TWO RIVERS WIND PROJECT
PHASES I-III

EAGLE CONSERVATION PLAN

PREPARED FOR:

Two Rivers Wind, LLC
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Pre-decisional Material for Internal Use Only

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Acronyms and Abbreviations

AES	Applied Ecological Resources
APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
ECP	Eagle Conservation Plan
EITP	eagle incidental take permit
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FR	Federal Register
GHMA	General Habitat Management Area
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
MIND	mean inter-nest distance
MW	megawatt
NOI	Notice of Intent
REA	Resource Equivalency Assessment
SCADA	supervisory control and data acquisition
USFWS	U.S. Fish and Wildlife Service
WGFD	Wyoming Game and Fish Department
WIRS	Wildlife Incident Reporting System
WTG	wind turbine generators

Two Rivers Wind Project Phases I-III Eagle Conservation Plan

This Eagle Conservation Plan (ECP) has been prepared in accordance with the U.S. Fish and Wildlife Service (USFWS), Region 6, Mountain-Prairie Region ECP guidance memo issued in January 2020 entitled "Recommended Approach for Development and Submission of Eagle Conservation Plans in support of an Eagle Incidental Take Permit Application for Wind Energy Projects." Two Rivers Wind, LLC (Two Rivers Wind) prepared this ECP for Phases I-III of the proposed Two Rivers Wind Project (Project), a wind energy conversion system (WECS) proposed in unincorporated Carbon and Albany counties in Wyoming, includes all items recommended by the USFWS Region 6 in Part A to support the Project's eagle incidental take permit (EITP) application. The Applicant has been in close coordination with the USFWS Region 6 in developing all aspects of this ECP.

1.0 Introduction to Application and Facility Overview

Recommendation (#1): **Include a direct statement that the ECP was prepared to support an application for an EITP for a wind energy facility, the name of the facility, and relevant company names of the applicant/owner/operator.**

Applicant Response:

Two Rivers Wind has prepared this ECP to support an application for an EITP for the Project under the Bald and Golden Eagle Protection Act (BGEPA), 16 United States Code [U.S.C.] 668-668c and its implementing regulations, Title 50 Code of Federal Regulations (CFR), section 22.26. This ECP addresses the potential incidental take of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) associated with the construction and operation of Phases I-III of the proposed Project.

Applicant/Owner/Operator Contact Information: The Applicant for the Project is Two Rivers Wind, LLC (Two Rivers Wind), a wholly owned subsidiary of BluEarth Renewables US, LLC. Two Rivers Wind will also be the Owner and Operator of the Project. The following person has been designated as the primary contact for the Project:

Representative	**Contact Information**	
Glenn Isaac Senior Management Consultant, Regulatory and Environment Two Rivers Wind LLC	Address:	c/o Cogency Global 850 New Burton Road, Suite 201 Dover, Delaware 19904
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Two Rivers Wind is a limited liability company organized in Delaware and authorized to do business in Wyoming. BluEarth Renewables US, LLC is the U.S. affiliate of BluEarth Renewables LP, headquartered in Calgary, Canada. BluEarth Renewables is a privately held, leading, independent power producer that develops, builds, owns, and operates wind, hydro, and solar facilities across North America.

2.0 Project Map and Location

Recommendation (#2): **Include a clear map showing the location of the WECS facility that USFWS can use for their NEPA document.**

Applicant Response:

A map showing the location of Phases I-III of the proposed Two Rivers Wind Project has been provided in **Attachment 1** (**Figure 1**)**.** GIS shapefiles for the Project were submitted with the EITP application package (**Attachment 4**).

Two Rivers Wind Project Phases I-III: Two Rivers Wind is proposing to develop Phases I, II, and III of the proposed Two Rivers Wind Project in unincorporated Carbon County, Wyoming, north of Highway 30 and the town of Medicine Bow (**Attachment 1, Figure 1).** Phases I, II, and III will be situated on 15,657 acres of the Two Rivers Ranch, interspersed with parcels of land administered by the State of Wyoming Office of State Lands and Investments (OSLI) and the Bureau of Land Management (BLM) Rawlins Field Office. Phases I-III of the Project are generally located within Township 22 North, Range 78 West, and Township 23 North, Range 78 West. **Table 1** provides a summary of the location of land included in Phases I-III of the Project boundary.

Table 1. Location of Leased Lands in the Phase I-III Two Rivers Wind Project Boundary

Township	Range	Sections	Ownership
Two Rivers Phase I, II and III			
22 North	78 West	5 - 7	Private
23 North	78 West	3, 5-7, 9, 15, 17 (portion), 19, 20 (east half), 21, 22 (portion), 27, 29, 31, 32 (east half), 33-34	BLM
23 North	78 West	4, 8, 10, 18 (portion), 20 (west half), 22 (portion), 28, 30, 32 (west half)	BLM
23 North	78 West	16	State

3.0 Permit Request for Eagle Take

Recommendation (#3): **Include a statement of how many years the applicant is requesting eagle take under the 2016 BGEPA regulations.**

Applicant Response:

Two Rivers Wind is requesting an EITP for 30 years under the 2016 BGEPA regulations at Phases I-III of the Two Rivers Wind Project.

4.0 Endangered Species Act Compliance

Recommendation (#4) ESA Compliance: **Include a statement and rationale that the wind energy project will result in no unpermitted take of wildlife, fish, or plants listed under the Endangered Species Act (ESA), or if there is a federal nexus (other than the EITP) that adverse effects to federally listed species (wildlife, fish, and plants) and critical habitat (designated and proposed) have been addressed by an inter-agency consultation between the action agency and the USFWS. Provide the name of the Ecological Services Field Office**

(ESFO) in the Region 6 state the wind project is located in that you worked with in completing any required ESA consultation or coordination with for the wind project. Include any interrelated or interdependent actions. If the EITP is the only federal nexus, identify the listed species and critical habitats to be included in an intra-Service consultation between the MBMO and the appropriate ESFO.

Applicant Response:

The EITP is not the only federal nexus; Two Rivers Wind has filed for a right-of-way (ROW) with the BLM Rawlins Field Office (RFO) for siting of Project facilities on BLM-administered land. *The Project will not result in any unpermitted take of wildlife, fish, plants, or associated critical habitat listed under the Endangered Species Act (ESA).* Two Rivers Wind has worked closely with the BLM Wyoming Ecological Services Field Office in Cheyenne, Wyoming to complete any required ESA consultation for this project. The Applicant has also worked closely with the Wyoming Game and Fish Department (WGFD), and other Federal and state agencies to incorporate agency feedback into development of the Project layout and design to avoid impacts to sensitive environmental resources.

The Project layout and WTG configuration were designed to consider all applicable state and county WTG setbacks, as well as applicable environmental setbacks and buffers as outlined in the BLM RFO Resource Management Plan (2008, as amended). The layout also was designed to comply with USFWS recommendations set forth in its ECP Guidance (USFWS 2013) and its 2012 Land-Based Wind Energy Guidelines (USFWS 2012), along with reasonable nest buffer recommendations resulting from Project-specific consultation with the USFWS Wyoming Field Office during meetings on September 30, 2019, November 18, 2019, February 26, 2020, February 19, 2021, May 30, 2021, July 13, 2021, and July 28, 2021. Additionally, pre-construction biological monitoring survey results were incorporated into WTG siting to avoid or minimize effects on aquatic resources, raptors and eagles, special-status wildlife species, sensitive vegetation communities, and cultural resources, to the extent practicable.

Six species listed as federally-endangered or threatened have the potential to occur in the Project area (**Table 2**). Five of the six species (least tern, piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid) could potentially occur; however, the Project Area is generally outside of these species' known range or suitable habitat may be extremely limited. Suitable habitat for Ute-ladies tresses may exist in the Project area; however, project facilities would generally avoid any potential habitat except for drainage crossings, which would be co-located with existing disturbance, and no Ute-ladies' Tresses were observed during incidental surveys (AES 2020) and the Project Area is outside known areas where the species have occurred. Collision risk and habitat displacement for federally listed species are not anticipated to occur as a result of the proposed Project.

