Wild Springs Solar Project
Natural Resource Strategy
Pennington County, South Dakota

Prepared by:

Geronimo Energy, LLC
8400 Normandale Lake Blvd, Suite 1200
Bloomington, Minnesota 55437

and

Western EcoSystems Technology, Inc.
7575 Golden Valley Road, Suite 300
Golden Valley, MN 55427

May 2020

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

Wild Springs Solar, LLC (Wild Springs), a wholly owned subsidiary of Geronimo Energy, LLC (Geronimo), a National Grid Company, is developing the Wild Springs Solar Project (Project), a photovoltaic (PV) ground-mounted solar energy project on private land in Pennington County, South Dakota. Wild Springs has requested support from Western EcoSystems Technology, Inc. (WEST) in developing this preliminary Natural Resource Strategy (NRS) for the Project. The purpose of the NRS is to provide a written record of the natural resource issues at the site as well as Wild Springs' commitment to environmental management and sustainable development.

From an energy policy perspective, utility scale ground-mounted solar PV installations present numerous societal and environmental benefits, including reduced greenhouse gases, an inexhaustible source of energy, and energy security. However, ground-mounted solar, similar to other energy and industrial land uses, can potentially introduce some adverse environmental impacts. Although the nature, magnitude, and extent of impacts varies based on land use intensity and other structural characteristics that are different from other forms of development, evaluation of potential effects is still good due diligence and provides an opportunity to minimize negative outcomes and further consider potential benefits. For example, ground-mounted solar projects present a unique opportunity for dual land use and maintaining or even enhancing ecological integrity through appropriate project siting, design, construction, and ongoing operational management.

1.1 Wild Springs' Commitment to Environmental Sustainability

Wild Springs is committed to responsibly developing, constructing, and operating the Project in a manner that balances the need for clean, renewable energy with consideration for on-site natural resource protection. This NRS was developed to support that commitment and document specific steps taken to assess natural resource conditions and plan for appropriate and sustainable site development and ongoing management.

1.2 Project Description

The proposed Project is an up to 128 megawatt (MW) PV ground-mounted solar facility located near the city of New Underwood, South Dakota (Figure 1). The Project will span approximately 1,499 acres (ac; 607 hectares [ha]) and will include solar modules (panels), racking, inverters and on-site underground electrical collection lines, fencing, access roads, a substation, operation and maintenance building, laydown yard(s), and weather station(s), as well as a 115-kilovolt transmission line to connect to the Western Area Power Administration (WAPA) owned New Underwood substation, located approximately 250 feet from the leased lands. The WAPA substation parcel has been included in the Project boundary and surveyed to allow for future routing of transmission structures to interconnect the Project. Construction is anticipated as early as the fall of 2021 with commercial operations beginning by the end of 2022.

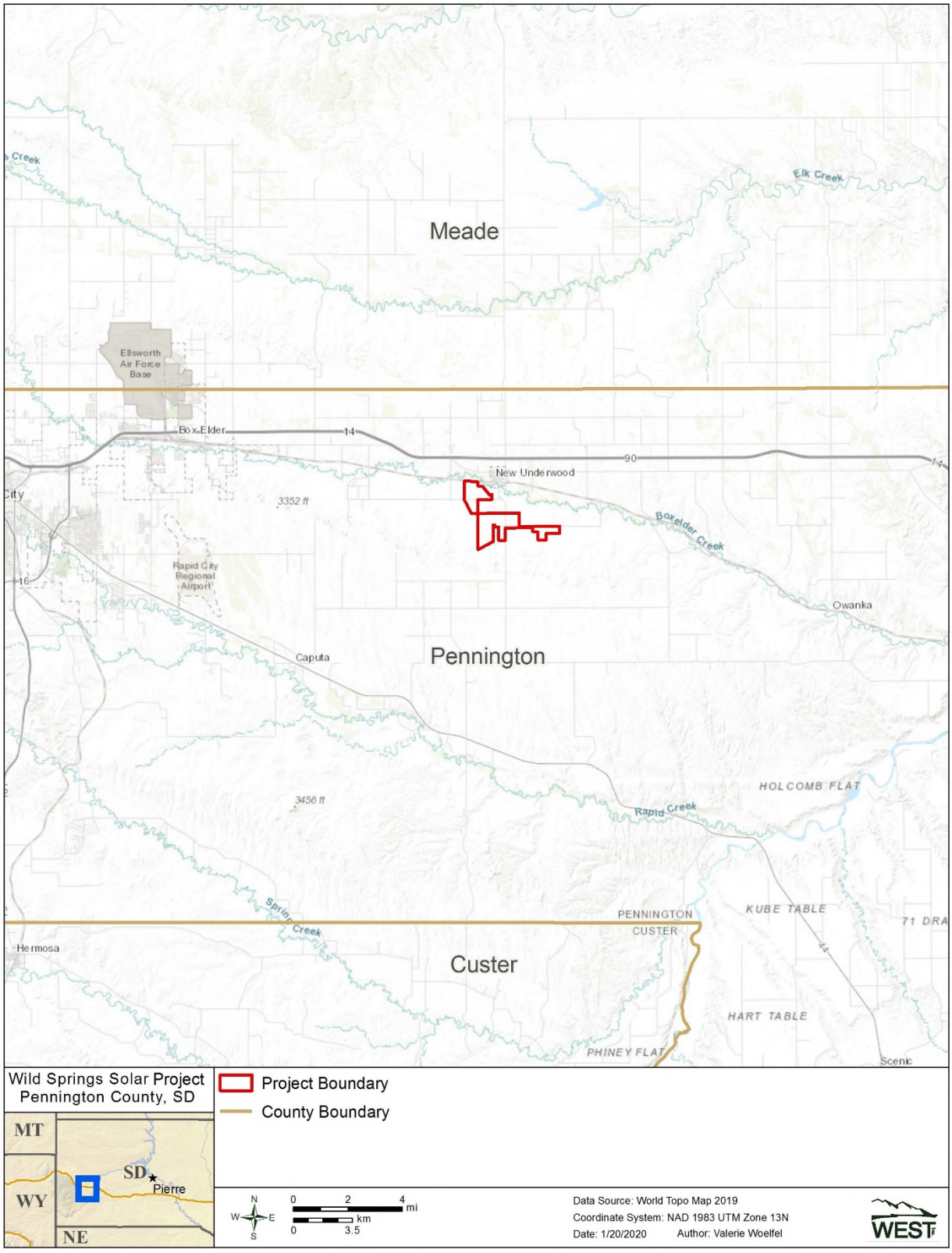


Figure 1. Location of the Wild Springs Solar Project, Pennington County, South Dakota.

1.3 Goals and Objectives for the Site

Wild Springs intends to develop and operate the Project in a way that it complies with regulatory requirements, maintains the ecological integrity of the site, and considers key natural resource stakeholder feedback.

1.3.1 Regulatory Compliance

Wild Springs intends to develop and operate this Project in compliance with appropriate natural resource regulations. Included below are key regulations that were considered in developing this NRS.

Endangered Species Act

Federal law protects endangered and threatened species listed under the Endangered Species Act of 1973 (ESA; 16 US Code [USC] 1531-1544 [1973]). The ESA is administered by the US Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries). Federally listed species and their designated critical habitats are protected under the ESA, which prohibits the take or trade of listed animals; however, there is a mechanism to grant permission for take that is incidental to an otherwise lawful activity.

State Endangered Species Law

State law protects endangered and threatened species under South Dakota Codified Law 34A-8. This law prohibits the take, possession, purchase, sale, transportation, exportation, or shipment of endangered or threatened plants and animals. Although the state of South Dakota has a process by which take of endangered and threatened species can be authorized (South Dakota Codified Law 34A-8-8), it is designed to authorize take associated with scientific, zoological, or educational purposes and does not include take associated with otherwise lawful activity (typically referred to as incidental take).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (MBTA; 16 USC 703-712 [1918]) assigns legal authority to the USFWS to protect over 800 species of raptors, diurnal migrants, and passerine migratory birds from take. Unlike the ESA, the MBTA only regulates direct take of migratory birds, it does not prohibit modification of habitat. On December 22, 2017, the Office of Solicitor of the US Department of the Interior (DOI) released a new legal opinion, M-37050, addressing the issue of incidental take under the MBTA. According to M-37050, the policy of the DOI is that incidental take of migratory birds that results from the operation of a solar project is not regulated by the MBTA. Furthermore, the USFWS does not have a permit for incidental take of migratory birds under the MBTA associated with otherwise lawful activities, such as commercial or industrial operations.

Bald and Golden Eagle Protection Act

Bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles are afforded legal protection under authority of the Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 USC 668–668d [1940]). BGEPA prohibits the take, sale, purchase, barter, offer of sale, purchase, or barter, transport, export or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. Take is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (16 USC 668c [1940]). Disturb is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (16 USC 668c [1940]).

Clean Water Act and Waters of the US

Pursuant to Sections 404 and 401 of the Clean Water Act (CWA), the US Army Corp of Engineers (USACE) regulates the discharge of dredge and/or fill material into Waters of the US (WUS). Section 404 requires that any entity proposing an activity that would discharge such materials into a WUS must obtain a permit from USACE. Section 401 requires states (in this case, South Dakota) to review projects and federal permits to ensure they will not violate surface water quality standards. USACE has final and legal authority in determining the presence of jurisdictional WUS and the extent of their boundaries. The South Dakota Department of Environment & Natural Resources has the responsibility of reviewing and approving Section 401 Water Quality Certification for activities occurring outside of Indian Country within South Dakota.

1.3.2 Maintain Ecological Integrity

One of Wild Springs' goals for the Project is maintaining ecological integrity at the site to the degree practicable. Ecological functions of the land on which the Project is sited can be valuable for both human land use and other natural resource values. In addition to operating a carbon-free energy facility, the Project lands can be managed with consideration for long-term soil health, water quality, vegetation structure and composition, and wildlife habitat. Even with the high density of Project facility structures, it is intended that the ecological value of the land will be maintained to the greatest extent practicable. This NRS, including the best management practices and adaptive management strategies herein, was developed to be employed during facility design, construction, and operations to fully consider the opportunity presented to maximize the ecological functions of the land within the Project boundary.

1.4 Early Stakeholder Communication

Early coordination with state and federal natural resource agencies and other stakeholders during the development process is critical to determine and address Project-specific environmental concerns. As such, Wild Springs has coordinated with the USFWS, the South Dakota Game, Fish and Parks (SDGFP), and the South Dakota Natural Heritage Program (SDNHP) throughout the siting and development processes (Table 1). This NRS reflects the comments and recommendations made during the coordination process with these agencies. As additional recommendations and comments are received from the agencies, this NRS may be updated accordingly.

Table 1. Summary of agency coordination regarding the Wild Springs Solar Project in Pennington County, South Dakota.

