that continued to be occupied and eggs or chicks were directly observed or assumed to be present during previous surveys. The goal of this survey was to identify eagle and ferruginous hawk fledge success. One or more checks was completed at each nest where chicks were present until fledge success was confirmed. Surveys were triggered by the fledge success confirmation at a highly visible nest (e.g. eagle or ferruginous hawk nest visible from a public road).

Nests were named by the Township, Range, Section and a unique nest ID for each section (e.g., Township 23, Range 80, Section 29, Nest 1 = 23802901).

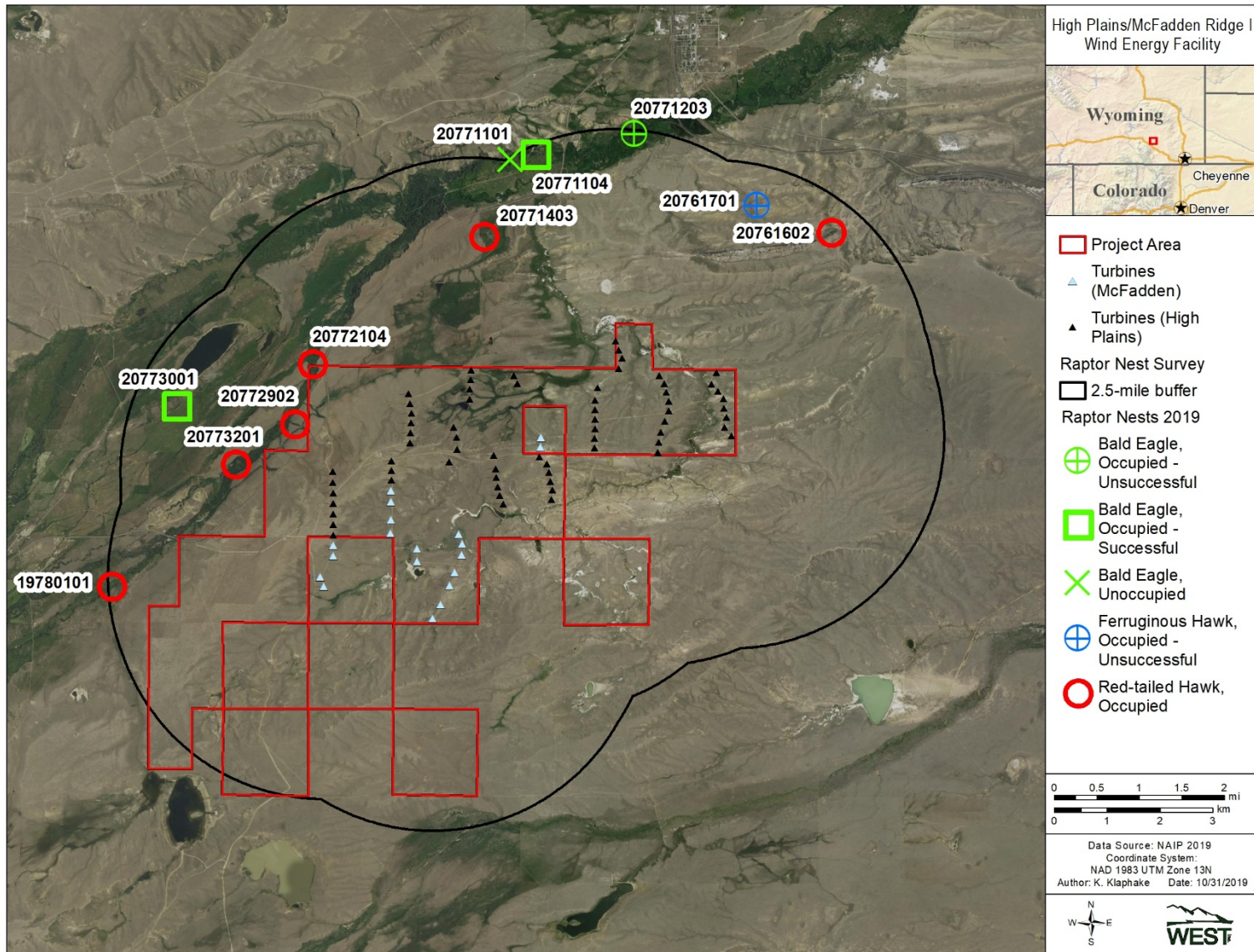


Figure 1. Results of the 2019 raptor nest survey conducted for the High Plains/McFadden Ridge I Wind Energy Facility located in Albany County, Wyoming.