Table 2. Potential Threatened and Endangered Species within Phases I-III of the Two Rivers Wind Project Area

Common Name	Scientific Name	Listing Status	Potential for Take	Rationale
Birds				
Interior Least Tern	*Sterna antillarum*	FE	No	This species is typically associated with large rivers systems. Their preferred habitat is sparsely vegetated sandbars along rivers or lakes and reservoir

Common Name	Scientific Name	Listing Status	Potential for Take	Rationale
				shorelines. The Project area is located outside of the known range of this species, although the potential for isolated occurrences of wayward individuals cannot be ruled out.
Piping Plover	*Charadrius melodus*	FT	No	This species is typically associated with large rivers systems. Their preferred habitat is sparsely vegetated sandbars along rivers or lakes and reservoir shorelines. The Project area is located outside of the known range of this species, although the potential for isolated occurrences of wayward individuals cannot be ruled out.
Whooping Crane	*Grus americanus*	FE	No	Whooping cranes breed and nest along lake margins or among rushes and sedges in marshes and meadows. Currently there are three wild populations of whooping cranes. The Project area is located outside of the known range of the closest population, although the potential for isolated occurrences of wayward individuals cannot be ruled out.
Fishes				
Pallid Sturgeon	*Scaphirhyncus albus*	FE	No	This species is associated with the Platte River System. No impacts are expected because no downstream effects to the Platte River System would occur from the Project.
Flowering Plants				
Ute Ladies'-tresses	*Spiranthes diluvialis*	FT	Low	This species typically occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. There is some likelihood that habitat for Ute Ladies'-tresses exists within the Project area, but impacts are expected to be low since project facilities would not be sited in wetland/riparian areas.
Western Prairie Fringed Orchid	*Platanthera praeclara*	FT	Low	This species typically occurs in moist tallgrass prairies and sedge meadows. The Project area is outside the known species range outside of reintroductions and suitable habitat is highly limited.

Source: USFWS 2019
FE Federally Endangered
FT Federally Threatened

5.0 FAA and DOD Coordination and Compliance

Recommendation (#5): **If the wind energy project that an EITP is being submitted for occurs in proximity to a DoD defense installation, or a civil or commercial airport, or both, include a statement that the permit applicant is coordinating with these entities regarding the wind project. Also in such cases the EITP applicant must provide documentation that DoD, FAA, or both have reviewed the wind project and that they do not have any issues with the project design and layout relative to their radar systems and other infrastructure.**

Applicant Response:

The Project does not occur in proximity to a Department of Defense (DOD) installation or commercial airport. The Project has consulted with the Federal Aviation Agency (FAA) with the proposed layout and has been provided with a Determination of No Hazard. The Project will include installation of aerial marker spheres or aircraft warning lights as required for the conductors or structures per the Federal Aviation Administration regulations. Since the Project will include WTGs over 200 feet, a Notice of Intent (NOI) to Construct with the FAA per the Federal Aviation Regulation Part 77 is required. The FAA also requires an aeronautical study to determine what lighting and additional measures may be required for the Project once WTG locations, size and markings are established. These FAA project specifics will not be available until pre-construction.

Two Rivers Wind will consult with the FAA on lighting requirements and height restrictions for local private airstrips nearby that may be affected by the Project. Guidance will be obtained from the *FAA Technical Note: Developing Obstruction Lighting Standards for Wind Turbine Farms* and a Project Lighting Plan will be developed. Area landowners and ranchers use personal aircraft to inspect land/forage conditions, locate and distribute livestock, stock dam water levels, and other aspects of their ranching operations. Two Rivers Wind will conduct an outreach program to gain input from, and disseminate project specific information to, local landowners and residents about potential impacts from the Project.

6.0 Project Description

Recommendation (#6) Project Description: **The project description should include a list of all infrastructure for the project (i.e., wind turbines, roads, power lines, met towers, substations, O&M building, etc.). Quantify how much of each project component will be built. For wind turbines: how many are there, what is the rotor diameter(s), total megawatts of the project, tower height, and total height with tower? Also include information about the wind turbine models the project will use for construction in terms of their rotor slowdown characteristics or time to feathering or shutdown. This will be key information if the wind project proposes or later adopts a conservation measure of using turbine curtailment to reduce or prevent eagle take. For roads and power lines: how many miles of each will be constructed? The power line description also should include the voltage of the lines and whether the lines will be constructed above or below ground. Also, for any new power line construction include a statement that indicates whether or not they will be constructed following the Avian Power Line Interaction Committee (APLIC) 2006 Suggested Practices for Avian Protection on Power Lines and the 2012 Reducing Avian Collisions with Power Lines APLIC manuals. Provide map(s) that clearly shows the location of all of the project infrastructure. All maps should be provided as both PDF versions and as GIS shape files.**

Applicant Response:

A Project site plan of up to 60 WTGs is provided in **Attachment 1** (Figures 2a-2b) and the mapbook included in **Appendix A** (1:24,000 scale). GIS shapefiles for Phases I-III of the Two Rivers Wind Project were submitted with the EITP application package (**Attachment 4**).

Phase I-III of the Two Rivers Wind Project comprises development of three wind powered electric generation facilities (Two Rivers I, II, and III) with a combined generating capacity of 140 to 314 MW, depending on the final turbine models selected. Project components proposed on private and public lands include the installation of up to 60 WTGs. Ancillary facilities include one operations and maintenance building, one substation, a concrete batch plant, five proposed permanent and three existing temporary MET towers, 45.5 miles of access roads for both the wind project and along the transmission line, 62.0 miles of electrical collection and communication system lines, and 10.6 miles of an overhead 230 kV Gen-tie transmission line that connects the Project to the existing PacifiCorp Freezeout substation (**Table 3**). Surface disturbance associated with both the wind development and associated transmission line includes 604.8 acres of temporary disturbance, and 134.2 acres of permanent disturbance, which would be fully reclaimed at the end of the Project.

Table 3. Description of Proposed Phase I-III Project Facilities

Facility	Unit	Project Total*	Assumptions of Disturbance
Wind Facility			
WTGs	Each	60	Current site plan includes a total of 60 WTGs, including 37 WTGs on BLM land, 19 on private land, and 4 on state land. Each WTG would have an associated site to allow for foundation and electrical facility construction and turbine installation. Typically about 1.6 acres per WTG to accommodate crane access initially; reclaimed to 0.18 acre for long-term maintenance access.
Transportation Network			
All Phase I-III Roads and Access	Miles	45.5	Improvement of existing roads or construction of new roads within the Project area to access wind turbines and other facilities. Temporary construction width of 50 ft., reduced to permanent widths between 8 to 28 ft. depending on the final road design needed during operations.
Electrical Systems			
34.5 kV Collection	Miles	62.0	Underground electrical delivery system from each WTG to the collection substation. Initial trenching disturbance would be 40 feet and will overlap with access road disturbance.
Substations	Count	1	Collection: One substation on BLM land that gathers energy generated from project turbines. Typically 2.5 acres would be required for the substation. Interconnection: Two Rivers Project connection to the electrical grid at the existing Freezeout substation.
230 kV Gen-tie Transmission Line	Miles	10.6	A 230 kV overhead Gen-Tie line connecting the Project to the Freezeout Substation. Site plan includes 4.7 miles on BLM land and 6.0 miles on private land.

Facility	Unit	Project Total*	Assumptions of Disturbance
Supporting Facilities			
Staging/Laydown Areas/Parking	Count	1	Vary widely in size depending on use and fully reclaimed where other permanent facilities are not located. Includes delivery staging areas, laydown yards, material storage, and vehicle parking for equipment and work force transportation.
Temporary Concrete Batch Plant	Count	1	Located on private land. Typically 10 acres in size to accommodate stockpiles.
Maintenance and Storage Building	Count	1	Located on BLM land. The operations, maintenance, and storage building would be approximately 9,000 sf constructed on 2.5 acres
Communication System	Miles	62.0	Co-located with collection lines and access roads. Buried communication cabling for the WTG control system to connect to the common 24/7 monitoring center located in the operations, maintenance, and storage building.
Met Towers (permanent)	Count	5	Five permanent towers on private land to collect wind data and verify site characteristics.
Met Towers (temporary)	Count	3	Three temporary towers on private land to collect wind data and verify site characteristics. All temporary towers are already installed.

*Project total includes all facilities proposed for the Project regardless of land jurisdiction.

Wind Turbines: Plans for Phases I-III of the Project include installation of up to 60 WTGs for a total generating capacity of 140 to 314 MW (**Attachment 1, Figures 2a-2b)**. All WTG models under consideration have the same general configuration that includes a single-rotor, three-bladed upwind horizontal-axis design on a tubular tower. WTG models under consideration range in nameplate capacity from 2.3 to 6.2 MW. Rotor diameters would be between 413 and 558 feet with hub heights of approximately 282 to 325 feet (see **Table 4)**. The final decision on the WTG model used will be based on the economics, availability of WTG models, and suitability for the wind regimes at the Project site.