Date	Agency	Coordination Summary
April 2017	SDGFP	On April 6, 2017, Melissa Schmit (Geronimo) contacted Silka Kempema (SDGFP) via email on Wild Spring's proposed lek survey protocol and requested information on known leks within or near the Project. The SDGFP responded on April 17, 2017 with general comments on the proposed protocol that did not require revisions to the survey methodology.
July 3, 2017	USFWS	Melissa Schmit (Geronimo) received a letter from Scott Larson (USFWS) providing comments on the proposed Project. The federally endangered whooping crane (*Grus americana*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*) were identified as potentially occurring within the Project. The USFWS also recommended pre- and post-construction surveys for migratory birds and eagles. The letter advised that wetlands be avoided and the APLIC guidelines for power lines be followed.
July 7, 2017	SDGFP SDNHP	Melissa Schmit (Geronimo) received a letter from Leslie Murphy (SDGFP) providing comments on the proposed Project. The letter advised both pre-construction wildlife surveys to document current conditions and post-construction mortality surveys to assess actual impacts. This included breeding grassland birds (songbirds and grouse) and bats. The SDGFP advised that any remnant native prairie tracts be avoided, and the APLIC guidelines for power lines be followed. A search of the SDNHP indicated that there are no known records of threatened, endangered, or rare species in the Project boundary. A joint meeting with the agencies was recommended.
October 22, 2019	SDGFP	Melissa Schmit (Geronimo) received a letter from Silka Kempema (SDGFP) providing comments on the proposed Project, in response to a letter dated October 4, 2019. The SDGFP reiterated the same concerns and recommendations as the July 2017 letter, and recommended an updated review of the Natural Heritage Database.
October 29, 2019	SDNHP	Area M, on behalf of Geronimo, received a response from the SDNHP for an updated Natural Heritage Data Request. The search of the database resulted in no documented threatened, endangered, or rare species within the Project boundary.
January 22, 2020	USFWS SDGFP	Melissa Schmit (Geronimo) and WEST met with representatives of the USFWS (N. Gates) and SDGFP (H. Morey) to provide an update on the Project and to discuss wildlife issues, surveys and avoidance/minimization approaches.
February 13, 2020	SDNHP	Area M, on behalf of Geronimo, received a response from the SDNHP for an updated Natural Heritage Data Request. The search of the database resulted in no documented threatened, endangered, or rare species within the Project boundary.
March 9, 2020	USFWS	WAPA received a comment letter on the proposed Project as a part of the National Environmental Policy Act (NEPA) environmental scoping process referencing the 2017 comment letter.
April 3, 2020	SDGFP	WAPA received a comment letter on the proposed Project as a part of the NEPA environmental scoping process referencing the 2017 and 2019 comment letters.

Area M = Area M Consulting; Avian Power Line Interaction Committee (APLIC); Geronimo = Geronimo Energy; Project = Wild Springs Solar Project; SDGFP = South Dakota Department of Game, Fish, and Parks; SDNHP = South Dakota Natural Heritage Program; USFWS = US Fish and Wildlife Service.

2 SITE ASSESSMENTS AND SURVEYS

2.1 Habitats in Project Area

2.1.1 Land Cover and Use

The Project is located south of New Underwood in Pennington County, South Dakota (Figure 1), within the Northwestern Great Plains Level III Ecoregion and the Semiarid Pierre Shale Plains Level IV Ecoregion (US Environmental Protection Agency 2017). The Northern Great Plains is characterized by semiarid plains of shale, siltstone, and sandstone with occasional buttes and badlands (Bryce et al. 1998). Native grasslands have persisted in areas of steep or broken topography, but have largely been replaced by spring wheat and alfalfa, although agriculture is limited in the region due to erratic precipitation and irrigation limitations (Bryce et al. 1998). The Semiarid Pierre Shale Plains are dry, with only one or two inches of precipitation per year (Bryce et al. 1998).

The Project comprises 1,499 ac of mainly herbaceous rangeland and cultivated agricultural land. Based on National Land Cover Data (NLCD; Yang et al. 2018, Multi-Resolution Land Characteristics [MRLC] 2019) and reconnaissance surveys conducted by Area M Consulting (Area M) on October 8-11 and November 22-26, 2019, 75.5% of the Project is composed of herbaceous/grasslands and 21.4% is cultivated cropland (Table 2; Figure 2). Less prominent land cover types include developed (2.5%), barren land (0.4%), open water (0.1%), shrub/scrub (0.1%), and emergent herbaceous wetland (less than 0.1%). Review of true-color satellite imagery suggests that some portions of the Project have been cultivated periodically over the past 20 years; however, the primary land use appears to be rangeland grazing along with perennial haying, with the cultivated areas being pasture grasses for livestock feed.

Table 2. Field verified land cover types, coverage, and percent composition within the Wild Springs Solar Project, Pennington County, South Dakota.

Land Use	Field Observations	Acres	% Composition
Grassland/Herbaceous	Includes pasture, hay, and fallow grassland areas	1131.2	75.5
Cultivated Crops	Alfalfa, hay, and wheat	320.3	21.4
Developed, All Categories	Generally roads bisecting the Project area	38.0	2.5
Barren Land	Associated with the WAPA substation	6.0	0.4
Emergent Herbaceous Wetlands	Delineated wetlands	0.4	<0.1
Open Water	Delineated wetlands	1.3	0.1
Shrub/Scrub	Associated with WAPA substation	1.3	0.1
Total [a]		**1,498.6**	**100**

Yang et al. 2018, Multi-Resolution Land Characteristics 2019, Area M 2019a

[a] Sums may not equal values shown due to rounding.

2.1.2 Wetlands and Waterbodies

Desktop Review

Area M reviewed the National Wetlands Inventory (NWI) and National Hydrography Dataset (NHD) and identified one NHD basin, seven intermittent drainages, and 24 NWI polygons intersecting the Project boundary (Area M 2019a). Altogether, the NWI and NHD datasets contain eight unique palustrine wetlands and six unique drainages/flowlines.

Wetland delineations

Wild Springs contracted with Area M to conduct wetland delineations for the Project in 2017 and 2019 to assist the USACE in determining jurisdiction and to support Sections 404 and 401 permitting. Note that the USACE issued a Jurisdictional Determination for the wetlands and waterbodies that occur within the Project boundary on March 18, 2020.

The current Project boundary contains 26 wetlands, all classified as either palustrine emergent or embanked ponds (Area M 2019a; Figure 2). Most wetlands within the Project are associated with minor drainages flowing into Boxelder Creek, some ephemeral, or clearly excavated basins for ranching/farming purposes.

Area M provided a baseline characterization of the general Project area in 2017. The existing landscape was identified as a mixture of pastureland, cropland, disturbed grassland, and riparian areas, with the majority of the land currently being used as cattle pasture. Area M identified the primary soil types within the Project to be Kyle clay with either a 0-2 or 2-6% slope with greater than 80 inches depth to water table (Area M 2017c).

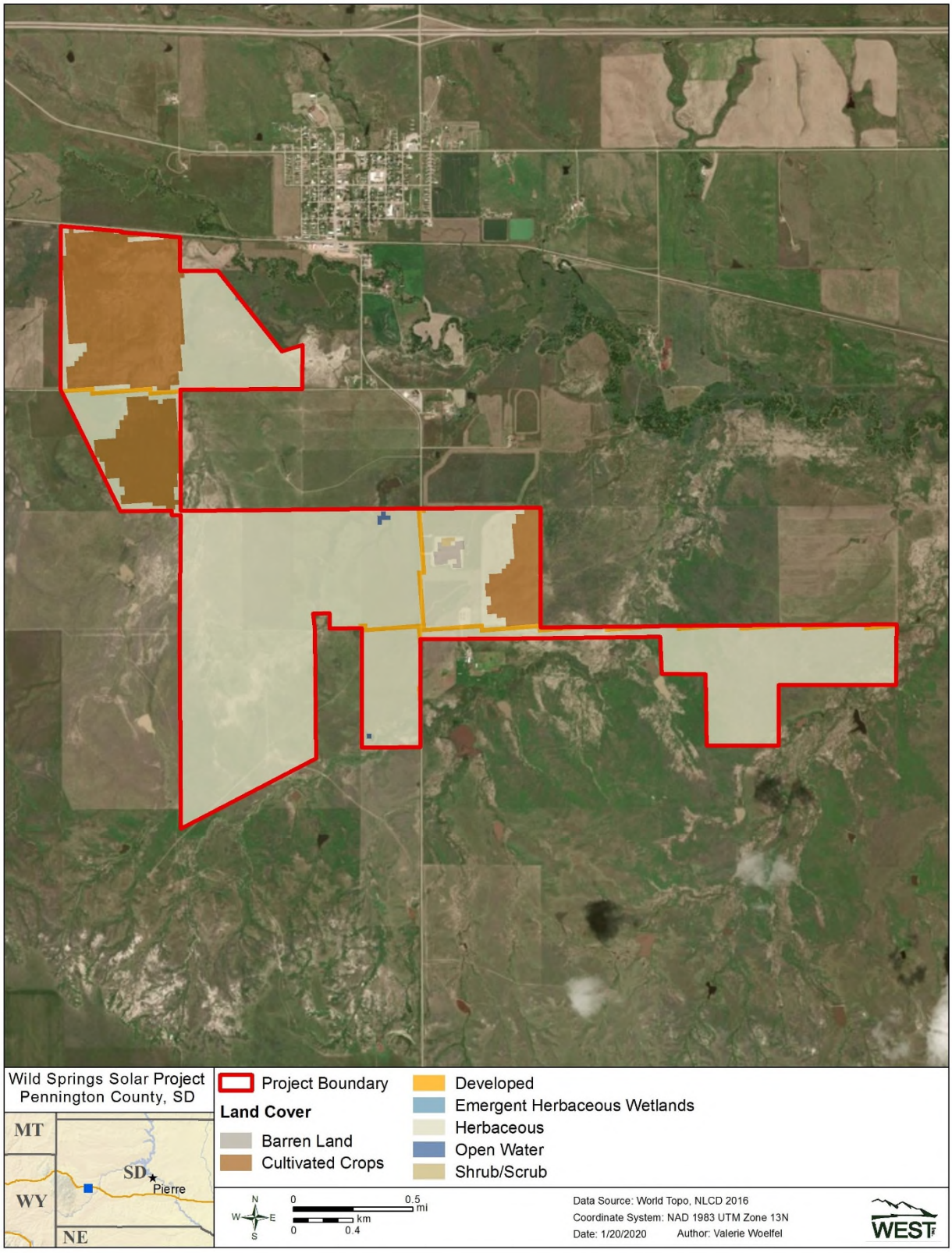


Figure 2. Field verified land cover and wetlands at the Wild Springs Solar Project, Pennington County, South Dakota.

2.1.3 Cultural Context and Public Lands

Indigenous Cultural Land Use

The Northern Great Plains have a rich history of American Indian tradition dating back to pre-historic times. The cultural history of the Northern Great Plains incorporates how American Indian tribes used the land over time and includes a variety of traditions. This includes the first bands of migratory hunters on the periglacial fringe, through adaptations of increasingly diversified hunter-gatherers due to rapid changes in climate and environment, to the tribal organizations and semi-permanent or permanent food-producing communities after A.D. 1000 to the equestrian adaptation of the early historic period (Area M 2017a). Native grasslands persisted and evolved under the pressure of grazing by huge herds of bison (*Bison bison*), and it was not until European settlers began to convert native prairies and grassland to agricultural land in the mid-1800s that native grasslands began to experience rapid declines (Sampson and Knopf 1994).

Area M conducted a Level I and Level III cultural resources inventory for the current Project boundary and surrounding area (Area M 2017a; Area M 2019b). Level I inventory conducted in April/May 2017 and November/December 2019 identified seven previously-completed cultural resources surveys within one-half mile (mi) of the proposed Project area. Three previously-recorded archaeological sites and four recorded architectural resources are located within one-half mi of the Project boundary (Area M 2017a; Area M 2019b). Zero previously-recorded cultural resources were identified within the current Project boundary (Area M 2017a; Area M 2019b).

The Level III inventory, conducted in May 2017 and October/November 2019, included ground-based field surveys of the proposed Project boundary in 15-meter (maximum) transects. These survey efforts identified one newly-recorded cultural resource within the 2017 Project boundary along Boxelder Creek (39PN3777; Area M 2017a). Area M recommended that the Project avoid 39PN3777 by employing a 50-foot buffer beyond the delineated site boundaries. Wild Springs has since shifted the Project boundary to exclude this cultural resource area.

Contemporary Cultural Land Use

In South Dakota, grassland conservation has become an important cultural value. Organizations such as the South Dakota Soil Health Coalition and the South Dakota Grassland Coalition are working to increase sustainable agriculture through improved soil health and to promote conservation of grasslands through sustainable and profitable management, respectively. Some of these sustainable practices include annual crop rotation and increasing rangeland productivity with rotational and strategic grazing. In South Dakota, grazing occurs on both ruderal and native rangelands and is managed by many different stakeholders and agencies.

Public Lands

The US Forest Service manages two major conservation areas in Western South Dakota: the Buffalo Gap National Grasslands and the Black Hills National Forest, both of which extend into Pennington County, located approximately 20 mi south and 27 mi west of the Project,

respectively. The US National Parks Service manages Badlands National Park and Wind Cave National Park, located approximately 25 mi southeast and 40 mi southwest of the Project, respectively. These areas are integral aspects of the contemporary cultural importance of natural areas and grasslands in South Dakota.

