



DATE: June 17, 2017

TO: John Kuba, ConnectGen, LLC

FROM: Karl Kosciuch, WEST, Inc.

RE: 2019 Golden Eagle and Raptor Nest Survey Report, Rail Tie, WY

Introduction

ConnectGen, LLC (ConnectGen) is developing the proposed Rail Tie Wind Project (Rail Tie, Project) in Albany County, Wyoming. Western Ecosystems Technology, Inc. (WEST) is under contract to provide biological support for the development of the Project, including aerial surveys for golden eagle (*Aquila chrysaetos*) and non-eagle raptor nests within the Project area and a surrounding 10-mile (mi; 16 kilometer [km]) buffer for eagles (Survey Area), and 1-mi (1.6 km) buffer for non-eagle raptors. Aerial surveys began in mid-March, 2019; a second visit was completed in early May, 2019. This memorandum summarizes the methodology and results of the 2019 golden eagle and raptor nest surveys at Rail Tie.

Survey Area

The Survey Area included the Project area and a surrounding 10-mi buffer, including portions of Albany and Laramie counties, Wyoming and Larimer County, Colorado (Figure 1). This area is bounded by the Laramie Mountains to the east and the Arapaho Roosevelt National Forest to the south. The Survey Area consists primarily of grassland and lodgepole/ponderosa pine habitat. The Survey Area included a number of rock outcroppings or mountains with large cliffs, all of which offer potentially suitable nesting habitat for golden eagles and other raptors. Much of the Survey Area is privately owned and actively managed for livestock grazing; non-private lands of the Arapaho Roosevelt National Forest, the Pole Mountain area of the Medicine Bow National Forest, Hutton Lake National Wildlife Refuge, and Curt Gowdy State Park.