Table 4. Specifications for Wind Turbine Generator

WTG Component	Typical Specification
Nameplate capacity	2.3-6.2 MW
Towers	Tubular steel
Hub height	282 to 325 feet
Tip Height	489 to 604 feet
Blades	202 to 260 feet
Rotor diameter	413 and 558 feet
Drivetrain	Gearbox with two planetary stages and one helical stage
SCADA	Condition Monitoring System

SCADA Supervisory Control and Data Acquisition
~ approximately

Access Roads: Project access will require a combination of new access roads, improvements to existing roads, and use of existing roads as is. Wherever available and practicable, existing roads, including two-tracks, will be used with upgrades. Based on the current layout, approximately 36.7 miles of Project access roads would be required for the Phases I-III wind project and 11.8 miles of two track roads will parallel the transmission line (**Table 5**). The primary access to the Project will be via Wyoming Highway 487. Within the site, access roads will lead to the maintenance and storage facilities, the concrete batch and mixing plant, substations, individual WTGs, and transmission structures (see Site Plan, **Appendix A**). Periodic maintenance will be conducted to ensure safe access to Project components. Wherever available and practicable, existing roads, including two-tracks, will be used with upgrades.

Transmission Lines: An aboveground 230 kV Generation-tie transmission line will connect the Project to the point of interconnection at Pacificorp's Freezeout substation in Township 23 North, Range 80 West, Section 15 (see Site Plan, Appendix A). Based on the current layout, approximately 10.6 miles of transmission lines are proposed for Phases I-III of the Project (**Table 6**).

Ground-disturbing activities associated with the construction of the transmission line will include the pole footings and laydown areas for construction. Small laydown areas would likely be adjacent to each pole to construct and raise the pole. No blading or clearing would occur along the transmission route. The Project would install steel or wood monopole or H-frame transmission structures (**Table 7**).

The Avian Power Line Interaction Committee (APLIC) has created guidelines to reduce bird collisions with power lines and other risks that result from avian interactions with electrical facilities. The Project's overhead transmission system will incorporate recommended measures in the APLIC 2006 Suggested Practices for Avian Protection on Power Lines and the 2012 Reducing Avian Collisions with Power Lines APLIC manuals.

Table 5. Phase I-III Access Road Requirements

Road Type	BLM (miles)	State (miles)	Private (miles)	Total (miles)
Phase I-III Wind Project Access Roads				
Arterial Road	12.3	1.5	10.6	24.4
Crane Path	0.6	0.1	1.0	1.7
Facility Road	0.1	--	0.1	0.2
Structure Road	--	--	0.0[1]	0.0
Turbine Road	4.0	0.3	3.0	7.3
Phase I-III Total	**17.0**	**1.9**	**14.8**	**33.7**
Gen-Tie Transmission Line Roads				
Transmission Road	5.2	--	6.6	11.8
Gen-Tie Total	**5.2**	**--**	**6.6**	**11.8**
Grand Total	**22.2**	**1.9**	**21.4**	**45.5**

[1] Due to rounding, the total length of the road is 0.0 miles. Actual length of road is 0.02 miles.

*All WECS access roads are located with the wind project development area boundary. Access roads along the 230 kV transmission lines are occur both within and outside the wind project development area boundaries.

Table 6. Land Requirements for the Phase I-III Gen-Tie Transmission System

Transmission Facilities*	BLM (miles)	State (miles)	Private (miles)	Total (miles)
Gen-Tie Transmission Line	4.7	--	6.0	10.6

Table 7. Typical Transmission Line Design Characteristics

Characteristic	Specification
Voltage	230,000
Circuit Configuration	Double Circuit 230 kV
Proposed T-Line Route Length	10.6 miles
BLM ROW Requested for Proposed Route	4.7 miles (Gen-tie T-line)
ROW Width	200-ft temporary ROW, 125-ft permanent ROW per 230 kV line
Type of Structure	H-Frame, Monopole
H-Frame Structure Height	60 – 90’
H-Frame Structure Width	21’6’’ at base; 43’at top
Monopole Height	75-feet
Monopole Width	8-10 feet
Estimated **Temporary Disturbance** Area per	ROW Width 200 feet x 150 feet = 0.69 acre

Characteristic	Specification
Structure per line	
Estimated **Permanent Disturbance** Area per Structure per line	Reduced to foundation diameter ROW Width 125 ft x 150 feet = 0.43 acre
Temporary Staging Area/Storage Yard	1 area at 5-10 acres each on private land
Wire Tensioning Site	150 feet x 60 feet located about every 9,300 feet
Access Roads	Use existing access roads and overland travel, use existing roads for water crossings
Other Hardware	Aerial marker spheres or other hardware may be applied as needed for aircraft and avian considerations where determined necessary

Met Towers: The Project will include the installation of meteorological (Met) towers to measure the wind conditions for efficient operation of the turbines. Phases I-III of the Project would have a total of five (5) self-supporting lattice permanent Met towers on private land (see Site Plan, **Appendix A**). Three temporary Met towers are already constructed in Phase I, II, III. To collect the required data, the towers will be equipped with wind speed and direction instruments at the turbine hub height and at the bottom of the rotor sweep. Two Rivers Wind may also install additional monitoring equipment on the towers, including remote cameras. Met towers will have fiber optic and power connections to the nearest wind turbine. Given the height of the Met towers, it is likely that they will be equipped with an aviation warning light.

7.0 Eagle Data

Recommendation (#7): **Submit copies of all eagle data collected for the project. This includes eagle use surveys, eagle roost surveys, eagle nest surveys, eagle migration surveys, eagle prey base surveys, eagle mortality monitoring, etc. If there was no eagle roosting habitat, or the project was not located in an eagle migration corridor, such that these surveys were not needed, then note this in the submission. At a minimum, provide a listing of the types of pre-construction monitoring conducted as well as the start and end dates for each type of survey, how many total surveys of each type were conducted, when surveys were conducted (specific dates), a written description of the protocols used to conduct each survey type (this can be in a consultants monitoring report, etc.), and figures that clearly show the sample points or the survey area used for the surveys.**

Applicant Response:

To assess eagle use of the Project Area, Applied Ecological Resources (AES) on behalf of Two Rivers Wind, conducted aerial nest surveys, ground nest monitoring, point-count surveys, and grid-based surveys for eagles and other raptor species on the Phase I-III area of the Two Rivers Wind Project. Western Ecosystems Technology, Inc. (WEST) also completed one additional spring season of nest surveys for Phases I-III in 2020. Surveys were conducted to understand eagle and raptor use of the existing habitat and landscape features found on site, including nests and potential nest substrate, important hunting and foraging areas, perching and congregation areas, winter use areas, and other

areas that experience increased eagle activity. The following spreadsheets in **Attachment 2** include the data collected for eagle and raptor use and nest surveys:

- TwoRivers_Phase I-III_Raptor Use (Results from eagle and non-eagle raptor use surveys in the Phase I-III area).
- TwoRivers_Phase I-III_RaptorNests (Results from aerial and ground-based eagle and non-eagle raptor nest surveys in the Phase I-III area).

For additional details regarding Project site characteristics, survey protocols, methodology, and results refer to the following reports provided in **Attachment 3**:

- Two Rivers (Phase I-III) Wind and Wildlife Interactions Report (AES 2020)
- Two Rivers Phase I-III 2017 Raptor Nest Survey Report (AES 2017)
- Two Rivers Phase I-III 2017-2019 Raptor Nest Survey Report (AES 2019)
- Two Rivers ECPG Phase I Site Characterization Report (ICF 2018, updated July 2020)
- Two Rivers WGFD Monitoring Plan (ICF 2020)

For supplemental eagle nest survey data collected in 2020 for the Phase I-III Project area by WEST refer to **Figures 19-20** in **Attachment 1** and the reports and GIS data in **Attachment 5**:

- Two Rivers Wind Project Phases I, II, and II – Raptor Nest Survey Memo (WEST 2020a)
- Golden Eagle Nest Monitoring Results for the Two Rivers Wind Energy Project (Phases I-III) (WEST 2020b).

Recommendation (#7 cont'd) Pre-Construction Eagle Use Surveys: **Submit a spreadsheet with a record of all the surveys conducted (following USFWS Region 6-provided spreadsheet that provides required fields), and the results from all the surveys including the flight paths (on a project area base map) or perch locations for all eagles recorded. Provide a written protocol describing how the pre-construction eagle use surveys were conducted (this can be in a consultants monitoring report, etc.). Provide an estimate of the project area (percentage) surveyed by eagle use survey efforts. All maps should be provided as both PDF versions and as GIS shape files. If a report was prepared that included the eagle use survey work include a copy of this with the ECP submission.**

Applicant Response:

Mapped results from the eagle use surveys, including flight paths and perch locations, are included in **Attachment 1 (Figures 3-16)**.