There are no federally or state-managed lands located within or adjacent to the Project boundary. The closest federally managed land is a National Public Lands Office located approximately 1.0 mi (1.6 kilometers [km]) south of the Project (Table 3; Figure 3). The New Underwood Dam State Conservation Area is located 0.9 mi (1.4 km) north of the Project, and is associated with a waterbody that may support waterfowl production and also has the potential to provide suitable habitat for birds and other wildlife. There are four State Resource Management Areas located within 5-mi the Project boundary (Table 3; Figure 3). These state-managed lands are subject to extraction (e.g., mining) or off-highway vehicle use.

Table 3. Public lands within 5 miles of the Wild Springs Solar Project, Pennington County, South Dakota

State-Managed Land Name	Distance/Direction from Project
New Underwood Dam (State Conservation Area)	0.9 mile/north
National Public Lands Office (National Public Lands)	1.0 mile/south
SD Public Land (State Resource Management Area)	1.1 mile/southeast
SD Public Land (State Resource Management Area)	3.5 miles/northeast
SD Public Land (State Resource Management Area)	4.5 miles/northeast
SD Public Land (State Resource Management Area)	4.8 miles/southeast

Data Source: US Geological Survey Protected Areas Database of the US 2019

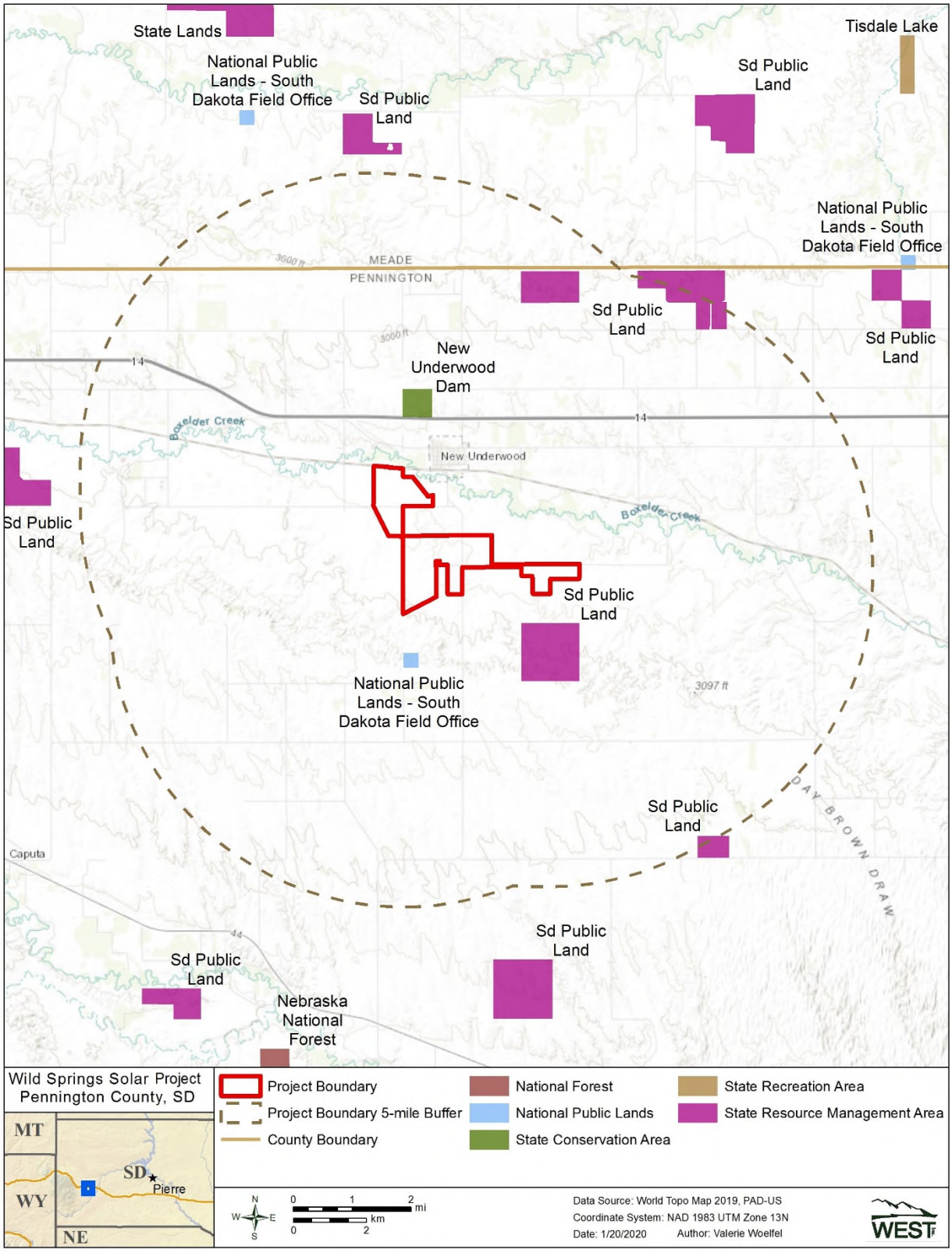


Figure 3. Public Lands in the vicinity of the Wild Springs Solar Project, Pennington County, South Dakota.

2.1.4 Vegetation

Characterizing the vegetation at a PV solar facility has two purposes: 1) assessing current and future potential wildlife habitat value, and 2) planning for restoration and ongoing land management. The combination of site-specific wildlife use data and vegetative cover and quality provides the complete picture for assessing wildlife habitat, and the opportunities for avoiding impacts and maintaining wildlife habitat. Site-specific mapping of vegetative cover and quality provides the information for developing a vegetation management plan intended to maintain the type and integrity of the existing vegetation even with a change in land use from ranching to energy operations. The following sections provide detail on available site-specific vegetation data collected, and recommendations for additional surveys to fill any information gaps that might exist.

Rare Plant Species

WEST consulted the USFWS county distribution list (USFWS 2017), USFWS Information, Planning and Consultation (IPaC) Environmental Conservation Online System (USFWS 2019a), South Dakota Natural Heritage Program (SDNHP 2019) and county distribution lists (2016) to identify state and federally listed plant species that may occur in or near the Project within Pennington County. Only one plant was identified by the USFWS county distribution list (USFWS 2017), Leedy's roseroot (*Rhodiola integrifolia* ssp. *leedyi*). Leedy's roseroot is a federally protected species that grows on rocky cliffsides, with only one documented occurrence in South Dakota, in the central Black Hills (SDNHP 2018). As such, this species has minimal potential to occur at the Project.

Site-Specific Field Characterization of Vegetation

The reconnaissance field surveys conducted by Area M in October and November of 2019 generally characterized the vegetation within the Project area (Area M 2019a). The Project is described as a mosaic of disturbed, grass-dominant plant communities containing dominant or co-dominant grass species including western wheat grass (*Pascopyrum smithii*), crested wheatgrass (*Agropyron cristatum*), blue grama (*Bouteloua gracilis*), buffalograss (*Bouteloua dactyloides*), and Poa spp. (*bluegrass*). In general, areas with less-intensive grazing and on ridgetops with shallow soils are plant associations dominated by the native shortgrass species blue grama and buffalograss, whereas the more heavily grazed and disturbed areas have plant associations that are dominated by the non-native crested wheat grass or bluegrass. The Project area also contains cultivated crops including alfalfa, hay, and wheat.

Low-lying forbs, shrubs, and sub-shrubs are present in varying densities, and include the native forbs fringed sage (*Artemisia frigida*), broom snakeweed (*Gutierrezia sarothrae*), curlycup gumweed (*Grindelia squarrosa*) and white sagebrush (*Artemisia ludoviciana*) which are frequently co-dominant with grasses, in their respective stratum. Only a few trees are present within the Project area: willow (*Salix* sp.) and boxelder (*Acer negundo*) stands surrounding embanked wetlands and lone cottonwoods (*Populus deltoides*) in the shallow drainage ways which retain moisture throughout the warm season. Few wetland communities are present within the general Project area, but those that occur grow within small drainage swales or around embanked ponds

and typically contain a small fringe component of sedge (*Carex* spp.) or cattails (*Typha* spp.) depending on wetland type.

Additional invasive plant species observed onsite include Canada thistle (*Cirsium arvense*), located primarily along roadsides, disturbed areas, and wetland perimeters. Russian thistle (*Kali tragus*), Russian olive (*Elaeagnus angustifolia*), cheatgrass (*Bromus tectorum*), and Japanese brome (*Bromus japonicus*) were also observed. Canada thistle is the only species on the State noxious weed list; however, the presence of cheatgrass and Japanese brome are significant concerns. Cheatgrass, an annual invasive grass that is native to Europe and eastern Asia, is a broad concern across all western rangelands and contributes to increased wildfire frequency and risk, reduced soil health (due to its shallow root systems), and less diverse native plant communities.

USDA Ecological Site Descriptions

Based upon the US Department of Agriculture (USDA) Major Land Resource Areas (MLRAs) of the United States (USDA 2006), the Project falls within the Western Great Plains Range and Irrigated Region – Pierre Shale Plains. The native vegetation in this MLRA consists primarily of cool- and warm-season grasses and forbs, with some trees and shrubs occurring along streams. Dominant land uses of the area are primarily ranching and, to a lesser extent, farming. The average annual precipitation for the eastern side receives 16 to 18 inches. Major resource concerns to this MLRA are wind erosion and surface water quality. Review of true-color satellite imagery of the Project and the site-specific surveys conducted by Area M confirm this characterization. A suite of 27 Ecological Site Descriptions (ESDs) have been developed for this MLRA, all of which are classified as rangeland. Five of these ESDs have been identified by WEST biologists to have a higher potential for occurrence within the Project based on field-verified soil types obtained from wetland delineations.

1. Dense Clay (*Pascopyrum smithii – Elymus lanceolatus*)
2. Clayey (*Pascopyrum smithii – Nassella viridula*)
3. Loamy (*Pascopyrum smithii – Hesperostipa comata* subsp. *comata*)
4. Thin claypan (*Pascopyrum smithii – Bouteloua gracilis*)
5. Wet Land (*Spartina pectinate – Calamagrostis Canadensis*)

The Area M field characterization identified the thin claypan (*Pascopyrum smithii – Bouteloua gracilis*) ESD association but none of the other associations. Soil surface textures in this ESD are fine sandy loam to clay loam, 1 to 5 inches thick. The natric (Btn) horizon typically occurs within 4 inches of the surface and is extremely hard clay, high in sodium creating a whitish coloration, and has prismatic or columnar structured subsoil creating a rounded or “biscuit-shaped” top. The vegetation in reference is a mix of cool- and warm-season grasses, mostly rhizomatous wheatgrass, blue grama, and buffalo grass. Prickly pear (*Opuntia polyacantha*) or fragile cactus (*Opuntia fragilis*) are often present.

US National Vegetation Classification System

WEST biologists reviewed the US National Vegetation Classification (USNVC) database and determined that vegetation at the Project is classified under the Central North American Grassland and Shrubland Division (2.B.2.Nb; USNVC 2019). Three groups within this division were identified as potential vegetative cover at the Project, described below.

1. Central Great Plains Mixedgrass Prairie Group
2. Northern Great Plains Mesic Mixedgrass Prairie Group
3. Northern & Central Great Plains Ruderal Grassland & Shrubland Group

2.2 Wildlife in Project Area

Characterizing wildlife within the general Project area is important for assessing potential impacts and risk and establishing management goals. WEST reviewed publicly available site-specific data to assess potential wildlife at the Project, and to provide site-specific field survey recommendations to further assess species risk and appropriate avoidance/minimization techniques.