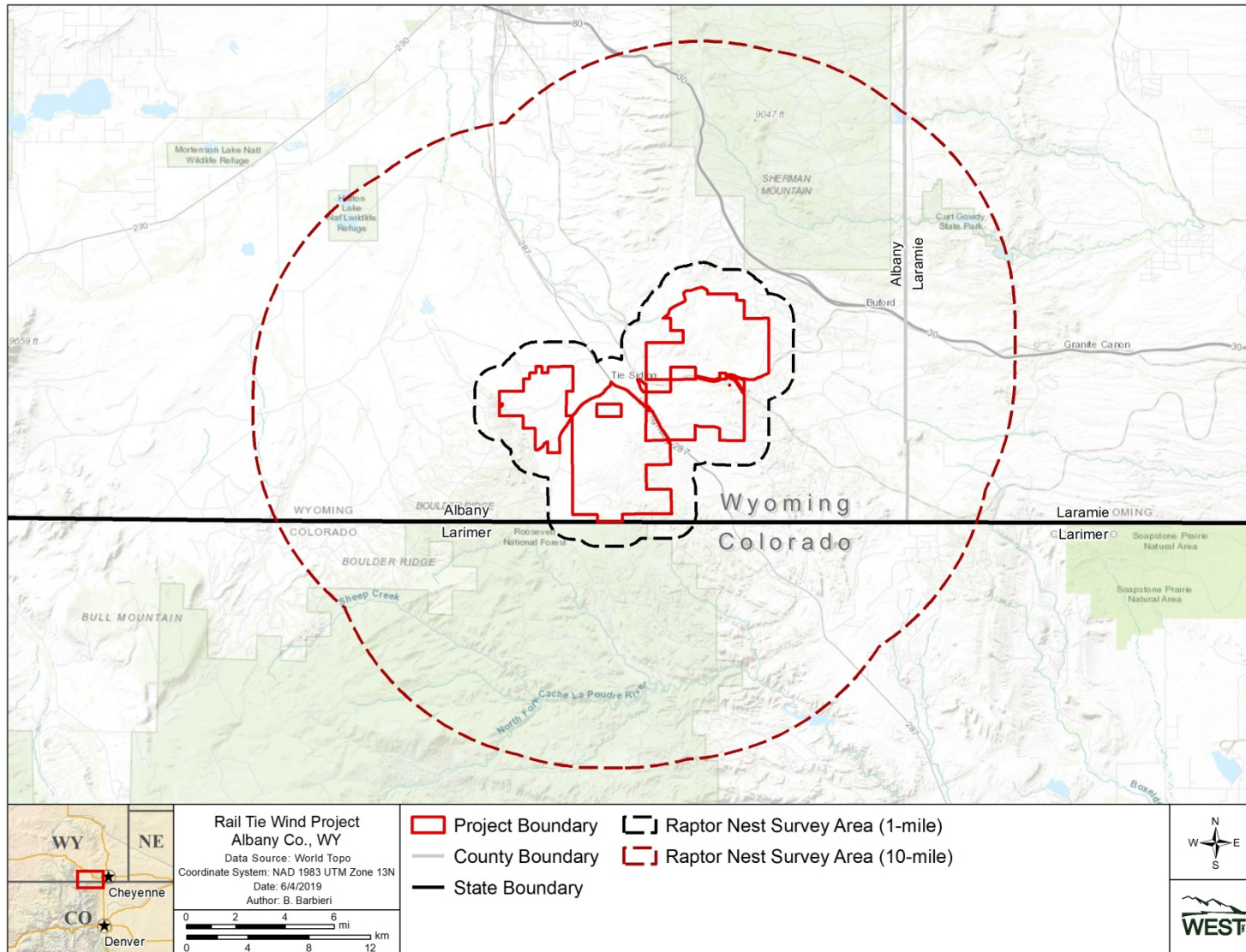


Figure 1. Overview of 2019 Rail Tie Wind Project golden eagle and non-eagle raptor nest Survey Area including 1-mile and 10-mile buffers.

Methods

The U.S. Fish and Wildlife Service (USFWS) recommends conducting two rounds of double-observer (i.e., a primary and secondary observer) aerial nest surveys at a proposed wind energy facility at least 30 days apart (USFWS 2013), with the initial survey scheduled to coincide with the primary nest establishment time period for golden eagles in a particular region. Nesting chronology of golden eagles varies depending on region (e.g., latitude) and yearly site-specific seasonality (e.g., winter storm activity); in Wyoming, golden eagles may begin to establish territories as early as January and February with nest-building, egg-laying, and requisite incubation activity commencing thereafter (e.g., March into April; Pagel et al. 2010). The initial survey was conducted on 11 and 12 March, 2019 during a time period that overlapped the primary territory establishment period of golden eagles in the area, while the follow-up survey was performed on 10 May, 2019 when both resident and non-resident (i.e., migratory) raptor species were actively engaged in reproductive activities (e.g., nest building, incubating, brooding), and when golden eagles engaged in ongoing nesting activities would be reliably on or around nests. The initial effort was also timed to minimize disturbance to golden eagles on active nests prior to critical life history stages such as incubating and brooding; golden eagles observed in the Survey Area were establishing territories and building nests in early March.

The Survey Area was determined based a Project boundary provided by ConnectGen, with 1-mi and 10-mi Projects buffers established in a Geographic Information System (GIS). The survey utilized an intuitive controlled survey method during the first survey (Figure 2). This intuitive controlled survey focused on areas with the highest potential to support target species; in this case, golden eagles and other raptors. These key habitat features included cliffs, rock outcrops, and large trees. The second survey focused on nest checks and searches of suitable habitat (Figure 3).

During surveys, the helicopter was positioned to allow thorough visual inspection of all appropriate habitat features. In general, the helicopter remained within a zone 100-feet (ft; 30.5 m) to 500-ft (152.4 m) above ground level at a relative air speed of approximately 50 miles per hour (mph; 80.5 kilometers per hour [kph]). When nests were located, the helicopter reduced speed and adjusted flight track to allow for a clear view of the nest for documentation and photographing. For each nest found, a GPS location was recorded, a photograph was taken, and nest attribute data were collected (Table 1). If there were multiple nests at a location, one representative GPS point was recorded and the number of nests at the location was noted. Photos of eagle nests are contained in Appendix A. If no birds were associated with a nest it is classified as unknown species. Unknown species nests are further classified as 'raptor' if the nest was likely built by a raptor species and 'large stick nest' if the size and structure are characteristic of an eagle.