The following spreadsheet has been included in **Attachment 2** to provide record of all pre-construction eagle use surveys:

- TwoRivers_Phase I-III_Raptor Use (Results from eagle and non-eagle raptor use surveys in the Phase I-III area).

For additional details regarding survey protocols, methodology, and results refer to the following reports provided in **Attachment 3**:

- Two Rivers (Phase I-III) Wind and Wildlife Interactions Report (AES 2020)

For supplemental eagle nest survey data collected in 2020 for the Phase I-III Project area by WEST refer to the reports and GIS data in **Attachment 5**:

- Two Rivers Wind Project Phases I, II, and II – Raptor Nest Survey Memo (WEST 2020c)
- Golden Eagle Nest Monitoring Results for the Two Rivers Wind Energy Project (Phases I-III) (WEST 2020d).

GIS shapefiles for the eagle use maps have been submitted with the EITP application package (**Attachment 4**).

Survey Protocol Summary: Per the USFWS 2013 ECP Guidance (USFWS 2013), 2016 Final Eagle Rule (81 FR 91494, December 16, 2016), and USFWS Region 6 recommendations (USFWS 2019), eagle use surveys were conducted year-round every two weeks during all daylight hours to ensure data was evenly distributed throughout all seasons. Surveys were one hour in duration and data recorded included all raptors (eagles and non-eagle raptors) seen and heard in an unlimited radius of the sampling point. For each individual raptor, data recorded included species, behavior, average distance and cardinal direction from the observer, average flight height, and flight start and stop times while flying within the 800 m by 200 m survey cylinder. Flight stop time was defined as the moment a raptor flew outside of the survey cylinder or landed and perched anywhere. Incidental observations of raptors identified within a one-mile buffer around the project area were also recorded. Surveys were conducted under all weather conditions except when visibility was less than 800 m horizontally and 200 m vertically. Additional details about survey methods can be found in the survey reports cited above.

Phase I-III Pre-Construction Eagle Use Surveys:

Pre-construction eagle and raptor use surveys for bald and golden eagles and raptors began on June 20, 2017 and concluded on June 8, 2019 within the Phase I-III area. At the request of the USFWS, one additional spring season of focused point counts near golden eagle nests within Phase I-III of the Project was completed by WEST between March 2020 and May 2020. The USFWS and Wyoming Game and Fish Department (WGFD) approved the eagle and raptor survey approach in meetings on April 14, 2017 for Two Rivers Phase I-III.

Survey Design, Effort and Methods: The USFWS 2013 ECP Guidance recommends the use of randomly located 800-meter (m) radius and 200 m height sample plots that cover at least 30 percent of the Project area. USFWS Region 6 recommends full coverage of the Project area, allowing for the exclusion of areas where turbine placement is unlikely due to topography or eagle nest and river setbacks. Sample plots were placed back-to-back wherever possible to ensure higher coverage of the Project area; therefore, this survey design did not assign sample plots randomly within specific habitat types (AES 2020). Originally 19 survey plots were plotted and surveyed for eagle use; however, point TR1-007 had to be relocated due to access issues after the first year of data collection and was subsequently omitted from the official analysis because the same center-point was not maintained for a consecutive two-year period. In addition, a large portion of this sample plot was located outside of the Project area boundary (AES 2020). Therefore, this survey design resulted in 55.5 percent coverage of the surface area within the entire Project area boundary. Grassland/mixed shrubland habitat comprised the largest portion of the survey area (AES 2020).

Eagle use surveys for Year 1 began on June 20, 2017 and concluded on June 8, 2018 while Year 2 spanned the period between June 21, 2018 and June 8, 2019. Most sample plots were surveyed for 48 hours over these two years; a few surveys at sample plots were missed due to access issues. The total amount of survey hours was 858 hours (this excludes the hours of surveys at points 7a and 7b) (AES 2020).

Results: Please refer to **Attachment 2** for the results of eagle use surveys on the Phase I-III area of the Project. A summary is provided here:

Golden Eagle: The 2017 – 2019 eagle use surveys recorded 149.7 minutes of golden eagle flight at 18 points, or 8.3 minutes per point. Over 70 percent of the golden eagle minutes were recorded at six survey plots (TR1-001, 008, 012, 013, 017, 018). Golden eagle activity steadily increased from March through May, dipped slightly in June, and was at its maximum between July and October with a peak in August at 32 golden eagle minutes (AES 2019, 2020).

Flight path maps illustrate seasonal patterns and concentrations of activity for golden eagles (**Attachment 1**, **Figures 9 – 16**). High golden eagle use can be seen at the Medicine Bow and Little Medicine Bow River corridors and along the ridgelines that run across the southern half of the site. Golden eagle activity is lower along the ridgelines in the northern third of the Project area.

In 2020, WEST conducted supplementary eagle use surveys during intensive nest monitoring efforts focusing on nest locations within the Project area. The purpose of the monitoring was to document the spatial distribution of nesting eagles. WEST documented 24 golden eagle observations between March 7, 2020 and May 6, 2020 (**Attachment 1, Figure 19**). GIS results of these surveys are included in Attachment 4 as supplementary eagle use data for golden eagle nests in Two Rivers Phase I-III and in the report memo in Attachment 5.

Bald Eagle: Bald eagles were sighted very infrequently during the 859 hours of raptor activity surveys. The 2017 – 2019 eagle use surveys recorded 13.5 minutes of bald eagle flight at the 18 points, or 0.75 minutes per point. The six flights occurred at four survey plots (TR1-005, 017, 018, 019) with the majority observed at the southern end of the Phase I-III area, which is likely associated with an active eagle nest to the south (**Attachment 1**, **Figures 9 – 16**). Bald eagle use was concentrated between March and June, with a peak of 2.0 eagle minutes in May.

Recommendation (#7 cont'd) Pre-Construction Eagle Nest Surveys: **Include a map showing the buffer around the project where surveys were conducted and the location of all eagle nests found. In regard to survey results for all eagle nests documented as in-use, provide information on occupancy, productivity, and nest success to the extent this information was recorded. This information should be summarized in a data table to be included with the submission. If a mean inter-nest distance was calculated for the project, provide this by eagle species and clearly indicate what nests were used to do the calculation and which year(s) of survey effort was used for the calculation (per USFWS 2013, Eagle Conservation Plan Guidance, Appendix H). Also, indicate whether or not you followed the USFWS, Region 6, MBMO recommended protocol for conducting eagle nest surveys for the project.**

Applicant Response:

Mapped results from the pre-construction eagle nest surveys are included in **Attachment 1 (Figures 17-18)**, which show the buffer around the Project areas where surveys were conducted and the location of all eagle nests found.

The following spreadsheet has been included in **Attachment 2** to provide record of all pre-construction eagle nest surveys and eagle nests and information on occupancy, productivity, and nest success:

- TwoRivers_Phase I-III_RaptorNests (Results from aerial and ground-based eagle and non-eagle raptor nest surveys in the Phase I-III area)

Raptor nest surveys were completed in accordance with the USFWS 2013 ECP Guidance (USFWS 2013), 2016 Final Eagle Rule (81 FR 91494, December 16, 2016), and USFWS Region 6 recommendations (USFWS 2019). For additional details regarding survey protocols, methodology, and results refer to the reports provided in **Attachment 3**.

Phase I-III Eagle Nest Surveys:

AES conducted raptor nest surveys on behalf of Two Rivers Wind within the Phase I-III area. Prior to initiating surveys in 2017, existing data from the BLM on raptor nests (2015 dataset) and USFWS on golden eagle nests (2017 dataset) were reviewed to orient surveyors on historical and potential current nest locations.

Aerial Surveys: An aerial survey of the Phase I-III area including a five-mile buffer was conducted on April 30 and May 1, 2017. AES conducted two aerial surveys within a 10-mile buffer around the Project in 2018. AES conducted an early season flight on February 26, 2018 and a nesting season flight on April 19, 2018. A few nests were also spot-checked from the air on April 26 and 27, 2018 after completion of aerial sage grouse surveys. WEST conducted an aerial survey including a five-mile buffer on March 10 and 15, 2020, and May 10 and 12, 2020.