Some of the wildlife species in this area are mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), badger (*Meles meles*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), mink (*Neovison vison*), white-tailed jackrabbit (*Lepus townsendii*), eastern cottontail (*Sylvilagus floridanus*), black-tailed prairie dog (*Cynomys ludovicianus*), wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), partridge (*Perdix perdix*), mourning dove (*Zenaida macroura*), mallard (*Anas platyrhynchos*), killdeer (*Charadrius vociferus*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), and red-winged blackbird (*Agelaius phoeniceus*; USDA 2006, SDGFP 2019). Opportunistic sightings of vertebrate species were recorded by Area M biologists in order to assemble an ongoing inventory of species which occur within the Project area. In total, 35 vertebrate species were detected during field surveys, including 27 birds and 8 mammals (Area M 2019a).

Area M identified two active black-tailed prairie dog colonies within the Project boundary, with the larger of the two being approximately 44 ac in size (Area M 2019a). The colonies are likely associated or satellite colonies based on review of true-color satellite imagery which shows that the colonies were contiguous in previous years across a larger area. While black-tailed prairie dogs are not protected under federal or state laws, their colonies can provide suitable habitat for other sensitive species, including burrowing owls (*Athene cunicularia*), swift fox (*Vulpes velox*), and black-footed ferrets (*Mustela nigripes*). Area M incidentally detected three burrowing owls within the prairie dog colonies in 2017 (Area M 2019a).

2.2.1 Federal and State-Listed Species

WEST consulted the USFWS county distribution list (USFWS 2017), USFWS IPaC Environmental Conservation Online System (USFWS 2019), the SDNHP (2019), and county distribution lists (SDGFP 2016) to identify state and federally listed wildlife species that may occur in or near the

Project within Pennington County (Table 3). Based upon review of suitable habitat for the species discussed in Table 3, and the habitat conditions at the Project, it is unlikely that any federal or state-threatened or endangered species will occur at the Project.

Table 4. Federally and state-listed threatened and endangered animal species and species of special concern with known or potential for occurrence in Pennington County, South Dakota.

Species	Status	Habitat	Potential Occurrence within the Project
MAMMALS			
Black-footed ferret[1] *Mustela nigripes*	FE, SE	Requires black-tailed prairie dog colonies; estimates of 100-150 acres of prairie dog colony are required to support one ferret.	The Project contains marginal suitable habitat for the black-footed ferret; due to the lack of occurrences outside of the reintroduced populations, it is unlikely this species will occur at the Project.
northern long-eared bat[2] *Myotis septentrionalis*	FT	Roosts and forages during spring and summer in mature forest interior and riparian areas. May roost in old buildings, and typically avoids open habitats. Swarms in wooded areas surrounding caves and mines in autumn, and hibernates in caves and mines.	The Project does not contain suitable summer habitat for the northern long-eared bat; the riparian corridor of Boxelder Creek just to the north of the Project may provide some roosting and foraging habitat, and the species may pass through the Project during migration.
northern river otter *Lontra canadensis*	ST	Utilizes streams and rivers that flow through tallgrass, mixed grass, and shortgrass prairies. Dens in hollow logs, underground space among roots, overhangs, beaver lodges or dens, and other animal burrows.	The Project contains no suitable habitat for this species; river otters are more likely to occur in larger rivers outside of the Project.
swift fox *Vulpes velox*	ST	Heavily grazed shortgrass or mixed-grass prairies with open gently rolling topography for high visibility; usually associated with prairie dog or ground squirrel colonies.	Suitable habitat exists within the Project; however, known records of the Swift fox are associated with Buffalo Gap National Grasslands and Badlands National Park in Pennington County, and therefore the species is unlikely to occur at the Project.
BIRDS			
American dipper *Cinclus mexicanus*	ST	Prefers clean, cold, fast flowing mountain streams with abundant aquatic insects.	The Project does not contain the preferred habitat for the American dipper. The species is associated with the Black Hills National Forest in Pennington County, and is unlikely to occur at the Project.

Table 4. Federally and state-listed threatened and endangered animal species and species of special concern with known or potential for occurrence in Pennington County, South Dakota.

Species	Status	Habitat	Potential Occurrence within the Project
interior least tern[2] *Sternula antillarum*	FE, SE	Nests on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, and lake and reservoir shorelines. May be found on lakes, rivers, and reservoirs during spring and fall migration.	The Project does not contain suitable breeding habitat for this species. Although interior least terns may pass through during migration, this is unlikely due to lack of preferred stopover habitat.
osprey *Pandion haliaetus*	ST	Always found near water – rivers, lakes, ponds; large open-top trees used for nesting and roosting.	The Project does not contain suitable breeding habitat for this species. Although osprey may pass through during migration, this is unlikely due to lack of preferred stopover habitat.
peregrine falcon *Falco peregrinus*	SE	Open grasslands with suitable nesting cliffs and rock outcroppings near a concentrated prey base such as waterfowl or colonial ground squirrels.	The Project contains suitable grassland habitat; however, the lack of cliffs and outcroppings make it unlikely that this species will occur at the Project.
red knot[2] *Calidris canutus rufa*	FT	Require stopover habitats rich in easily digested foods, such as invertebrates with thin or no shell.	Suitable stopover habitat is not present, and therefore the red knot is unlikely to occur at the Project.
whooping crane[2] *Grus americana*	FE, SE	Migrates through South Dakota; migration habitat includes marshes and submerged sandbars in rivers with good horizontal visibility, water depth of 12 in or less, and minimum wetland size of 0.1 ac for roosting.	The general Project area contains limited migration stopover habitat for this species, and higher suitability habitat is located outside of the Project boundary; this species is unlikely to occur in within the Project boundary.
FISH			
longnose sucker *Catostomus catostomus*	ST	Prefers cool, clear, spring-fed streams and lakes.	Based on wetland delineations the Project does not contain suitable habitat for this species and it is unlikely to occur.
Sturgeon chub *Macrhybopsis gelida*	ST	Prefer areas with moderate to strong current on large rivers with rocks, gravel or coarse sand substrates.	Based on wetland delineations the Project does not contain suitable habitat for this species. More likely to occur in larger rivers outside of the Project.

Table 4. Federally and state-listed threatened and endangered animal species and species of special concern with known or potential for occurrence in Pennington County, South Dakota.

Species	Status	Habitat	Potential Occurrence within the Project

Source: Area M Consulting (Area M) 2019; South Dakota Department of Game, Fish and Parks (SDGFP) 2014, 2016; South Dakota Natural Heritage Program (SDNHP) 2019; US Fish and Wildlife Service (USFWS) 2017, 2019

FE = Federally listed as endangered, FT = Federally listed as threatened, SE = State-listed as endangered, ST = State-listed as threatened.

[1]Black-footed ferrets have been reintroduced into Badlands National Park, Buffalo Gap National Grasslands, Cheyenne River Sioux Reservation, Lower Brule Sioux Reservation, Rosebud Sioux Reservation and Wind Cave National Park and therefore occur in Pennington County; however, this species is not expected to occur within the Project.

[2]Species identified by the USFWS Information for Consultation and Planning (IPaC) tool; discussed in greater detail in the subsequent sections.

Interior Least Tern

The interior least tern (*Sternula antillarum*) is a federal and state-endangered species. This species prefers open areas for feeding and nesting; feeding occurs in the shallow water of lakes, ponds, and rivers located close to nesting areas with an abundance of small fish; nesting habitat is bare or sparsely vegetated sand, shell, and/or gravel beaches, sandbars, islands, and salt flats associated with rivers or lakes (SDGFP 2014; USFWS 2019). The Project does not contain suitable breeding or stopover habitat for this species; therefore, it is unlikely that this species will occur at the Project.

Northern Long-eared Bat

The northern long-eared bat (NLEB; *Myotis septentrionalis*) was once found commonly throughout its range; on January 14, 2016, the USFWS published a final rule in the Federal Register (FR; 81 FR 1900) designating the NLEB as a threatened species throughout its geographic range as a response to the documentation of white-nose syndrome (WNS) in the United States (81 FR 1900). The USFWS's WNS Zone map, dated July 25, 2019, shows Pennington County is within 150 mi of several known WNS-infected hibernacula (USFWS 2019); therefore, the Project falls within the WNS-buffer zone, per the Final 4(d) Rule (81 FR 1900).

No forested habitat was identified within the Project based on NLCD data. WEST conducted additional desktop analysis of the general Project area using true-color aerial imagery and identified scattered patches of shrubs and trees within the Project comprising approximately 0.19 ac and would not be considered suitable for NLEB. The nearest potentially suitable habitat are the forested areas along the riparian corridor of Boxelder Creek, located within one mile and to the northeast of the Project. Due to the paucity of suitable summer forested habitat and migration corridors, it is likely that NLEB is absent from the Project in the summer, although the NLEB could pass through the general area during migration.

Red Knot

The red knot (*Calidris canutus rufa*) is a federally listed threatened species that has one of the longest known migration distances, traveling between breeding grounds in the central Canadian

arctic to wintering areas primarily in South America (USFWS 2019b). Due to the comparatively long migration, red knots require stopover habitats rich in easily digested foods, such as invertebrates with thin or no shell (USFWS 2013). Red knots typically rely on key stopover areas in coastal regions, but also use stopover areas along the Northern Plains of the Midwest during migration (Baker et al. 2013). Although the USFWS IPaC report generated for the Project indicates that there is potential for this species to occur within Pennington County, the red knot has not been reported in the general Project area and has rarely been observed in the surrounding region (eBird 2019, SDNHP 2019). Because suitable stop-over habitat is not present within the general Project area and the red knot is a rare migrant in the spring and fall along the Missouri River corridor, the potential for the red knot to occur within the Project is minimal.

Whooping Crane

The USFWS defined both a national and South Dakota state-specific migration corridor, which contain 95% of the whooping crane observations documented during migration from the early 1960s through 2007 (Tacha et al. 2010). The Project is located within the outer limits of the USFWS state-specific corridor, and over 45 mi west of the USFWS national corridor. The U.S. Geological Survey (USGS) has also defined a national migration corridor based on both historical sightings from 1942–2016 and more refined location data from 58 telemetered birds from 2010–2016 (Pearse et al. 2018). The Project is located approximately 13 mi west of the more recent USGS corridor. From available data through Spring of 2018, the closest documented observation of a whooping crane is approximately 11.4 mi west of the Project boundary (Cooperative Whooping Crane Tracking Project 2018; Figure 4).

Suitable whooping crane stopover habitat includes marshes and submerged sandbars in rivers with good horizontal visibility, water depth of 12 inches or less, and minimum wetland size of 0.1 ac for roosting (SDGFP 2014). The Project is located in an area with the lowest potential for whooping crane use, according to the USFWS decile model for North and South Dakota (Niemuth et al. 2018; Figure 4). While some of the field delineated wetlands could be suitable stopover habitat for the whooping crane, higher suitability habitat is located outside of the Project boundary, and it is unlikely that this species will occur at the Project.

2.2.2 Birds

USFWS Birds of Conservation Concern and Birds of Fragmentation Concern

The USFWS lists 28 species as Birds of Conservation Concern (BCC) within the Badlands and Prairies Bird Conservation Region (BCR) where the Project is located (USFWS 2008) and five additional BCC species within the nearby Shortgrass Prairie BCR (USFWS 2008); the USFWS has determined that two of these species are of potential concern at the Project location: golden eagle and lark bunting (*Calamospiza melanocorys*; USFWS 2019a). Additionally, due to prairie dog use of the area and the potential for burrowing owls (BCC and a species of greatest conservation need in South Dakota [SDGFP 2014]) to use prairie dog burrows for nesting, this species is also of higher concern at the Project location.

A review of eBird data (2019) indicates that golden eagles have been sighted within one mi of the Project as recent as 2013, but that sightings are infrequent and primarily occur west of the Project

near the Black Hills National Forest (eBird 2019). Lark buntings have also been sighted within one mi of the Project as recent as 2014, but the majority of sightings occur south and west of the Project in the Black Hills National Forest, Buffalo Gap National Grasslands, and Badlands National Park (eBird 2019). One burrowing owl observation was recorded just to the west of the Project along Boxelder Creek in 2013 and three other burrowing owls were observed at prairie dog colonies within the general Project area in 2017 (Area M 2019a); however, similar to lark buntings, the majority of sightings of burrowing owls in the area occur south of the Project in the Buffalo Gap National Grasslands and Badlands National Park (eBird 2019).