Nest status was categorized using definitions originally proposed by Postupalsky (1974) and largely followed today (ECPG 2013). Nests were classified as occupied if any of the following were observed at the nest structure: (1) an adult in an incubating position; (2) eggs; (3) nestlings or fledglings; (4) presence of an adult (sometimes sub-adults); (5) a newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed earlier in the breeding season; or (6) a recently repaired nest with fresh sticks (clean breaks) or fresh

boughs on top, and/or droppings and/or molted feathers on its rim or underneath. Occupied nests were further classified as active if an egg or eggs were laid. Nests were classified as inactive if no eggs or chicks were present. Nests not meeting the above criteria for "Occupied" during at least two consecutive surveys were classified as "Unoccupied."

Results

Twelve golden eagle nests were documented during surveys (Table 1). Of the twelve nest locations, three had multiple nests at a location including nest 35 (five nests), 48 (two nests), and 62 (two nests); however, these are considered a single nest for the purposes of this study. Of the 12 golden eagle nests, the final determination of status was seven occupied-active and five occupied-inactive. Of the seven occupied-active golden eagle nests, five contained adults in an incubating position and the number of eggs could not be determined. One 2-week old chick was observed in each of the two remaining two occupied-active nests (nests 10 and 34).

One occupied-active bald eagle nest was documented during surveys (Table 1). The adult was in incubating position and the number of eggs could not be determined.

Other occupied-active nest documented during surveys included one Canada goose, two common raven, three ferruginous hawk, five red-tailed hawk, one Swainson's hawk, one prairie falcon, and five great horned owl (Table 1).