Ground Surveys: Initial ground surveys were conducted on May 7, 2017; however, ground searches within the Project area were limited due to access issues on private land. Additional follow-up nest checks targeting nests previously identified during the aerial and initial ground surveys and historic nests identified were conducted on May 23 and 24, June 9 and 16, July 14, and September 9, 2017. In 2018, AES conducted active golden eagle nest monitoring and checked accessible nests monthly when possible. Ground surveys were conducted on March 15, March 24, April 10, April 15, May 6, May 19, May 20, May 31, June 8, June 22, July 7, and July 23, 2018. See **Attachment 3**, for more information about survey methods used in raptor nest surveys. WEST conducted ground surveys between January 1 and February 15, 2020; late March through early April 2020; and June through August 2020. Access was limited during the first survey period due to weather and road conditions. In 2020, WEST also conducted intensive nest monitoring at golden eagle nests within the project footprint to document spatial use of nesting pairs (**Attachment 5**).

Results: A total of 64 nests were identified during the three years of nest searches within a 10-mile buffer of the Project area (**Attachment 1**, **Figures 17-18 and 20**):

- Within the Project area boundary: 20 nests; 3 in-use in 2017 (one each of golden eagle, bald eagle, and ferruginous hawk); 2 in-use in 2018 (one bald eagle and one ferruginous hawk); and 7 occupied in 2020 (two bald eagle, three golden eagle, two ferruginous hawk)
- Within the five-mile buffer: 26 nests
- Within the 10-mile buffer: 19 nests

Results, including maps, of the 2020 intensive nest monitoring are included in **Attachment 3**.

2021 USFWS Supplemental Nest Data: In April 2021, the Service provided Two Rivers Wind with additional golden eagle nest data collected by consultants conducting eagle nest surveys in previous years for other wind projects in the vicinity of the Two Rivers Phase I-III Project area. These nests were not identified during raptor nesting surveys conducted for Phase I-III in 2017, 2018, and 2020. Two Rivers Wind sent biologists to the Project site to confirm the location and status of the two newly identified nests on April 21, 2021. The golden eagle nest identified adjacent to the Little Medicine Bow River corridor was confirmed to be active. The golden eagle nest identified in the southeast Project area was inactive at the time of the survey and partially collapsed. Two Rivers Wind has incorporated this additional nest data provided by the Service in April 2021 into decisions regarding nest buffers for the final layout and development of avoidance and minimization measures.

Recommendation (#7 cont'd) Eagle Roosts: **For eagle roosts include a map of the project area showing the locations of all documented roosts. If surveys were conducted to locate suitable eagle roosting habitat and then subsequently to determine whether or not this habitat was used for roosting, or to determine if a known documented eagle roost in the project area was used by eagles, provide the written protocols for how these surveys were conducted, a listing of all the surveys conducted by date, and the survey results. All maps should be provided as both PDF versions and as GIS shape files. If a report was prepared that included the eagle roost survey work include a copy of this with the ECP submission.**

Applicant Response:

No eagle congregation or communal roosting areas of golden or bald eagle were identified within the Phase I-III area boundaries. Raptor and eagle perches were noted during the Phase I-III eagle use surveys (**Figures 9-16**).

Recommendation (#7 cont'd) Prey Base: **For concentrated areas/sources of eagle prey base such as prairie dog colonies and sage or sharp-tailed grouse/prairie chicken leks, include a map of the project area showing their locations. If surveys were conducted for prairie dog colonies and sage or sharp-tailed grouse/prairie chicken leks, provide the written protocols for how these surveys were conducted, a listing of all the surveys conducted by date, and the survey results. Indicate the specific species the surveys were conducted for. If there are big game parturition (birthing) areas located within the project area provide a map that shows their location. For domestic livestock, clearly indicate which type of livestock are present (i.e. cattle, sheep, horses or some combination thereof). Also, if there are lambing or calving areas within the project area, provide the location of each, and how many such lambing or calving areas there are. All maps should be provided as both PDF versions and as GIS shape files. If a report was prepared that included the eagle prey base assessment work include a copy of this with the ECP submission.**

Applicant Response:

Sources of potential eagle prey and/or forage within the Phase I-III area includes road-kill livestock and ungulate carcasses along Wyoming State Highway 487. This highway has a posted speed limit of 70 miles per hour, which could result in high potential for eagle scavenging of available carcasses.

Domestic livestock grazing does occur within the Phase I-III area and any winter killed cattle carcasses could be potential scavenging opportunities for resident eagles. In addition, big game

hunting activity within and near the wind development areas could provide gut piles left behind from harvested ungulates during the fall hunting seasons.

The Phase I-III area includes yearlong range for elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), moose (*Alces americanus*), white-tailed deer (*Odocoileus virginianus*), and pronghorn antelope (*Antilocapra americana*), which indicates that these species make general use of the suitable habitat on a year-round basis. The WGFD has mapped 15,355 acres of pronghorn crucial winter range across the Project area. Crucial ranges for elk, moose, white-tailed deer, or mule deer do not overlap with the Project area but exist in the surrounding areas (ICF 2018).

Greater sage-grouse have been observed around the Project area; however, the Project is located entirely outside of the Greater sage-grouse core population area and the defined connectivity corridors as designated by the State of Wyoming under Wyoming Governors Executive Order 2019-3. The Project area is located in designated general habitat management area (GHMA), and the nearest occupied lek is approximately 4.61 miles from the Phase I-III Project boundary (ICF 2018, 2020).

White-tailed prairie dogs are believed to be an important food source for golden eagles and other raptors. Prairie dog density was mapped using aerial photography and locations were divided into high- (30 and more burrows per acre), medium- (13 to 29 burrows per acre), and low-density areas (1 to 12 burrows per acre). Field verification of the mapping exercise in 2018 showed the prairie dog population in the Project area is typically low; the Phase I-III area includes prairie dog colonies of medium and low densities (**Figure 9**).

8.0 Avoidance and Minimization Measures

Recommendation (#8): **With the ECP submission, provide documentation of all avoidance and minimization measures provided by the USFWS, Region 6 for the wind project. State which of these avoidance and minimization measures were implemented for the project. For those avoidance and minimization measures provided by USFWS that could not be implemented for the wind project, list these items and provide documentation as to the reason(s) why they could not be implemented.**

Applicant Response:

USFWS Region 6 Recommendations for Avoidance and Minimization of Impacts: Two Rivers Wind has proactively engaged the Service since Project development activities commenced in 2017 to allow for the greatest opportunity to work collaboratively with the Service to develop avoidance and minimization measures for eagles. Two Rivers Wind has formally engaged the Service on site-specific layout discussions for the Phase I-III development area over the past year-and-a-half, since February 2020, as soon as 24 months of data was collected per the ECPG. Two Rivers Wind has been committed to working with the Service to develop and apply avoidance and minimization measures for the Project, to the extent practicable. The Ecological Services Programs in the Region 6 Regional Office and Wyoming Ecological Services Field Office in Cheyenne, Wyoming, have produced specific recommendations for avoidance and minimization of impacts to golden eagles at wind facilities and for the Project over several years of cooperative engagement. Recommendations were provided to Two Rivers Wind in letters and meetings including meetings on November 18, 2019, February 26, 2020, February 19, 2021, May 30, 2021, July 13, 20201, and July 28, 2021, and letters dated August 13, 2018, December 12, 2019, February 5, 2021, and April 8, 2021. **Table 8** summarizes the current recommendations and details Two River Wind's efforts to develop and revise the Project design to

be consistent with each recommendation, particularly those top priorities provided in the Service's April 8th, 2021 letter.

Table 8. Region 6 Recommendations for Avoidance and Minimization of Impacts for the Two Rivers Project

AMM	USFWS Recommendation	Project Consistency	Applicant Response
#1	The applicant should avoid siting WTGs within 2 miles of golden eagle nests in the Project area.	No	Two Rivers used a 1-mile buffer for all in-use golden nests in the Project area to minimize risks to eagles. In addition, a 1-mile buffer has been applied to the intact inactive golden eagle nests located on the eastern Project boundary and western Project boundary. A 1-mile buffer has been applied to the bald eagle nest located in the southwest Project area. A 0.5-mile buffer was applied to the newly identified golden eagle nest (inactive and partially collapsed) located in the southeast Project area and the bald eagle nest located along the Project boundary in the western portion of the Project. The development area boundary is tightly constrained on all sides by a subdivision to the east, the town of Medicine Bow to the south, and two operating wind farms (Ekola Flats Wind to the west and Dunlap Wind to the north). In addition, WTG siting is also constrained within the Project boundary due to required county and BLM setbacks and avoidance of sensitive cultural and environmental areas and Fresnel zones. A kernel-density analysis was completed to delineate areas of high eagle use, and the applicant conducted eagle prey base surveys and additional spring 2020 eagle use surveys to further define areas of high eagle use. The majority of golden eagle activity is concentrated along Highway 487 (potentially drawn by the presence of roadkill and suitable perching locations for hunting), and along the ridgelines that follow the Little Medicine Bow River, and at prairie dog colonies. All WTGs have been sited outside of high eagle use areas, and the number of turbines was reduced in the Phase I-III area from 74 to 60 WTGs. Two Rivers Wind is proposing a 1-mile buffer for the one in-use golden eagle nest in accordance with Region 6 golden eagle buffer recommendations (USFWS May 2020), based on adequate site-specific data to support the 1-mile buffer.