In addition to BCC, the USFWS also has specifically identified several grassland birds that are considered South Dakota *Species of Habitat Fragmentation Concern* (Bakker 2020). These are species of concern for which a relevant federal, state, tribal, and/or local agency has found that separation of their habitats into smaller blocks reduces connectivity such that the individuals in the remaining habitat segments may suffer from effects such as decreased survival, reproduction, distribution, or use of the area. Although intensive avian surveys have not yet been completed of the Project area, several grassland birds that were specifically identified as of habitat fragmentation concern are known or likely occur in the Project area (e.g., burrowing owl, lark buntings, several species of grassland sparrow, etc.).

USGS Breeding Bird Survey

The USGS North American Breeding Bird Survey (BBS) is a collaborative effort between the USGS Patuxent Wildlife Research Center and Environment Canada's Wildlife Service. The objective of the survey is to monitor the status and trends of North American bird populations via standardized protocol collected by participants along thousands of randomly established roadside routes throughout the continent. The closest BBS routes, Railroad Butte and Owanka, are approximately 10 mi southwest and 11 mi southeast of the Project, respectively.

The Railroad Butte BBS route has been monitored a total of 22 years between 1995 and 2018. A total of 72 bird species have been observed along this route, with annual species numbers ranging from 19 in 2008 to 31 in 1996 (Pardieck et al. 2019). The most common species were western meadowlark (*Sturnella neglecta*), mourning dove, and lark bunting. One golden eagle observation has been recorded along this route, in 2017. Eight additional raptor species have also been observed along the route, including the American kestrel (*Falco sparverius*), burrowing owl, ferruginous hawk (*Buteo regalis*), northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), and turkey vulture (*Cathartes aura*). Both of the BCC species identified above have been documented along the Railroad Butte BBS route.

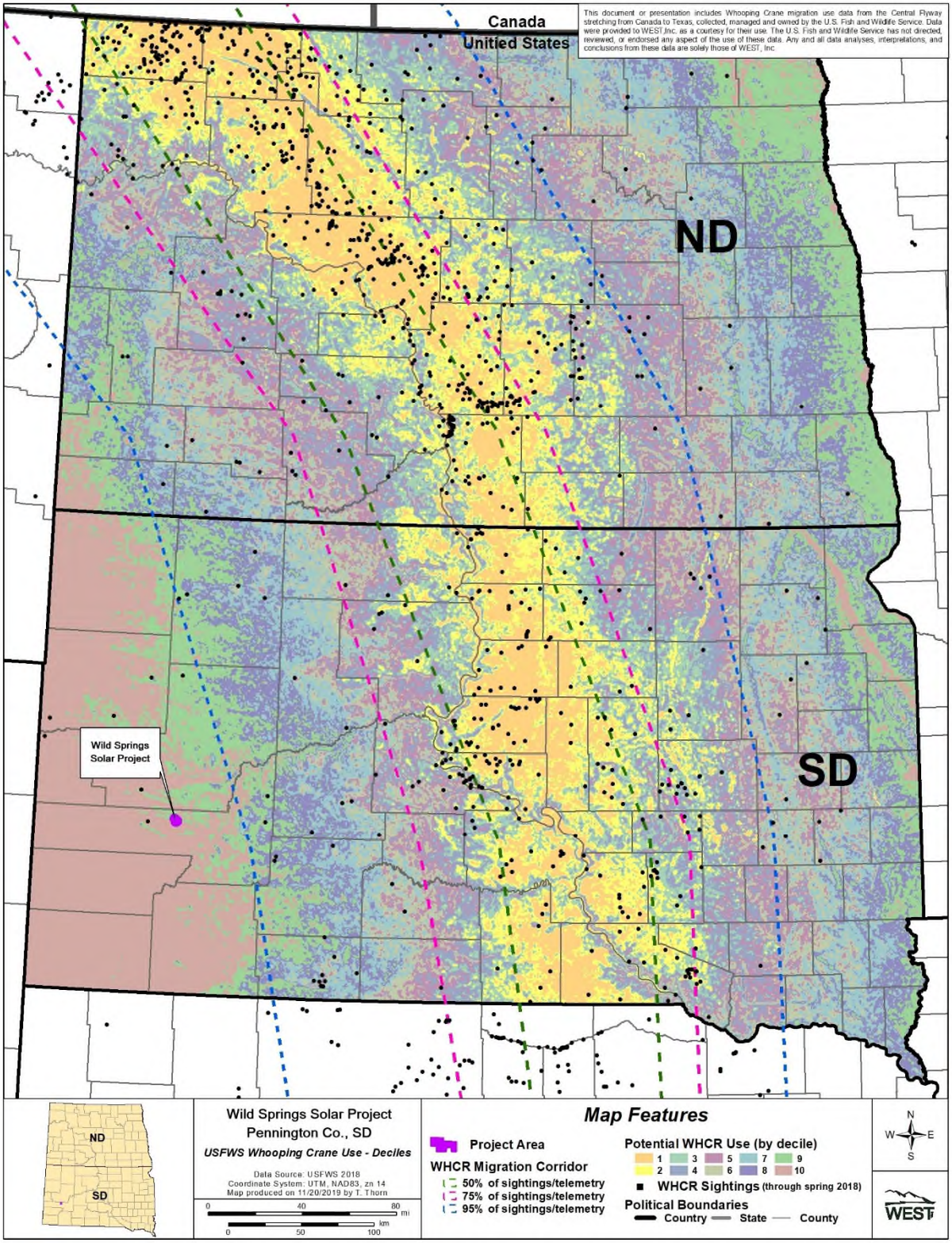


Figure 4. US Fish and Wildlife Service Whooping Crane Use by Deciles Model for North and South Dakota and the location of the Wild Springs Solar Project, Pennington County, South Dakota.

The Owanka BBS route has been monitored a total of 37 years between 1967 and 2014. A total of 100 bird species have been observed along this route, with annual species numbers ranging from 25 in 2009 to 45 in 2002 (Pardieck et al. 2019). The most common species were western meadowlark, lark bunting, and red-winged blackbird. Golden eagles were infrequently seen along this route, with golden eagles observed in 1983, 1984, 1985, 1990, 1993, 1994, and 2001, for a total of 10 observations, and none were observed all other years that the route was surveyed. All raptor species observed along the Railroad Butte BBS route were also observed along the Owanka BBS route, with the exception of turkey vulture and the addition of great horned owl (*Bubo virginianus*), and both BCC species identified above were also documented.

During the reconnaissance surveys in 2019 and previous surveys in 2017, the most common species observed by Area M biologists were western meadowlarks, horned larks (*Eremophila alpestris*), and vesper sparrows (*Pooecetes gramineus*).

Raptors

Based on the publicly available data sources discussed in the previous two sections, multiple raptor species may use the general Project area for foraging and nesting. During field surveys conducted at the Project, seven species of raptors were observed incidentally in the general Project area including: red-tailed hawks, northern harriers, American kestrels, Swainson's hawks, short-eared owls, rough-legged hawks (*Buteo lagopus*), and burrowing owls. Ground-based raptor nest surveys were conducted in 2017, 2019, and 2020. As of early April 2020, there were no raptor nests within the Project boundary and nine raptor stick nests located within about 1 mile of the current Project boundary. Three of these nests were occupied by red-tailed hawks, two of these nests were occupied by great horned owls, and the remaining stick nests appeared unoccupied. Based on the overall size, stick composition, and nesting substrate, these unoccupied nests nest were likely built by red-tailed hawks. Note that large owl species frequently use unoccupied buteo nests. Therefore, if these nests become active at a later time, likely occupants would be red-tailed hawks, Swainson's hawks, great horned owls, or long-eared owls. Regardless, none of these nests would be directly impacted by Project construction. .

Prairie Grouse

Greater prairie-chicken (*Tympanuchus cupido*) and sharp-tailed grouse (*Tympanuchus phasianellus jamesi*) are the most common grouse species in South Dakota (SDGFP 2017). However, populations have declined due to a combination of habitat conversion and destruction stemming from agricultural practices and cattle grazing (SDGFP 2017, Johnson et al. 2011, Connelly et al. 1998). Prairie grouse utilize heterogeneous habitats throughout their life stages, including native prairie with tall grass and medium grass components, field edges, croplands, and grasslands with thick residual growth (Johnson et al. 2011, Connelly et al. 1998).

Greater prairie-chickens are likely absent from Pennington County, while sharp-tailed grouse leks are known to occur within Pennington County (SDGFP 2017). Prairie grouse leks or booming grounds are historic areas where males annually display for courtship and mating. Leks are typically located on small rises with shorter vegetation, allowing maximum visibility for courtship activities and predator vigilance. Males begin establishing territories on leks in late February to

early March, with females typically beginning to attend in late March to early April (Johnson et al. 2011, Connelly et al. 1998).

Area M conducted lek surveys for prairie grouse for the 2017 Project boundary following protocols established by SDGFP and the Wyoming Game and Fish Department (WGFD) from April 10-14, 2017. These surveys consisted of a hybrid of techniques including point observations on topographic rises, pedestrian transects (in conjunction with conducting the cultural resource survey; Area M 2017a), and field investigation for sign on high-quality potential lek habitat (SDGFP 2017, Christiansen 2007). Area M concluded that prairie grouse leks were not present within the 2017 Project boundary based on a low number of observed prairie grouse, the absence of observed lekking behavior, and the lack of concentrated sign (Area M 2017b).

Following similar protocols as used previously, Area M also conducted prairie grouse lek surveys during the week of April 6th, 2020. This survey covered the most recent Project boundary (see Figure 2). No leks or lekking behavior was observed during these surveys.

2.2.3 Bats

Six bat species occur in eastern South Dakota (Harvey et al. 2011, Bat Conservation International 2016; Table 5). These species could potentially occur in the Project vicinity during all seasons except winter, when they are hibernating or have migrated to warmer places. More detailed information on the federally listed NLEB is provided in Section 2.2.1, above.

Table 5. Bat species with potential to occur in or near the Wild Springs Solar Project, Pennington County, South Dakota.

Common Name	Scientific Name
Big brown bat	*Eptesicus fuscus*
Eastern red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*
Little brown bat	*Myotis lucifugus*
Northern long-eared bat [1]	*Myotis septentrionalis*
Silver-haired bat	*Lasionycteris noctivagans*

[1] Federally listed as a threatened species

As stated above, no forested habitat was identified within the Project based on NLCD data. WEST conducted additional desktop analysis of the general Project area using true-color aerial imagery and identified scattered patches of shrubs and trees within the Project comprising approximately 0.19 ac and would likely not be considered suitable for the bat species listed in Table 5. The nearest potentially suitable habitat is the forested corridor along Boxelder Creek, located within one mi and to the northeast of the Project. Due to the paucity of forested habitat and migration corridors, it is unlikely that these bat species will exhibit high use of the Project.

2.2.4 Additional Field Surveys

Based upon WEST's review of available site-specific data to assess potential wildlife use at the Project, additional site-specific field surveys are recommended to further assess wildlife use and species risk at the Project, discussed further below.

Wild Springs will conduct a rigorous breeding bird survey during the avian breeding and nesting season (May/June of 2020) to gather information on species presence, distribution, and relative abundance within the Project area. In particular, this survey will assess the presence of any BCC species that might nest at the site. The survey would involve point-count methodology similar to Ralph (1993) and Rosenstock et al. (2002). Sampling locations for point-count surveys will be identified within the Project area using a two-stage randomized process and to maximize the area covered. Appropriate data will be recorded to provide estimates of bird diversity, species richness, bird count, percent of count, and frequency of occurrence. Wild Springs will conduct a single seasonal survey prior to construction. After the Project goes into operation, two breeding bird surveys will be completed within the Project boundary. To help fully assess potential Project impacts, adjacent but similar habitats in reference areas outside of the Project boundary will also be surveyed for comparison (at two years and four years after construction). These pre- and post-construction surveys will be designed to allow for an assessment of the wildlife habitat value and function within an operating solar facility. The inclusion of reference sites during each year of this study will be particularly important to control for any temporal variation that might be observed in wildlife use.