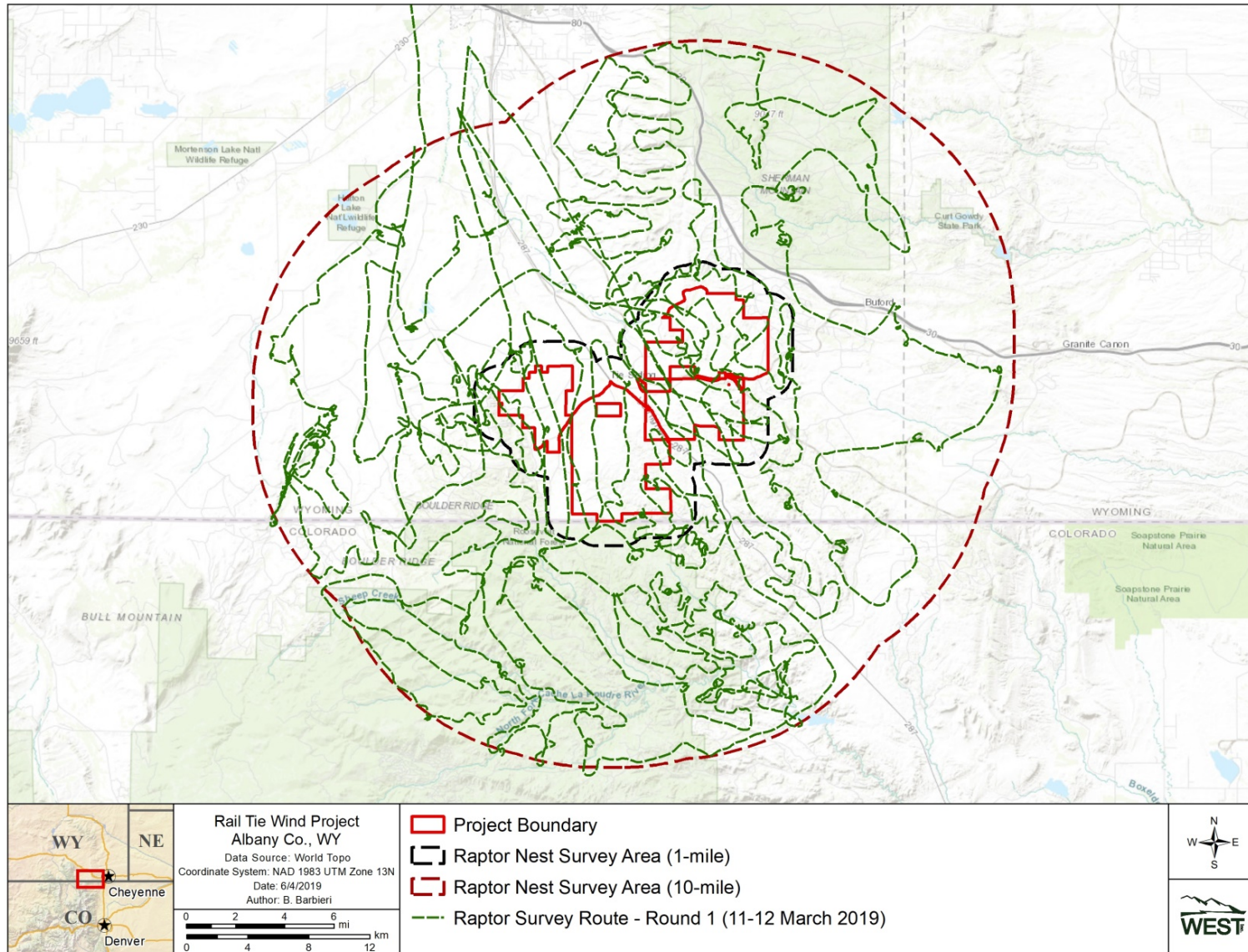


Figure 2. Survey route during round 1 aerial nest surveys at Rail Tie Wind Project, 11 – 12 March 2019.