AMM	USFWS Recommendation	Project Consistency	Applicant Response
#2	No WTGS should be constructed within 0.5-mile (800-meters) of any in-use or alternate (historic) eagle nests.	Yes	The applicant has sited all WTGs at least 0.5-mile from any in-use or alternate golden or bald eagle nests.
#3	All WTGs located between 0.5-1.0 mile of a golden eagle nest should be diurnally curtailed from January 15 through May 1 each year.	No	Two Rivers used a 1-mile buffer for all in-use golden nests in the Project area to minimize risks to eagles. In addition, no WTGs were sited within 0.5-mile of any eagle nest. 7 WTGs are located within 0.5-1.0 mile of a nest. Two Rivers Wind would conduct post construction monitoring to identify any eagle nesting activity within the Project area and has developed a conservative step-wise adaptive management plan that would utilize informed curtailment, as necessary.
#4	All WTGS within 2 miles of a golden eagle nest that becomes occupied should be diurnally curtailed until the young fledge or the nest becomes unoccupied	No	Two Rivers collected extensive pre-construction eagle use data in the Project area following ECPG recommendations plus additional survey data as requested by Cheyenne ECOS. Pre-construction eagle use data show that greater than 50% of golden eagle flights are associated with the slopes and valley bottoms of the Medicine Bow River and Little Medicine Bow River. Eagle use of the Phase I-III site was nearly always associated with the large river valleys and adjacent slopes and with Nest 15 while it was active. Minimal eagle use was recorded in the northern portion of the Project area. A 2-mile curtailment buffer would encompass the entire Phase I-III project area and is not economically practicable for this Project. Two Rivers Wind would conduct post construction monitoring to identify any eagle nesting activity within the Project area and has developed a conservative step-wise adaptive management plan that would utilize informed curtailment, or other appropriate measures, as necessary, to reduce risks to eagles.
#5	The applicant should focus on avoiding areas of topographic relief (e.g., cliff features used for nesting, ridge features used for migration, rims used for orthographic lift) associated with high eagle use	Yes	The Project is consistent with this recommendation. A kernel-density analysis was completed for the Phase I-III area and Two Rivers Wind has avoided siting WTGs in areas of top 80% of eagle flight densities and along ridgelines of the Little Medicine Bow River corridor. The Phase I-III Project layout was revised and reduced from 74 WTGs to 60 WTGs to avoid and minimize Project areas of

AMM	USFWS Recommendation	Project Consistency	Applicant Response
			topographic uplift features and where survey results indicated preferred eagle use areas.
#6	Areas of Concentrated Prey Resources – The Service recommends that perch deterrents be used on the new transmission line where it is constructed in areas of concentrated prey resources. We also recommend that Two Rivers Wind construct free-standing met towers without guy wires to minimize perching opportunities for eagles.	Yes	The Project is consistent with this recommendation. Two Rivers Wind will build and maintain transmission lines using recommendations identified by the APLIC to minimize electrocution and collision risks to all avian species (APLIC 2006, 2012). This may include constructing nest minimizing designs (monopoles) or installing perch deterrents in areas of concentrated prey resources. Two Rivers Wind will consult with the USFWS to determine the most appropriate option to reduce impacts to eagles.
Service Identified Top Priorities for the Two Rivers Phase I-III Project			
#7	Do not site WTGs in, or within, a distance equal to the height of the WTG within areas of high eagle use (areas with 80% of eagle flight path density) (Service Top Priority).	Yes	The Project is consistent with this recommendation. A kernel-density analysis was completed for the Phase I-III area and Two Rivers Wind has avoided siting WTGs in areas of top 80% of eagle flight densities.
#8	Move or eliminate WTGs within 1-mile of all (occupied and alternate) golden eagle nests (Service Top Priority).	No	Two Rivers used a 1-mile buffer for the one in-use golden nest in the Project area to minimize risks to golden eagles. In addition, a 1-mile buffer has been applied to the inactive, alternate golden eagle nests located on the eastern Project boundary and western Project boundary. A 0.5-mile buffer was applied to the newly identified inactive golden eagle nest located in the southeast Project area that is partially collapsed. All nests are considered important and Two Rivers Wind will implement post construction monitoring and adaptive management to further reduce any future risks to golden eagles within the Project area. All WTGs have been sited outside of high eagle use areas, and the number of turbines was reduced in the Phase I-III area from 74 to 60 WTGs.

Summary of Avoidance and Minimization Measures Applied to Two Rivers Phase I-III:

In response to recommendations provided by the Service between 2018 to 2021, Two Rivers Wind has redesigned the Project resulting in the removal of 14 turbines and up to 36 turbine moves to incorporate avoidance and minimization recommendations. The following measures will be

implemented for the Project, including measures to incorporate the Service's "top priorities" for minimizing impacts to eagles as recommended in their April 8th letter:

- All 74 WTGS originally proposed for the Phase I-III Project have been either relocated or removed. All WTGs have been moved in order to buffer areas of high eagle use and avoid features, natural or anthropogenic, that may be utilized during by raptors for various activities, specifically areas.
- Two Rivers Wind has designated a no turbine development area along Highway 487 in addition to the large nest buffer area along the river corridor to protect the areas of highest eagle and raptor use around nests located below the rim along the Little Medicine Bow River, to provide a movement corridor through the Project area, and incorporate areas of high eagle activity associated with identified nests (both in-use and alternate/no-use). All WTGs have been sited outside of the top 80% of eagle flight path densities. All WTGs have been sited 1-mile away from the one, in-use golden eagle nest. In addition, a 1-mile buffer has been applied to the alternate/no-use golden eagle nests located on the eastern and western Project boundaries (USFWS top priority indicated in the April 8 letter). Two Rivers Wind has moved 13 of the 18 turbines located within 1-mile of the alternate/no-use nest in poor condition located in the southeast Project area. No WTGs are located within 0.5 mile of the nest. Two Rivers Wind will monitor the nest during operations to identify any future nesting activity and apply adaptive management strategies, as necessary.

All WTGs have been sited 0.5-mile away from any golden eagle nest (alternate or in-use).Two Rivers Wind will conduct post-construction monitoring and has developed a conservative step-wise adaptive management plan to identify triggers and additional actions that will be implemented at the Project in advance of the Project reaching permitted take numbers (see Section 11.0).

9.0 Eagle Conservation Measures

Recommendation (#9): **Provide a list of all conservation measures (pre-construction, construction, and post-construction) that were or will be specifically implemented to reduce risk to eagles associated with the project.**

The Best Management Practices (BMPs) included in Chapter 7 of the USFWS, Land-based Wind Energy Guidelines (USFWS, 2012) should be implemented at wind energy projects to benefit wildlife and wildlife habitat generally. However, many of these BMPs, such as using appropriate erosion control in project construction and operation to control or minimize runoff into water bodies, do not provide any direct conservation benefit to eagles, and hence they should not be included with the ECP submission.

If the EITP applicants elects to also develop a separate Bird and Bat Conservation Strategy for their wind facility this information should be included in this document. *Include in the ECP only those measures that provide a direct conservation benefit to eagles*, such as a measure establishing that all big game and livestock carcasses will be removed (or at least covered until they can be removed to prevent eagle access) from the wind facility within 24 hours of their discovery.