3 RISK ASSSESSMENT

From available research, PV solar facilities are one of the most benign forms of energy generation technology available today, with many impacts being neutral, to even beneficial (Archambault 2012). A 2009 study assessed 32 impacts from PV solar facilities under the themes of land use intensity, human health and wellbeing, plant and animal life, geohydrological resources, and climate change and found that 22 of the considered 32 impacts were beneficial (Turney and Fthenakis 2011). Of the remaining 10 impacts the study found four were neutral and six required further research before the impacts could be fully assessed, with none of the impacts being negative relative to traditional power generation (Turney and Fthenakis 2011).

Although solar power has been identified as providing a positive effect on the environment when replacing or reducing certain other energy sources, research is on-going to understand the potential direct (e.g. mortality) and indirect (e.g. habitat modification) impacts of these facilities on nearby natural resources including wildlife (Moore-O'Leary et al. 2017). However, studies related to the interaction of wildlife species with human disturbance offers lessons for proper development of solar projects. The following sections examine the known and potential impacts associated with the construction / decommissioning and the operation of these facilities, as well as planning and design measures to minimize these concerns throughout all phases of the project life cycle.

3.1 Impacts due to Construction and Decommissioning

The construction and later decommissioning of solar facilities requires ground disturbance. Similar to other construction projects, there are potential associated impacts to habitat and wildlife, including mortality, disturbance, and habitat modification due to the installation and removal of equipment (e.g., arrays, substation) and other construction-related activities, such as road

installation, dust suppression, and transporting of equipment from off-site locations (Lovich and Ennen 2011). The Project has proposed best management practices for sustainable development of solar facilities that will reduce the potential for direct impacts during construction (see Section 4.2).

3.2 Impacts due to Operation

The literature generally suggests that, with proper planning, the ecological impacts of ground-mounted solar panels will be relatively limited and location-specific (Moore et al., 2017; Taylor et al. 2019). The extent of these impacts is primarily dependent on the sensitivity of proximate species, the location and extent of disturbance, and the infrastructural design (Hernandez et al. 2014). Consultation with stakeholders (such as the USFWS and SDGFP) have specifically identified potential concerns related to birds and mammals, which are discussed further below.

3.2.1 Impacts on Avian Species

Direct Impacts

There is the potential for direct avian mortality at solar facilities due to collision with PV panels (Smith and Dwyer 2016, Kagan et al. 2014). In 2020, WEST synthesized public avian fatality data associated with the only publicly available studies of PV utility-scale solar facilities (Kosciuch et al. 2020). This summary included fatality monitoring data from 13 studies at 10 PV solar facilities in the Southwestern US located in the Sonoran and Mojave Deserts bird conservation regions (x10), the Coastal California bird conservation regions (x2), and the Great Basin bird conservation region (x1). Although relatively low numbers of bird fatalities were found during these studies, passerines were the most represented bird type at these facilities (54.7%). The majority of these passerine fatalities were horned lark, house finch, and western meadowlark (common resident species found near these projects). Doves and pigeons had the next highest percentage of birds detected (15.4%). Although water associates (e.g., ducks, geese, rails, herons) and water obligates (e.g., loons, grebes, cormorants) did not occur consistently across sites, these groups of birds were also found (6.3 and 7.8%, respectively). Bird fatalities were reported within the PV array but also in areas away from array search plots, fences, and power lines, suggesting that a portion of the fatalities found during these studies were natural background mortality (over 60% of fatalities were feather spots where the cause of death was unclear and only about 16% of avian fatalities appeared associated with panel collisions). The overall fatalities rates were 2.49 bird fatalities/MW/year. As a point of comparison, Sovacool (2009) estimated a fatality rate of 74.2 birds/MW/year from fossil fuel power plant operations. Preliminary reports from similar studies conducted at PV facilities in Florida indicate similarly low avian fatality rates (Golder in press). The Project is not anticipated to experience a higher-than-average mortality, given the abundance of comparable habitat in close proximity.

Some water-obligate species, including species of loons and grebes, have been found within solar projects located within the desert portions of the southwest U.S (Kosciuch et al. 2020). In total, 36 grebe, 13 loon, 24 coot, and 10 duck deaths have been identified across 10 solar facilities. The highest number of water-obligate birds found seem to be found near the Salton Sea, an important site in an arid region that provides migratory stop-over and winter habitat for hundreds of thousands of water-associated and water-obligate birds. South Dakota and the Wild Springs

Project are not located in a desert with comparable concentrations of water-obligate birds occurring in the area. Given the large amount of solar now installed across the country and the lack of reports or anecdotes of significant water-obligate bird discoveries suggests that solar facilities are not a widespread or significant cause of waterbird mortality.

Based on the comparatively sparse data available in the peer-reviewed literature (and none currently available for the norther Great Plains), generalizations of direct impacts of PV solar energy development to birds are somewhat limited. However, two of the studies from the Coastal California bird conservation region described above were in areas dominated by arid grasslands similar to the Project area. In these two studies, water associate or water obligate birds were not found. Additionally, the most common birds found were mourning dove, horned lark, and western meadowlark, resident species common to those grassland areas. Furthermore, no large fatality events were documented and the cause of bird death in a majority causes was unclear. Given this information, it seems unlikely that significant avian fatalities would be expected at the Wild Springs Project.

Indirect Impacts

Several studies have documented altered avian use patterns at PV solar facilities, with mixed results. A study of eleven solar sites in the southern United Kingdom found a significantly higher diversity of birds within the solar plots compared to the adjoining land (Montag et al. 2016). A 2019 study published in Germany collected data from 75 solar facilities on “derelict” land and found that the installation of these PV solar facilities could improve biodiversity. In contrast, the Jasper PV solar facility in South Africa reported that bird species richness and density within the PV facility tended to be lower than the boundary zones and adjacent undisturbed land, suggesting that birds may avoid solar facilities once they are operational (Visser et al. 2019). A study conducted at PV arrays and nearby airport grasslands in Arizona, Colorado, and Ohio observed lower species diversity at solar arrays, but there were twice as many birds per hectare in the solar arrays than in the nearby airfield grassland areas (DeVault et al. 2014).

In terms of raptors, preliminary findings from avian point-count studies conducted at the California Valley Solar Ranch in south-central California documented no use of constructed solar arrays by raptors (Smith et al. 2013). A later study at the same facility documented higher raptor abundance pre-construction than post-construction, suggesting that raptors may avoid facilities once they are operational (Smith and Dwyer 2016). These finding are consistent with the previously discussed study by DeVault et al. (2014), where large birds were also less common at PV arrays than nearby airfield sites. The results of these studies suggest that some avian species, such as large birds and raptors, likely avoid operational solar facilities while other species may actually prefer the artificial or restored habitat to the available natural habitat in the area.

Two additional studies have collected data to support this hypothesis. Avian point counts were conducted at the Topaz Solar Farms in San Luis Obispo County, California, both during construction and for three years post-construction (Griffiths et al. 2019). This study documented no negative impacts to avian use from construction or operation of the solar farm, and documented an increase in species richness (Griffiths et al. 2019). Overall wildlife and habitat

studies conducted at the same facility documented higher vegetation productivity on site than in surrounding reference sites (Sinha et al. 2018). Additionally, numerous wildlife species, including 27 bird species, eight mammal species, and four reptile species, with six of the total species having special conservation status, were recorded using habitat at the solar facility (Sinha et al. 2018). These studies suggest that the development of the solar farm can create habitat that may benefit wildlife species through providing resources that would not normally be available within the surrounding habitat, and can potentially increase habitat quality through strategic restoration and land management.

There is currently no data available on avian use within operating solar facilities in the northern Great Plains. However, based on the information available from the studies described above, it seems likely that native birds (small birds in particular) will continue to occur within the Project boundary after the facilities are constructed. The diversity and density of the avian community will likely largely depend on a specific species' response to facility structures (and shading from PV panels) as well as the vegetation community and vegetation management approach within the facility. To maximize the potential for a diverse and healthy bird community after construction, Wild Springs will emphasize the use of native plant species for site restoration within the Project solar arrays and other areas within the fenceline (see section 4.3) and include habitat enhancement measures to encourage ongoing wildlife use of the areas within the Project boundary (see section 4.3.2). Furthermore, Wild Springs will use this opportunity to conduct a series of pre- and post-construction avian use surveys to help better understand avian impacts and to inform decisions around future solar development in the region (see section 2.2.4)

3.2.2 Fencing

Utility-scale PV solar energy facilities must comply with the National Electrical Code and National Fire Protection Code, which include protective fencing that is at least seven feet high or six feet high with at least one foot of barbed wire at the top of the fence around generating stations and substations (Ode 2016). This fencing will act as a barrier to prevent large mammals (e.g., white-tailed or mule deer, pronghorn) from using areas within the Project boundary. Siting design should account for anticipated ground-based wildlife movement through and adjacent to the Project while ensuring the safe and reliable operation of the infrastructure. Due to the presence of prairie dog colonies in the Project boundary, exclusionary fencing options may be utilized for the Project such as chicken-wire below the chain link fence extending below grade. In general, fencing that creates open travel areas between solar facilities allows the most effective big game movement (American Planning Association 2019).

While research on best practices to improve access is still on-going (The Nature Conservancy 2019), proper fencing design will need to consider multiple objectives. For example, ingress and egress by smaller mammals could be facilitated with shorter fencing, woven-wire type fencing with wide wire grid, and/or gaps at the bottom of the fence. However, to prevent deer from becoming entrapped in fencing enclosures, resource agencies recommend higher fencing and installing the fences tight to the ground with no gaps (Wyoming Game & Fish Department 2004).

4 AVOIDANCE, MINIMIZATION, AND MITIGATION

4.1 Pre-construction Siting and Design

Information gathered during the site assessments and field surveys will be used for PV array and infrastructure siting to minimize impacts to birds, bats, species of concern, and their habitats. Additionally, the Project is sited with consideration for the efficiency of selected PV array models and minimizing impacts to area residents. Wild Springs has incorporated setback and constraint information from literature reviews, site-specific studies, and agency recommendations.

4.1.1 Project Siting Measures Used to Reduce Impacts

- The Project was sited to avoid the 2019 mapped prairie dog colonies and cultural resources.
- The Project was sited to avoid and minimize impacts to wetlands and streams.
- Detailed pre-construction wildlife and habitat surveys have been conducted, and additional surveys are proposed to further inform Project siting and restoration goals.
- The Project boundary went through multiple iterations including a reduction in the northwest portion of the Project to exclude Boxelder Creek and the newly identified cultural area, and an expansion of the Project boundary to the south and to the east to provide additional land area for solar arrays and other infrastructure within the boundary to avoid the 2019 mapped prairie dog colonies through micro siting.

4.1.2 Project Design Measures Used to Reduce Impacts

- The Project was designed to minimize the infrastructure required in the planning of access roads, power lines, fences, and associated facilities.
- The Project design for electrical facilities will be based upon the Avian Power Line Interaction Committee's (APLIC) suggested practices for minimizing risk of electrocution of birds from power lines.
- To the extent practicable, the AC collector system will be placed underground, thereby eliminating the risk of bird electrocution.
- On-site/substation lighting will be minimized in order to not disorient nocturnal wildlife species, particularly birds and bats (e.g., down-shielded lighting).
- Project fencing will be designed to enclose a series of distinct Project blocks/arrays. As such, big game will be allowed to move through the general Project area.
- Based on pre-construction vegetation characterization, a vegetation management plan will be developed. This will include incorporation of a grass mix, and strategies to restore and manage vegetation at the site in an ecologically sound and economically efficient way (discussed in more detail in Section 4.3, below).