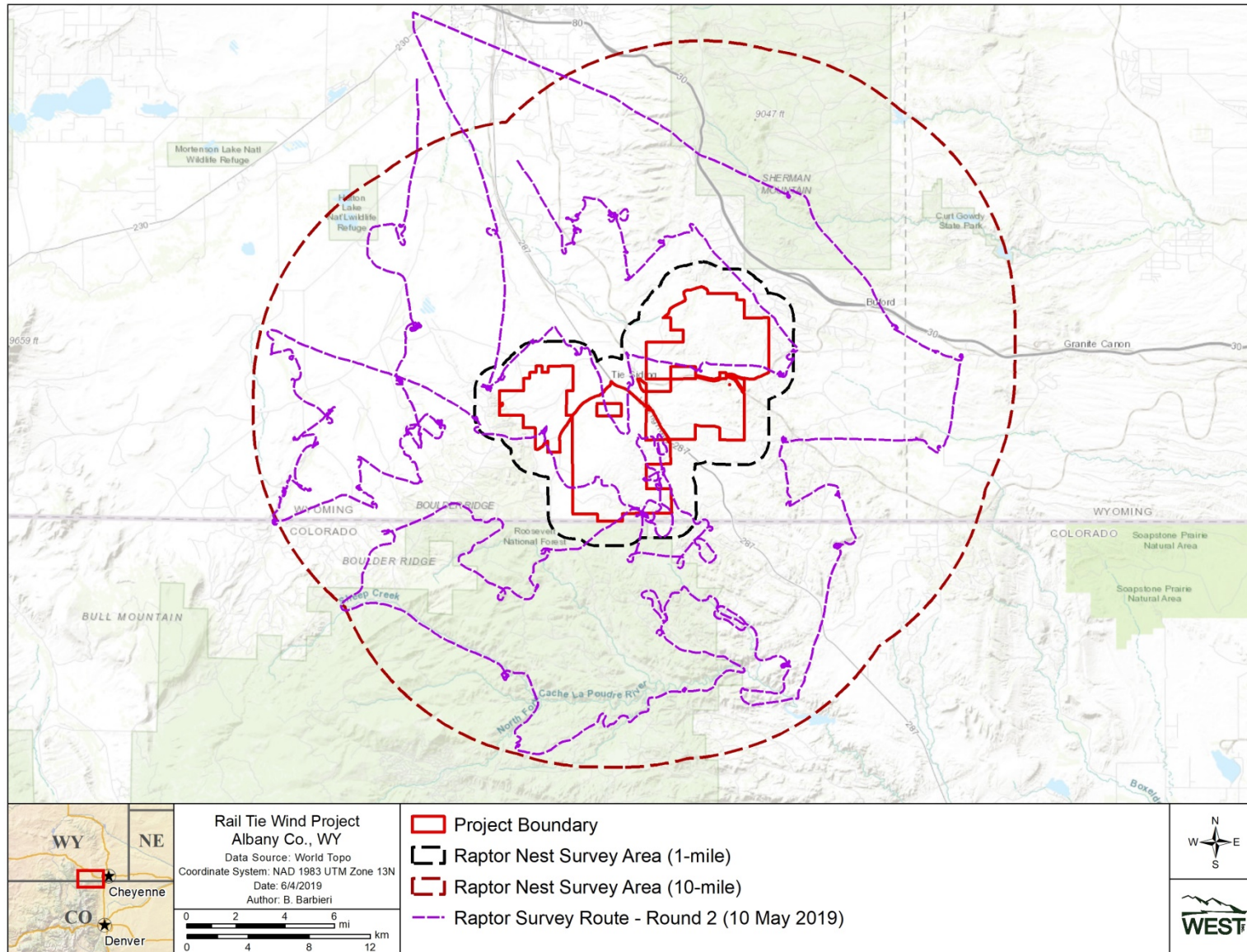


Figure 3. Survey route during round 2 aerial nest surveys at Rail Tie Wind Project, 10 May 2019.