Applicant Response:

The following Conservation Measures will be implemented at the Project to provide additional avoidance and minimization of risk to eagles:

- The area and intensity of disturbance will be minimized to the extent possible during construction, and construction activities will be conducted in a way that prevents any unnecessary damage to, or destruction of, natural habitats.
- A transportation plan will be developed and implemented to minimize impacts to wildlife during all phases (construction, operations, and decommissioning). Speed limits for construction and operations personnel along the access and service roads will be restricted to 30 miles per hour (mph) to reduce the risk of wildlife or livestock collisions and to minimize sound emissions. Vehicle movement associated with the Project will be restricted to designated access and service roads and temporary construction areas which will minimize carrion availability for golden and bald eagles.
- The Avian Power Line Interaction Committee (APLIC) guidance on power line construction (APLIC 2006 and 2012) will be followed.
- To the extent possible, facility construction will minimize cutting into hill slopes, with an objective of achieving smooth, rounded terrain, rather than sudden berms or cuts. This measure is intended to reduce attraction of fossorial or burrowing mammals and to reduce prey abundance.
- Sensitive resources (e.g., nests) identified during pre-construction surveys will be flagged and all site personnel will be notified of their presence and necessary setbacks.
- Project personnel and all contractors will be instructed to remove garbage promptly to avoid creating attractive scavenging opportunities for birds.
- Project personnel and all contractors will be instructed to remove rock piles resulting from construction activities, which may attract or provide cover for mammalian prey.
- Storage of parts or equipment near WTGs and creation of large rock piles that attract small mammals and their predators will be prohibited.

The following Conservation Measures will be implemented during operation of the Project to provide additional avoidance and minimization of risk to eagles:

- Management activities such as seeding forbs or maintaining rock piles, which attract potential prey, will not be implemented.
- Parts and equipment which may be used as cover by prey will not be stored in the vicinity of WTGs.
- Any carcasses that could be foraging sources for eagles or other raptors (with the exception of carcasses being used for post-construction bias trials) found within the Project area will be removed immediately by personnel with the appropriate permits and authorizations.
- Low level speed limits (30 mph or lower) will be maintained on all roads within the Project area.

- Project personnel will be trained to be alert for wildlife at all times, especially during low visibility conditions. All new employees will undergo and employee orientation program that will enhance wildlife awareness, minimize impacts to natural resources, and facilitate employee understanding of their respective roles in ensuring compliance with the Project permit conditions and commitments. Any known occurrence or habitat of federally listed species or other species of concern identified within construction areas will be included in the training.
- Personnel, contractors, and visitors will be instructed to avoid disturbing wildlife, especially during the breeding seasons and seasonal periods of stress.
- Fire hazards from vehicles and human activities will be reduced (e.g., use spark arrestors on power equipment; avoid driving vehicles off roads; and allow smoking in designated areas only).
- Project personnel and all contractors will be instructed to remove garbage promptly at the end of each day, to avoid creating attractive scavenging opportunities for birds.
- Two Rivers Wind will develop and implement a Wildlife Incident Reporting System (WIRS) at the start of operations. The WIRS will be implemented for the life of operations for the Project.
- All met towers and WTGs that are no longer operational will be removed.

In addition to these eagle specific conservation measures, Two Rivers Wind has also conducted migratory bird and bat use surveys and will initiate discussions with USFWS on project-specific conservation recommendations once the Project layout is approved. Two Rivers Wind is developing and will submit a Bird and Bat Conservation Strategy (BBCS) for the Project following the USFWS Land-based Wind Energy Guidelines and recommendations from USFWS' Region 6 Outline for Bird and Bat Conservation Strategy: Wind Energy Projects.

Two Rivers Wind also would be willing to participate in current or future research studies to assist USFWS, or other appropriate entities, in assessing the effectiveness of experimental mitigation or adaptive management practices (e.g. contrast painting of turbine blades) that may reduce risks to eagles.

10.0 Compensatory Mitigation

Recommendation (#10): **Provide a statement indicating that all predicted golden eagle takes for the initial phase of the project will be offset through compensatory mitigation. In such cases the statement needs to clearly state a commitment from the applicant to completing all required compensatory mitigation. At present the only compensatory mitigation method for which the USFWS has developed a Resource Equivalency Analysis (REA) to establish mitigation credits is power pole retrofits.**

The EITP applicant would need to first submit the REA for the alternative compensatory mitigation method to USFWS.

Include a statement with the ECP submission indicating that a power pole retrofit plan will be developed for the project to meet the compensatory mitigation requirements, and provide all necessary data that USFWS would need as input to the USFWS Resource Equivalency Analysis

(REA) spreadsheet to calculate the required number of power pole retrofits for the project (see Appendix G of the USFWS Eagle Conservation Plan Guidance (USFWS 2013). **However, if the EITP applicant chooses to use the In Lieu Fee program provided by Eagle Electrocutions Incorporated, LLC (or another USFWS endorsed in lieu fee mitigation bank) for the required compensatory mitigation to offset the take of golden eagles, then a fully detailed power pole retrofit plan is not required. In these cases, the project proponent need only provide USFWS with a memo documenting the intent to use an in lieu fee mitigation provider, the name of the mitigation banker, and key information USFWS would need to complete an REA analysis for the project.**

Applicant Response:

All predicted golden eagle takes for the Project will be offset through compensatory mitigation. A power pole retrofit plan will be developed for the Project to meet the compensatory mitigation requirements. The necessary data that USFWS would need to input to the USFWS Resource Equivalency Analysis (REA) spreadsheet to calculate the required number of power pole retrofits for the project is provided in **Table 9** below (adapted from Table G-1, Appendix G of the USFWS Eagle Conservation Plan Guidance [USFWS 2013]).

Table 0-9. Resource Equivalency Analysis Inputs for the Two Rivers Wind Project (Phase I-III only)

Parameter	**REA Input**	
Start year of permit	2024	
Length of permit renewal period	5 years	
Estimated take	[USFWS to input from CRM]	
Average maximum lifespan	30 years	
Age distribution of birds killed at wind facilities (based on age distribution of GOEA population)	(0-1) (1-4) (4-30)	20% 35% 45%
Age start reproducing	Age 5 [age class (5-6)]	
Expected years of reproduction	25 years	
% of adult females that reproduce annually	80%	
Productivity (mean number of individuals fledged per occupied nest annually)	0.54	
Year 0-1 survival	70%	
Year 1-2 survival	77%	
Year 2-3 survival	84%	
Year 3-4 survival	87%	
Year 4+ survival	87%	
Relative productivity of mitigation option	0.0036 eagle/electrocutions/pole/year	
Discount factor	1.03	

11.0 Adaptive Management

Recommendation (#11): **If a wind company negotiated with USFWS, Region 6 and reached agreement on an adaptive management table for the wind project, with various eagle take thresholds and the corresponding actions/conservation measures/ mitigations that will be implemented once that threshold is reached, then include this in the ECP submission. At a minimum the applicant and USFWS need to discuss what actions will be taken if eagle take approaches or reaches the amount authorized by an EITP issued by USFWS, Region 6 to the company. The ECP submission should include the outcomes from these discussions.**

Applicant Response:

The programmatic eagle take permit is structured to incorporate adaptive management into the permitting process. Long-term incidental take permits are required to include adaptive management provisions that provide for additional or changed mitigation measures under specified conditions, such as under increasing levels of eagle take. Under the Final Eagle Rule (USFWS 2016), adaptive management under a permit must specify circumstances under which modifications to avoidance, minimization, or compensatory mitigation measures or monitoring protocols would be required. These may include, but are not limited to, take levels, location of take, and changes in eagle use of the activity area. At a minimum, the permit must specify actions to be taken if take approaches or reaches the amount authorized and anticipated within a given time frame. Adaptive management terms in a permit will include review periods of no more than five years and may require prompt action(s) upon reaching specified conditions. **Table 10** summarizes the steps incorporated into project planning and development to avoid and minimize impacts to eagles, and the avoidance and minimization measures developed for the Two Rivers Wind Project.

Table 10. Project Avoidance and Minimization Measures

Avoidance and Minimization	1. Turbines were sited to avoid in-use and alternate/no-use eagle nest sites. 2. Turbines were sited to avoid areas with high eagle use around the Little Medicine Bow River corridor and along Highway 487. 3. Reduce number of turbines to 60 from 74 turbines in the original layout, thereby reducing the overall rotor swept area. 4. Carcasses that may attract eagles will be removed within the wind project lease area and Two Rivers Wind will promptly inform WYDOT of necessary carcass removal from nearby highways when identified.
Compensatory Mitigation	Powerpole retrofits will mitigate the loss of golden eagles at a 1.2:1 ratio as determined by the Service's resource equivalency analysis for no net loss of golden eagle populations. No compensatory mitigation is anticipated for bald eagles as relevant bald eagle populations are healthy enough to sustain the mortality contemplated by the Project.