4.2 Project Construction

4.2.1 Construction Best Management Practices

- Vegetation clearing, excessive site grading, and timelines for which soils are exposed will be minimized to the extent practicable.
- All trash and food-related waste will be placed in closed containers and removed daily from the site so as not to attract wildlife during construction.
- The Project's Storm Water Pollution Prevention Plan (SWPPP) will be utilized to ensure control measures are taken to prevent erosion and runoff during construction of the Project. Of particular concern is runoff into sensitive habitats as well as into streams and roadside ditches. The measures within the SWPPP will comply with the requirements of the National Pollutant Discharge Elimination System/State Disposal System Permit Program.
- To minimize the risk of unintentionally starting a wildfire that could destroy bird and bat habitat, or that could be injurious to construction personnel, construction crews will exercise proper caution and safety measures while handling and storing flammable chemicals, petroleum, and other materials with the potential for combustion.
- Construction teams will be informed of invasive species and take measures to prevent their propagation via the movement of people, materials, and equipment into and out of the site. Control measures include washing off any soil, dirt, and debris on vehicles, equipment, and personal clothing and footwear prior to construction activities.
- Big game will be driven outside of the Project boundary prior to completion of fencing construction to avoid trapping big game within the fenceline.
- The timelines between completion of construction and vegetation restoration will be shortened and minimized as much as possible, potentially through dormant seeding in the winter months or a cover crop if necessary.

4.2.2 Wildlife Best Management Practices

- Site personnel will receive training on wildlife awareness and response procedures.
- To minimize disturbance, all construction and operation vehicle traffic will be restricted to established roads, construction areas, and other designated areas. Construction and operation traffic will adhere to reasonable speed limits to minimize the risk of wildlife collisions.
- Dust suppression will occur during construction activities when necessary to meet air quality standards and protect biological resources.

- The Project has been sited to avoid the 2019 mapped prairie dog colonies. If construction commences in the Fall of 2021, isolated burrows that could be used by burrowing owls for nesting outside the 2019 mapped colonies' extent and within the fenceline will be collapsed after the breeding season (May 15 to August 15). Larger burrows that could be used by larger mammals (e.g., badger or Swift fox) will be left intact and monitored for activity during the natal denning season (April 15 to July 1) and collapsed if not active. Alternatively, if construction does not commence until the Spring of 2022, any existing burrows that could be used by burrowing owls for nesting or larger burrows that could be used by a badger or Swift fox will be collapsed outside of the nesting and denning season in the early Winter of 2021. Collapsing burrows prior to construction should minimize the potential for sensitive species like burrowing owls and Swift fox to use the Project area and potentially be disturbed by construction.
- If an active burrowing owl nest or Swift fox natal den are discovered in the Project area, Wild Springs will avoid construction within a quarter mile of the nest or den until after the nesting and/or natal denning season.
- During construction of the Project, if a whooping crane is sighted by on-site personnel, the sighting will be reported to the USFWS South Dakota Ecological Services Field Office.
- Materials such as wooden pallets, wooden power poles, and metal tubing, providing nesting and shelter habitat for birds during the nesting season and artificial refugia for other special-status species will be visually inspected before use during nesting season to ensure the absence of nests. Disturbance to any new and active nests found during these inspections will be avoided to the extent practicable.
- During construction, personnel will visually inspect each open trench or pit daily to determine if any animal has become trapped in the trench or pit. If an animal has become trapped, the Site Manager will be notified and appropriate action taken to safely remove and release the animal and/or allow the animal to escape unimpeded.

4.3 Project Operations

Solar project operations combine energy facility management with vegetation management due to the high density of solar facility structures on the landscape. This is in contrast to wind projects, in that wind turbines are widely spread across the landscape, and leaseholders can continue their existing land use practices once wind projects are operational. This unique situation for solar projects requires an obligation on behalf of the Project operators to be good stewards of the land throughout the life of the facility thus allowing the leaseholder to return to "in-kind" land quality and cover after decommissioning.

The current land use at the Project is predominantly rangeland grazing along with perennial haying. Additionally, the current land cover provides habitat for wildlife use. Ecological functions of the land that are valuable for both human land use and wildlife use, including soil health properties, riparian areas, connectivity with external habitat, and vegetation structure and composition, have been considered in facility planning. Even with the high density of facility structures, it is intended that the ecological functions will be maintained to the greatest extent

practicable. The adaptive management strategy to be employed during facility operations will enable adjustments in facility vegetation management to address the site ecological functions.

The vegetation management plan will build upon data collected during development of the Wild Springs NRS. The plan will largely reflect the fact that the existing perennial vegetation is an asset to be built upon. By minimizing mass grading and ground disturbance generally, the existing sod layer will be left in place to the extent possible and the need for time consuming and expensive dust suppression, erosion control, and revegetation options will be lessened. This approach will focus on maintaining a viable vegetation layer and existing bud bank that will allow for rapid revegetation and soil stabilization. While some site preparation may include decompaction and overseeding, this will be minimized to utilize existing desired existing vegetation rather than to completely "start from scratch" with seed.

The overall vegetation management strategy would thus be to use seeding to augment the perennial vegetation that is viable after construction. The pattern and composition of existing vegetation should be understood at a level to allow for customizing seed mixes to match (e.g., grass seed may be used to assist in restoring areas where pre-construction vegetation cover includes alfalfa or wheat). In some locations there may be existing grassland with a relatively high level of ecological integrity, whereas other areas may be poor (e.g., cultivated areas). This pattern might also serve as a plan for construction to employ sustainable practices in some areas in order to retain the higher quality patches. The Vegetation Management Plan (VMP) consists of proposed seed mixes developed in coordination with the local NRCS office to ensure the mixes are local to the area and will have a high probability of establishment success.

Vegetation management will be expected to use the professional oversight of a restoration professional, and when selecting landscape service contractors, give preference to those with qualifications as stated below.

Restoration Professional: The Restoration Professional (Project Restorationist) will be or have equivalent qualifications to a Certified Ecological Restoration Practitioner (CERP)[1], and will evaluate the site, design the restoration, oversee landscape contractors, monitor using SMART criteria, convey adaptive management needs to contractors, and prepare any summary reports that may be a condition of permits.

Restoration Contractor: The landscaping or Restoration Contractor(s) perform seeding and vegetation management under the oversight of the Project Restorationist. The contractor(s) should be qualified by demonstrating direct experience performing seeding and management.

Restoration Professionals within the same contracting firm must act as independent agents. Potential measures for independence include secured data storage folders, separate supervisors, and employee affirmative statements that they will avoid potential conflict.

[1] Certified Ecological Restoration Practitioner Program https://www.ser.org/general/custom.asp?page=Certification

4.3.1 Operational Best Management Practices

- Site operational personnel will receive training on wildlife awareness and response procedures.
- Long-term rodent and/or prairie dog management will minimize the use of rodenticides. This management could include maintaining vegetation at heights that would be unlikely to attract prairie dog colonization (e.g., black-tailed prairie dogs prefer open patches of grassland, and will move into heavily grazed patches of grassland).
- Project access roads will be posted with a 25-mi per hour speed limit to avoid vehicle-wildlife collisions.
- Fire risk will be minimized by utilizing spark arrestors on all electrical equipment, and by restricting smoking to designated areas.
- During operations, tree trimming will be prioritized over tree removal, all tree trimming will occur in such a manner as to avoid impacting nesting or migrating birds and roosting bats.
- As described in section 2.2.4, a post-construction avian study to assess potential project impacts to the bird community will be conducted. Given the relatively low level of avian fatalities that have been found at PV fatalities to date (Kosciuch et al. 2020; Golder in press), a formal post-construction avian mortality monitoring study is not proposed at this Project. However, operational staff will be trained to identify and report birds or other wildlife that are incidentally discovered within the site during ongoing Project operations.

4.3.2 Habitat Mitigation

During operation of the Project, Wild Springs will maintain vegetation in the areas of the Project outside of the arrays but within the fenceline with native vegetation that does not contain Project infrastructure. While within the fenceline, these areas will be maintained as habitat for those wildlife species that will not be excluded by the fences (e.g., small birds, small mammals, amphibians, reptiles, etc.). Enhancements may be added to these areas to promote wildlife use (e.g., kestrel and other bird nest boxes, bat boxes). As has been shown at several studies of PV facilities thus far (DeVault et al. 2014; Visser et al. 2018), the wildlife community using the areas and PV panel array areas may change but will not be eliminated after the Project begins operations. As such, the habitat within the Project boundary may be altered but will not be lost for ongoing use by wildlife, including small birds and mammals.

5 ADAPTIVE MANAGEMENT

Natural resource agencies view adaptive management as a flexible decision-making framework to address uncertainties in ecological restoration as outcomes from prior management actions become better understood (Williams et al. 2009), with a particular focus on landscape-scale restorations that involve managing widespread invasive species. There is no universal approach to land management and restoration, and flexibility is key for selecting management actions that are appropriate for the state of the managed system at the time of the decision. Each management action will influence the managed system into the future, and therefore management strategies

should, to the extent practicable, account for both the current and future impacts of management decisions. Oftentimes stakeholders can have differing views about the most appropriate management strategy, and the purpose of an adaptive management approach is to incorporate the various viewpoints into the decision making process. Through appropriate adaptive management, understanding of the resource can be enhanced over time, and management can be improved.

Adaptive management is a systematic approach for improving restoration and land management by learning from past mistakes. Management actions will be selected based upon the response of the undesirable condition (e.g., erosion, weed, or noxious species) to the preceding action. Additionally, any unexpected findings pertaining to potential adverse impacts to wildlife could potentially trigger an adaptive management response from Wild Springs; any such adaptive management response would be evaluated in coordination with appropriate state and federal agencies.

6 CONTRIBUTORS

Melissa Schmit
Director, Permitting
Geronimo Energy, LLC

Elizabeth Markhart
Senior Restoration Ecologist
Western EcoSystems Technology, Inc.

Alaini Schneider Cossette
Wildlife Biologist
Western EcoSystems Technology, Inc.

Todd Mattson
Senior Ecologist
Western EcoSystems Technology, Inc.

7 References

1.1 Literature Cited

American Planning Association. 2019. Planning for Utility-Scale Solar Energy Facilities. Accessed on-line on January 2, 2020 at: https://www.planning.org/pas/memo/2019/sep/

American Wind Wildlife Institute (AWWI). 2019. AWWI Technical Report: A Summary of Bird Fatality Data in a Nationwide Database. Washington, DC. Available at www.awwi.org.

Archambault, A., 2012. Solar PV Atlas: Solar Power in Harmony with Nature. World Wildlife Fund.

Area M. 2017a. Level I and Level III Cultural Resources Inventory for Wild Springs Solar, LLC (US250 Wild Springs). Pennington County, South Dakota. Prepared for Geronimo Energy, LLC. Prepared by Area M Consulting, LLC. June 2017.

Area M. 2017b. Prairie Grouse Lek Survey Report. Wild Springs Solar Project. Prepared for Geronimo Energy, LLC. Prepared by Area M Consulting, LLC. June 2017.

Area M. 2017c. Wetland Delineation Report. Wild Springs Solar Project. Prepared for Geronimo Energy, LLC. Prepared by Area M Consulting, LLC. June 2017.

Area M. 2019a. Wild Springs Solar Site Characterization Report. Prepared for Wild Springs Solar, LLC. Prepared by Area M Consulting, LLC. December 2019.

Area M. 2019b. Level I and Level III Cultural Resources Inventory for Wild Springs Solar Project (US250 Wild Springs). Pennington County, South Dakota. Prepared for Wild Springs Solar, LLC. Prepared by Area M Consulting, LLC. December 2019.

Baker, A., P. Gonzalez, R. I. G. Morrison, and B. A. Harrington. 2013. Red Knot (*Calidris Canutus*), Version 2.0. P. G. Rodewald, ed. *In:* The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Retrieved from The Birds of North America Online: http://birdsna.org/Species-Account/bna/species/redknot

Bakker, K .K. 2020. South Dakota Species of Habitat Fragmentation Concern: Grassland Birds. Report developed for: U.S. Fish and Wildlife Service, South Dakota Ecological Services Field Office, Pierre, SD, 38 pp. Information online: https://www.fws.gov/mountain-prairie/es/southDakota/SD_HAB_FRAG.pdf

Bat Conservation International, Inc. (BCI). 2016. Bat Species: Us Bats. Species ranges' from 2003-2016 data. Accessed November 2019. Information online: http://www.batcon.org/resources/media-education/species-profiles

Bryce, S., J. M. Omernik, D. E. Pater, M. Ulmer, J. Schaar, J. Freeouf, R. Johnson, P. Kuck, and S. H. Azevedo. 1998. Ecoregions of North Dakota and South Dakota. Northern Prairie Wildlife Research Center (NPWRC) Online. Jamestown, North Dakota. South Dakota Ecoregion Map, US Geological Survey (USGS) NPWRC. Modifed August 3, 2006. Ecoregions of North Dakota and South Dakota: http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/index.htm (Version 30NOV1998). South Dakota Ecoregion Map: http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/sodak.htm

Christiansen, T. 2007. Chapter 12: Sage Grouse (*Centrocercus urophasianus*). Pp. 12-11 to 12-51. *In*: S. A. Tessmann, ed. Handbook of Biological Techniques. 3rd Edition. Wyoming Game and Fish Department (WGFD), Cheyenne, Wyoming.