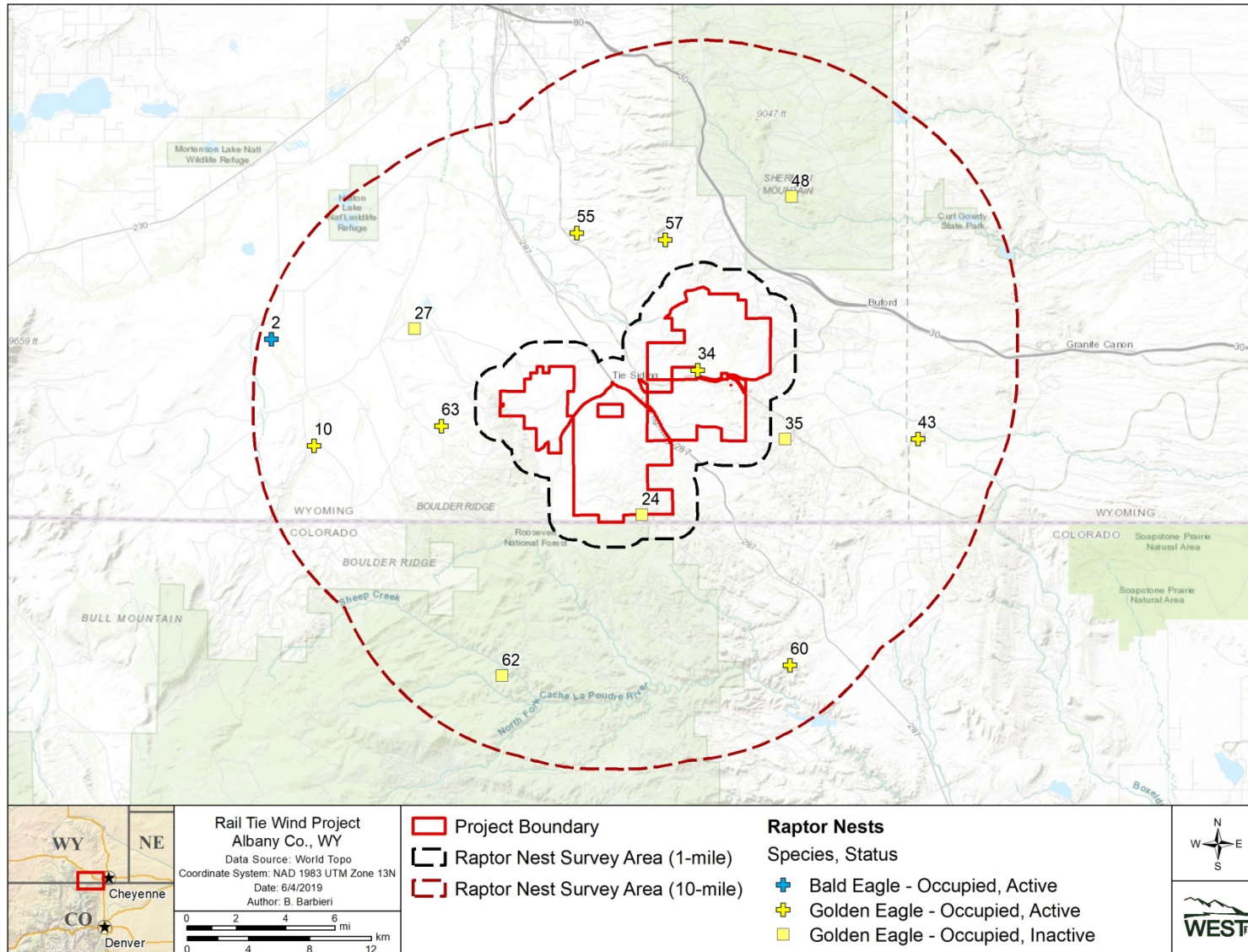


Figure 4. Bald eagle and golden eagle nest locations documented during aerial surveys of Rail Tie, 2019.