Adaptive Management	Adaptive management specifies the actions to be taken if take approaches or reaches the amount authorized and anticipated within a given time frame. Adaptive management terms in a permit will include review periods of no more than five years and may require prompt action(s) upon reaching specified conditions. Adaptive management actions may include: 1. Employ onsite biological monitor(s) during daylight hours at locations and/or times of suspected risk, to further refine the understanding of risk factors. 2. Implement habitat management or modification plan to minimize attraction to the Project, limit perching within the Project, and generally minimize risky behaviors. 3. Implement a limited curtailment program specific to the area(s) and/or period(s) of highest collision risk. 4. Develop and evaluate technology designed to detect and deter large raptors in consultation with the USFWS. 5. Other measures agreed upon in consultation with USFWS.
Data Provided to Service	Data will be collected by a qualified, independent entity and provided to the USFWS, including: annual monitoring report of fatalities; reporting of injured eagles; and information on the effects of specific, applied conservation measures.

The development of the Project ECP has been the result of considerable interaction and coordination between Two Rivers Wind and the Service. Similarly, ongoing implementation of the Project ECP will continue to depend on frequent communication between agency biologists and Two Rivers Wind. Many of the avoidance, minimization, and mitigation measures that will or may be implemented at the Project may need to be reviewed and evaluated for effectiveness. The status of eagle populations and eagle/wind turbine interactions will evolve over time, both locally and nationally, and over the life of the Project. Adjustments to the eagle take permit program and to the eagle conservation measures associated with the Project will be made over time.

If it is determined that the rate of eagle take is approaching a higher than anticipated level of take based on the eagle model predictions and post-construction monitoring data and reports, then adaptive mitigation or conservation measures may be required. **Table 11** summarizes the stepwise adaptive management process for the Project for the initial five-year permit period, which has been developed in close coordination with the Service and allows flexibility to respond to evolving environmental conditions in the Project area. The overall mitigation program for the subsequent five-year permit period would be reevaluated, based on actual results as compared with permitted levels of take, and this stepwise approach will start over with Step I.

Table 11. Stepwise Adaptive Management Approach

Step	Noncumulative Threshold or "Trigger"[1]	Conservation Measure[2]	Cost Cap[3]
Step I	Any eagle taken during effective period of the permit.	Coordinate with USFWS to determine cause of mortality if not an obvious turbine collision. No further action would be required if mortality determined to be non-Project related. For Project-caused fatalities, determine if there are any factors that might influence risk. Assess eagle fatalities to determine if cause or contributing risk factors can be determined (e.g., nest proximity, weather, presence of	No cost cap is identified due to the assumption that no additional contractor support or equipment is needed beyond the baseline post-construction monitoring program. If additional contractor support or equipment is

Step	Noncumulative Threshold or "Trigger"[1]	Conservation Measure[2]	Cost Cap[3]
		prey/carrion) based on information gathered by a qualified, independent entity and if management response is warranted and feasible. Coordinate with USFWS about findings from assessment.	needed, then USFWS and Two Rivers Wind will discuss a cost cap not to exceed cost caps identified in subsequent steps.
Step II	If any two eagles taken within any 12-month period or two eagles taken within the first two years of the effective period of the permit.	Coordinate with USFWS to determine cause of mortality if not an obvious turbine collision. No further action would be required if mortality determined to be non-Project related. For Project-caused fatalities, perform additional targeted observational/behavioral studies similar to pre-construction monitoring methods for identified areas and seasons of concern to further evaluate risk and inform potential conservation measures. For example, flight path monitoring that defines seasonal and diurnal flight patterns which may inform future risk reduction plans for the Project. Use monitoring results to determine if a risk mitigation plan is appropriate. Coordinate with USFWS about findings from evaluation.	There is no cost cap for this step unless additional contractor support or equipment is needed to conduct additional observational/behavioral studies and analysis for this step. Costs for additional contractor support or equipment will be limited to a maximum of $75,000 a year.
Step III	If any three eagles taken within any 24-month period (actual annual rate >1.5 eagle per year)	Coordinate with USFWS to determine cause of mortality if not an obvious turbine collision. No further action would be required if mortality determined to be non-Project related. For Project-caused fatalities, work in conjunction with USFWS to implement a program in which personnel with appropriate skills to monitor for raptors will be present on-site during daylight hours during high-risk periods identified in prior studies, and will have the authorization to modify turbine operations when an eagle approaches the rotor swept area (RSA). Continue monitoring and develop a curtailment plan in which turbines will be curtailed in high-risk areas during high risk periods based upon information collected in Step I, the data collected during the observational/ behavioral studies performed in Step II, and/or during the interim program here in Step III. The curtailment plan will identify eagle risk areas/times/turbines to be targeted for implementation of informed curtailment as part of regular operations to the extent practicable. Curtailment will be designed to reduce risk at times or in areas where environmental factors contribute to the collision risk of eagles.	Costs associated with biological monitoring to implement modification of turbine operations will be limited to a maximum of $100,000 per year of monitoring. Turbine curtailment will be limited to a maximum cost of $100,000 per year as long as permitted eagle take is not exceeded.

Step	Noncumulative Threshold or "Trigger"[1]	Conservation Measure[2]	Cost Cap[3]
Step IV	If more than four eagles taken within any 24 month period (actual annual rate > 2 eagles per year)	Work with USFWS to determine cause of mortality if not an obvious turbine collision. No further action would be required if mortality determined to be non-Project related. For project-caused fatalities, coordinate with USFWS to determine best options to reduce eagle fatalities, and implement measures in a joint collaborative process involving USFWS. Measures could include: (1) implementing informed curtailment plan to reduce risk in high-risk areas or during high risk periods; (2) deploying approved advanced technology designed to detect and deter large raptors; and/or, (3) implementing technology that is designed to curtail turbine blade rotation as eagle(s)/large raptors approach individual turbine's RSA.	Turbine curtailment will be limited to a maximum cost of $200,000 per year. Costs associated with installation of alternative technologies to prevent further eagle fatalities will be limited to a maximum of $200,000 as long as permitted eagle take is not exceeded.

[1] Nothing in this table authorizes the permittee to exceed the level of take authorized in the eagle take permit. The purpose of the table is to describe how permittee will respond to data that potentially indicates additional measures may be needed to ensure compliance with permit conditions.

[2] USFWS and Two Rivers Wind will negotiate in good faith to attempt to reach agreement on any issues arising during the implementation of the ECP. However, if there is an issue that cannot be resolved within a timely manner at the field level, Two Rivers Wind and USFWS staff will coordinate to bring the matter up the chain of command in a stepwise manner.

[3] The Capped Amount is defined as the total of (a) direct out-of-pocket costs incurred in the implementation of such measures and practices, (b) revenues from sales of power or environmental attributes forgone through any program of operational curtailment, and (c) wind energy production tax credit proceeds associated with forgone power generation, expressed in a pre- tax fashion (PTCs divided by 1 minus the applicable corporate tax rate).

12.0 Other USFWS Permits

Recommendation (#12): **If an applicant intends to apply for any other permits to USFWS, Region 6, MBMO, for other authorizations needed for their wind project, either under the Migratory Bird Treaty Act (MBTA) or BGEPA, include a statement indicating which permits are needed and clearly indicating that they will apply for them. For example *many wind energy companies apply for MBTA 21.27 Special Purpose Utility permits so that they can legally collect migratory birds and hold them at their facility for use in post-construction mortality monitoring work. In some cases construction of a wind project may occur in close proximity to an in-use eagle nest such that a BGEPA 22.26 permit is necessary so that there is legal coverage under a permit if this construction work were to cause disturbance take of eagles at the nest.***

Applicant Response:

Details of conditions relevant to other USFWS permits required for the Project will be provided by the USFWS upon approval of the proposed Project layout.

Two Rivers Wind will retain the services of wildlife contractors to address potential wildlife incidents during construction and operation. All permits for temporary possession of wildlife or carcasses are to be supplied by the contractor.

13.0 Summary

Two Rivers Wind has been coordinating with the Service since 2017, early on in Project development and prior to construction, to work with the Service to develop a site plan for the Project that provides the greatest opportunity to avoid and minimize impacts to eagles. In addition to proactive Project siting, a robust suite of additional avoidance, minimization, and mitigation measures have been developed for the Project to reduce impacts to eagles to the greatest extent feasible.

Two Rivers Wind has collected all of the necessary information and has prepared an ECP that confidently assesses eagle risk, and will "reduce predicted eagle take, and the population level effect of that take, to a degree compatible with regulatory standards to justify issuance of a programmatic take permit by the Service" (USFWS 2013). Through our applied avoidance and minimization measures, implementation of the ECP, the step-wise adaptive management plan, post construction monitoring and compensatory mitigation, the Project will achieve a no-net-loss of eagles to meet the conservation standard of the BGEPA and the permit requirements set forth in 50 CFR 22.26.

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Appendix A
Project Site Plan