Results

Three occupied bald eagle (*Haliaeetus leucocephalus*) nests were identified within the HPWEF survey area in 2019 (Figure 1; Table 1). Nests 20771104 and 20773001 each successfully fledged one juvenile, which was confirmed during ground checks conducted on July 11, 2019 (Table 1). Nest 20771203 was unsuccessful at fledging bald eagle juveniles in 2019 (Table 1). This nest was classified as an occupied bald eagle nest on March 9, 2019 during the first aerial survey; however, access was not available for an April ground check and during the following aerial survey conducted on May 7, 2019, a Canada goose (*Branta canadensis*) was observed incubating in the nest. Historic bald eagle nest 20771101 was classified as unoccupied for the 2019 nesting season (Figure 1). Survey notes for all eagle nests are provided in Table 1.

Seven occupied non-eagle raptor nests were observed within the 2.5-mile turbine buffer in 2019, including one ferruginous hawk nest and six red-tailed hawk (*Buteo jamaicensis*) nests (Figure 1). Incubating adults were observed at these nests during the aerial survey completed May 6 – 7, 2019. A ground check was conducted at the occupied ferruginous hawk nest (20761701) on June 17, 2019; no adults or young were observed, and the nest was determined to be unsuccessful at fledging juveniles. There was no further monitoring of the occupied red-tailed hawk nests in 2019.

Table 1. High Plains/McFadden Ridge I Wind Energy Facility 2019 eagle nest summary.

Nest ID	Species	Status	Determination of Success	Minimum # of Fledged Chicks	Survey Notes
20771101	Bald Eagle	Unoccupied	-	-	No sign of recent nesting activity 3/9/19 and 5/7/19; Occupied bald eagle in 2017
20771104	Bald Eagle	Occupied	Successful	1	No activity 3/9/19; Adult and two chicks, 2-3 weeks old 5/7/19; One fully feathered nestling perched on nest, two adults perched nearby 6/17/19; Adult and one fledgling flying in the area 7/11/19
20771203	Bald Eagle	Occupied	Unsuccessful	0	Adult bald eagle tending, new construction 3/9/19; No ground access; Canada goose incubating 5/7/19
20773001	Bald Eagle	Occupied	Successful	1	Adult incubating 3/9/19; Adult incubating, another perched nearby 4/15/19; Adult and one chick, one week old 5/7/19; One fledgling flying in the area, adult perched 150 m North of nest 7/11/19

Summary

During the 2019 nesting season, three occupied bald eagle nests were identified within the survey area (Figure 1; Table 1). This was one more than the number identified in 2018 (2) and 2017 (2). However, data indicates the possibility that nest 20771104 was an alternate to nest 20771203, and that only two bald eagle pairs occupied nests within the survey area in 2019. Nest 20771203 was occupied by bald eagles during the first aerial survey, while no nesting activity was observed at nest 20771104. During the second aerial survey, nest 20771203 was being used by Canada geese, and nest 20771104 was occupied by bald eagles. Bald eagle nests 20771104 and 20773001 each fledged one juvenile in 2019 (Table 1). No golden eagle (*Aquila chrysaetos*) nests were observed during raptor nest surveys conducted at the HPWEF. One occupied ferruginous hawk nest (20761701) was identified within the 2.5-mile buffer in 2019, and it was confirmed to be unsuccessful (Figure 1). This was down from 2018, when two occupied ferruginous hawk nests were documented. In addition, six occupied red-tailed hawk nests were observed in 2019 (Figure 1).

References

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. Executive Summary and frontmatter + 103 pp. Available online at:
<https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>