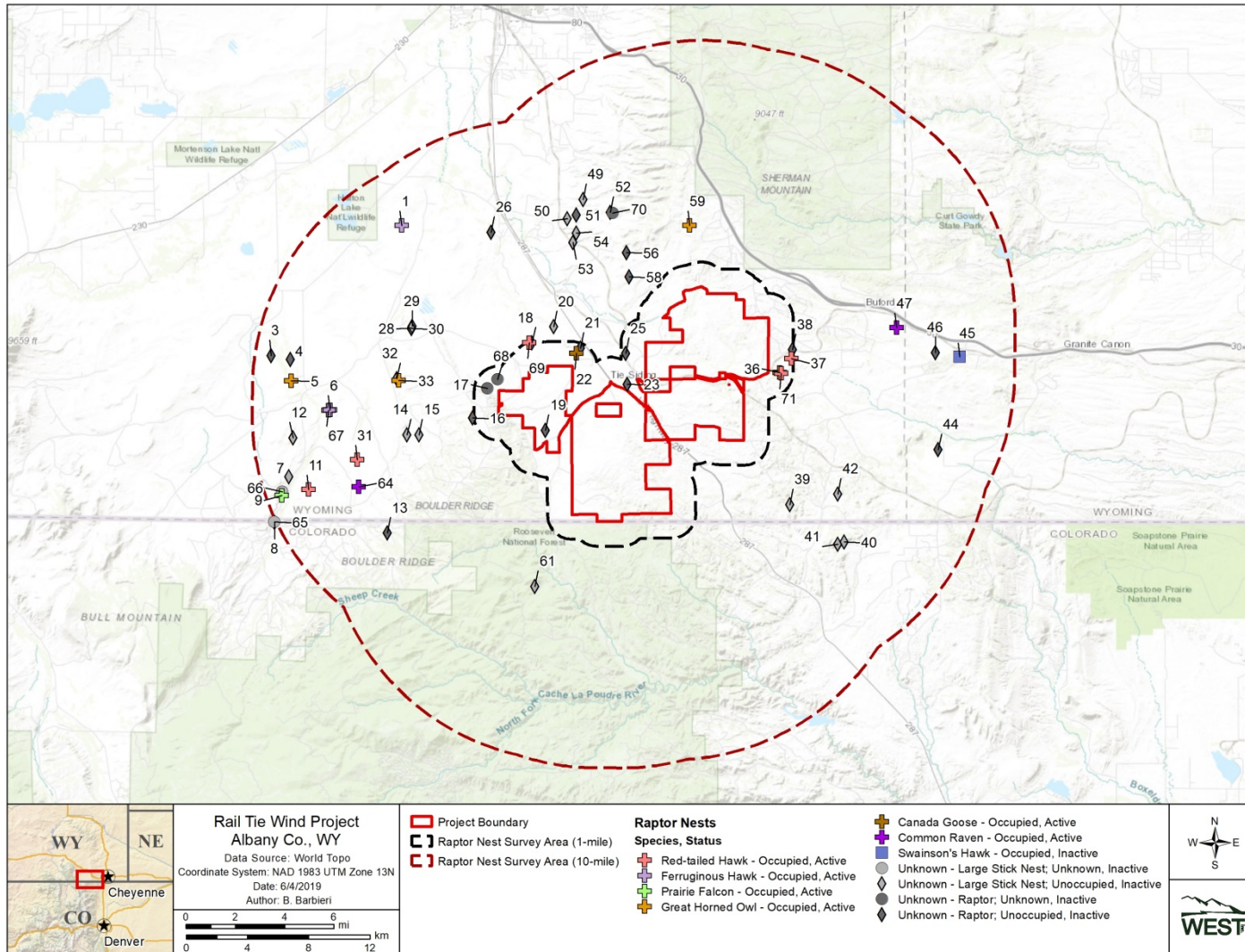


Figure 4. Non-eagle raptor nest locations documented during aerial surveys of Rail Tie, 1-3 March and 24-26 April, 2017.

Table 1. Eagle Nests Detected During Nest Surveys for the Rail Tie Wind Project, Albany County, Wyoming.

Nest ID	Species*	1st Visit	Status	Contents	2nd Visit	Status	Nest Substrate	Contents
2	Bald eagle	3/11/2019	Occupied Active	Unknown	5/10/2019	Occupied Active	Tree	Unknown, incubating adult
10	Golden eagle	3/11/2019	Occupied Active	Empty	5/10/2019	Occupied Active	Cliff	1 chick, 2 weeks old
24	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Inactive	Cliff	Empty
27	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Inactive	Cliff	Empty
34	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Active	Cliff	1 chick, 2 weeks old
35	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Inactive	Cliff	Empty
43	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Active	Cliff	1 chick, 2 weeks old
48	Golden eagle	3/11/2019	Occupied Inactive	Empty	5/10/2019	Occupied Inactive	Cliff	Empty
55	Golden eagle	3/12/2019	Occupied Inactive	Empty	5/10/2019	Occupied Active	Cliff	Unknown, incubating adult
57	Golden eagle	3/12/2019	Occupied Active	Empty	5/10/2019	Occupied Active	Tree	Unknown, incubating adult
60	Golden eagle	3/12/2019	Unoccupied Inactive	Empty	5/10/2019	Occupied Active	Cliff	Unknown, incubating adult
62	Golden eagle	3/12/2019	Occupied Inactive	Empty	5/10/2019	Occupied Inactive	Cliff	Empty
63	Golden eagle	3/12/2019	Not Detected		5/10/2019	Occupied Active	Cliff	Unknown, incubating adult

Table 2. Raptor Nests Detected During Nest Surveys for the Rail Tie Wind Project, Albany County, Wyoming.

Nest ID	Species	1st Visit	Status	Contents	2nd Visit	Status	Nest Substrate	Contents
22	Canada Goose	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
47	Common Raven	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
64	Common Raven	3/11/2019	Not Detected		5/10/2019	Occupied Active	Cliff	Unknown, adult incubating
1	Ferruginous Hawk	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active		Unknown, adult incubating
6	Ferruginous Hawk	3/11/2019	Active	Unknown	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
67	Ferruginous Hawk	3/11/2019	Not Detected		5/10/2019	Occupied Active	Tree	Unknown, adult incubating
5	Great Horned Owl	3/11/2019	Active	Unknown	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
33	Great Horned Owl	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Cliff	2 chicks, 3 weeks old
36	Great Horned Owl	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
59	Great Horned Owl	3/12/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
9	Prairie Falcon	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Cliff	Unknown, adult incubating
11	Red-tailed Hawk	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
31	Red-tailed Hawk	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Tree	Unknown, adult incubating
37	Red-tailed Hawk	3/11/2019	Inactive	Empty	5/10/2019	Occupied Active	Cliff	Unknown, adult incubating
69	Red-tailed Hawk	3/11/2019	Not Detected		5/10/2019	Occupied Active	Tree	Unknown, adult incubating

Table 2. Raptor Nests Detected During Nest Surveys for the Rail Tie Wind Project, Albany County, Wyoming.

Nest ID	Species	1st Visit	Status	Contents	2nd Visit	Status	Nest Substrate	Contents
71	Red-tailed Hawk	3/11/2019	Not Detected		5/10/2019	Occupied Active	Tree	Unknown, adult incubating
45	Swainson's Hawk	3/11/2019	Inactive	Empty	5/10/2019	Occupied Inactive	Tree	Unknown, adult incubating
7	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
8	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
12	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Rock	Empty
14	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
15	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
20	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
28	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
29	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
30	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
32	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
39	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
40	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
41	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty

Table 2. Raptor Nests Detected During Nest Surveys for the Rail Tie Wind Project, Albany County, Wyoming.

Nest ID	Species	1st Visit	Status	Contents	2nd Visit	Status	Nest Substrate	Contents
42	Unknown - Large Stick Nest	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
49	Unknown - Large Stick Nest	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Rock	Empty
50	Unknown - Large Stick Nest	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
53	Unknown - Large Stick Nest	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
54	Unknown - Large Stick Nest	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
61	Unknown - Large Stick Nest	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
65	Unknown - Large Stick Nest	3/12/2019	Not Detected		5/10/2019	Unknown Inactive	Cliff	Empty
66	Unknown - Large Stick Nest	3/12/2019	Not Detected		5/10/2019	Unknown Inactive	Cliff	Empty
3	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
4	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
13	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
16	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
17	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unknown Inactive		Empty
18	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
19	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty

Table 2. Raptor Nests Detected During Nest Surveys for the Rail Tie Wind Project, Albany County, Wyoming.

Nest ID	Species	1st Visit	Status	Contents	2nd Visit	Status	Nest Substrate	Contents
21	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
23	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
25	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
26	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
38	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
44	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
46	Unknown - Raptor	3/11/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
51	Unknown - Raptor	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
52	Unknown - Raptor	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Cliff	Empty
56	Unknown - Raptor	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
58	Unknown - Raptor	3/12/2019	Inactive	Empty	5/10/2019	Unoccupied Inactive	Tree	Empty
68	Unknown - Raptor	3/12/2019	Not Detected		5/10/2019	Unknown Inactive	Rock	Empty
70	Unknown - Raptor	3/12/2019	Not Detected		5/10/2019	Unknown Inactive	Tree	Empty

*Unknown Large Stick Nest is consistent with size and structure characteristics of an eagle nest, but could not be confirmed.

References

Pagel, J.E., D.M. Whittington and G.T. Allen. 2010. Interim golden eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

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>

Appendix A – Eagle nest photo log



Nest 2. Occupied-active bald eagle nest.



Nest 10. Occupied-active golden eagle nest.



Nest 24. Occupied-inactive golden eagle nest.



Nest 27. Occupied-active golden eagle nest.



Nest 34. Occupied-active golden eagle nest.



Nest 35. Occupied-inactive golden eagle nest.



Nest 43. Occupied-active golden eagle nest.



Nest 48. Occupied-inactive golden eagle nest.



Nest 55. Occupied-active golden eagle nest.



Nest 57. Occupied-active golden eagle nest.



Nest 60. Occupied-active golden eagle nest.



Nest 62. Occupied-inactive golden eagle nest.



Nest 63. Occupied-active golden eagle nest.