Connelly, J. W., M. W. Gratson, and K. P. Reese. 1998. Sharp-Tailed Grouse (*Tympanuchus phasianellus*). A. Poole and F. Gill, eds. The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. Retrieved from The Birds of North America Online: http://birdsna.org/Species-Account/bna/species/shtgro; doi: 10.2173/bna.354

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. US Department of the Interior (USDOI) Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

DeVault, T.L., Seamans, T.W., Schmidt, J.A., Belant, J.L., Blackwell, B.F., Mooers, N., Tyson, L.A. and Van Pelt, L., 2014. Bird Use of Solar Photovoltaic Installations at US Airports: Implications for aviation safety. Landscape and Urban Planning, 122, pp.122-128.

eBird. 2018. Ebird: An Online Database of Bird Distribution and Abundance. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2018. Information online: http://ebird.org/content/ebird/

ESRI. 2019. World Imagery and Aerial Photos. (World Topo). ArcGIS Resource Center. Environmental Systems Research Institute (ESRI), producers of ArcGIS software. Redlands, California. Information online: http://www.arcgis.com/home/webmap/viewer.html?useExisting=1

Griffiths, J. L., J. D. Dart, and D. E. Meade. 2019. Avian Utilization and Species Richness at a Large-Scale Photovoltaic Solar Facility in San Luis Obispo County, California. Poster Session. Annual Wildlife Society – Western Section Conference.

Harvey, M. J., J. S. Altenbach, and T. L. Best. 2011. Bats of the United States and Canada. The Johns Hopkins University Press, Baltimore, Maryland.

Hernandez, R. R., S. B. Easter, M. L. Murphy-Mariscal, F. T. Maestre, M. Tavassoli, E. B. Allen, C. W. Barrows, J. Belnap, R. Ochoa-Hueso, S. Ravi, and M. F. Allen. 2014. Environmental impacts of utility-scale solar energy. Renewable and sustainable energy reviews, 29, pp.766-779. Available online: https://escholarship.org/content/qt62w112cg/qt62w112cg.pdf

Johnson, J. A., M. A. Schroeder, and L. A. Robb. 2011. Greater Prairie-Chicken (*Tympanuchus Cupido*), Version 2.0. A. F. Poole, ed. *In:* The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. Retrieved from The Birds of North America Online: http://birdsna.org/Species-Account/bna/species/036

Kagan, Rebecca A., Tabitha C. Viner, Pepper W. Trail, and Edgard O. Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: a Preliminary Analysis. National Fish and Wildlife Forensics Laboratory, April 2014. Accessed online on December 30, 2019 at: https://alternativeenergy.procon.org/sourcefiles/avian-mortality-solar-energy-ivanpah-apr-2014.PDF.

Kosciuch K, D. Riser-Espinoza D, M. Gerringer, W. Erickson. 2020. A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern U.S.. PLoS ONE 15(4): e0232034. https://doi.org/10.1371/journal.pone.0232034

Lovich, J. E. and J. R. Ennen. 2011. Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States. Bioscience 61(12): 982-992.

McCrary, M. D., R. L. McKernan, W. D. Wagner, and R. E. Landry. 1984. Nocturnal Avian Migration Assessment of the San Gorgonio Wind Resource Study Area, Fall 1982. Report # 84-RD-11. Prepared for Southern California Edison Company, Research and Development, Rosemead. 87 pp.

Montag, Hannah, Guy Parker, and Tom Clarkson. 2016. The Effects of Solar Farms on Local Biodiversity; A Comparative Study. Clarkson and Woods and Wychwood Biodiversity. Access on-line on December 31, 2019 at: https://www.solar-trade.org.uk/wp-content/uploads/2016/04/The-effects-of-solar-farms-on-local-biodiversity-study.pdf

Moore-O'Leary, K. A., R. R. Hernandez, D. S. Johnston, S. R. Abella, K. E. Tanner, A. C. Swanson, J. Kreitler, and J. E. Lovich. 2017. Sustainability of utility-scale solar energy–critical ecological concepts. Frontiers in Ecology and the Environment, 15(7), pp.385-394. Available online: https://www.researchgate.net/profile/Rebecca_Hernandez2/publication/319116547_Sustainability_of_utility-scale_solar_energy_-_critical_ecological_concepts/links/5995f95f458515017ea5f8cc/Sustainability-of-utility-scale-solar-energy-critical-ecological-concepts.pdf

Multi-Resolution Land Characteristics (MRLC). 2019. National Land Cover Database (NLCD) 2011. Multi-Resolution Land Characteristics (MRLC) Consortium. US Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center, MRLC Project, Sioux Falls, South Dakota. May 10, 2019. Information online: https://www.mrlc.gov/data

Niemuth, N. D., A. J. Ryba, A. T. Pearse, S. M. Kvas, D. A. Brandt, B. Wangler, J. E. Austin, and M. J. Carlisle. 2018. Opportunistically Collected Data Reveal Habitat Selection by Migrating Whooping Cranes in the US Northern Plains. Condor 120(2): 343-356. doi: 10.1650/CONDOR-17-80.1.

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

Ode, M. 2016. A New Look at PV Supply Stations. Electrical Contractor, September 2016. Accessed on-line on January 2, 2020 at: https://www.ecmag.com/section/codes-standards/new-look-pv-supply-stations

Pardieck, K. L., D. J. Ziolkowski, Jr., M. Lutmerding, V. Aponte, and M.-A. R. Hudson. 2019. North American Breeding Bird Survey Dataset 1966 - 2018, Version 2018.0. US Geological Survey (USGS), Patuxent Wildlife Research Center. Information online: www.pwrc.usgs.gov/BBS/RawData/

Pearse, A. T., M. Rabbe, L. M. Juliusson, M. T. Bidwell, L. Craig-Moore, D. A. Brandt, and W. Harrell. 2018. Delineating and identifying long-term changes in the whooping crane (*Grus americana*) migration corridor. PloS One 13(2) e0192737.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of Field Methods for Monitoring Landbirds. General Technical Report (GTR). PSW-GTR-144. US Department of Agriculture (USDA) Forest Service General Technical Report (GTR), Pacific Southwest (PSW) Research Station, Albany, California. Available online: http://www.fs.fed.us/psw/publications/documents/gtr-144/

Rosenstock, S. S., D. A. Anderson, K. M. Giesen, T. Leukering, and M. F. Carter. 2002. Landbird Counting Techniques: Current Practices and an Alternative. The Auk 119(1): 46-53. doi: 10.1093/auk/119.1.46. Available online: https://www.researchgate.net/publication/335654242_Landbird_Counting_Techniques_Current_Practices_and_an_Alternative

Sampson, F. and Knopf, F., 1994. Prairie Conservation in North America. Other Publications in Wildlife Management, p.41.

Sinha, P., Hoffman, B., Sakers, J. and Althouse, L., 2018. Best Practices in Responsible Land Use for Improving Biodiversity at a Utility-Scale Solar Facility. Case Studies in the Environment.

Smitt, J.A., J. Seay, D. Zajanc, S.B. Terrill, B.B. Boroski, and D.S. Johnston. 2013. Initial Responses of Raptors and Other Birds to Development of a Large Photovoltaic Solar Facility in California. 2013. Abstracts from I Worldwide Raptor Conference, October 2013, Bariloche, Argentina. Available online at:
https://raptorresearchfoundation.org/files/2013/10/WorldwideRaptorConferenceProgram.pdf

Smith, J. A. and J. F. Dwyer. 2016. Avian Interactions with Renewable Energy Infrastructure: An Update. Condor 118(2): 411-423. doi: 10.1650/CONDOR-15-61.1.

South Dakota Department of Game, Fish and Parks (SDGFP). 2014. South Dakota Wildlife Action Plan. SDGFP, Pierre, South Dakota. Available online at: http://gfp.sd.gov/images/WebMaps/Viewer/WAP/Website/PlanSections/SD%20Wildlife%20Action%20Plan%20Revision%20Final.pdf

South Dakota Department of Game, Fish and Parks (SDGFP). 2016. State and Federally Listed Threatened, Endangered and Candidate Species Documented in South Dakota by County. SDGFP, Pierre, South Dakota. Updated July 19, 2016. Available online at: https://gfp.sd.gov/userdocs/docs/ThreatenedCountyList.pdf

South Dakota Soil Health Coalition. 2019. South Dakota Health Assessment Scorecard, Revision 1. Available online: https://www.sdsoilhealthcoalition.org/wp-content/uploads/2019/04/SDSHC-Soil-Health-Assessment-Scorecard-Vs.2.pdf

Sovacool, Benjamn K. 2009. Contextualizing avian mortality: a preliminary appraisal of bird and bat fatalities from wind, fossil-fuel, and nuclear electricity. Energy Policy 37(6): 2241-2248.

Tacha, M. A. Bishop, and J. Brei. 2010. Development of the Whooping Crane Tracking Project Geographic Information System. North American Crane Workshop Proceesings 144. Available online: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1150&context=nacwgproc

Taylor, R., J. Conway, O. Gabb, and J. Gillespie. 2019. Potential ecological impacts of ground-mounted photovoltaic solar panels. An introduction and literature review. Available online: http://avesnature.com.pl/wp-content/uploads/Solar-Panels-and-Wildlife-Review-2019.pdf

The Nature Conservancy. 2019. Principles of Low Impact Solar Siting and Design. Accessed on January 2, 2020 at: https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/ED_TNCNCPrinciplesofSolarSitingandDesignJan2019.pdf

Turney, D. and Fthenakis, V., 2011. Environmental Impacts from the Installation and Operation of Large-Scale Solar Power Plants. Renewable and Sustainable Energy Reviews, 15(6), pp.3261-3270.

US Fish and Wildlife Service (USFWS). 2017. South Dakota Listed Species by County List. Updated January 11, 2017. Available online: https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf

South Dakota Game, Fish, and Parks (SDGFP). 2019. Hunting in South Dakota. Available online: https://gfp.sd.gov/hunt/. Accessed December 10, 2019.

South Dakota Legislature. Title 34a - Environmental Protection; Chapter 34a-8 - Endangered and Threatened Species. Information online: http://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=34A-8&cookieCheck=true

South Dakota Natural Heritage Program (SDNHP). 2018. Rare Animals of South Dakota. South Dakota Game, Fish and Parks. Pierre, South Dakota. Accessed July 17, 2019. Information online: https://gfp.sd.gov/pages/rare-animals/

South Dakota Natural Heritage Program (SDNHP). 2019. Rare Plants and Animals of South Dakota. Data requested May 9, 2019. Data received May 14, 2019.

Unnasch, R.S., D. P. Braun, P. J. Comer, and G.E.Eckert. 2008. The Ecological Integrity Assessment Framework: A Framework for Assessing the Ecological Integrity of Biological and Ecological Resources of the National Park System. Report to the National Park Service. https://www.natureserve.org/sites/default/files/publications/files/nps_ecological_integrity_framework.pdf

United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. US Department of Agriculture Handbook 296.

US Department of the Interior (USDOI). 2017. The Migratory Bird Treaty Act Does Not Prohibit Incidental Take. Memorandum M-37050. December 22, 2017. Available online: https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf

US Environmental Protection Agency (USEPA). 2017. Level III and Level IV Ecoregions of the Continental United States. Ecosystems Research, USEPA. Last updated December 26, 2018. Accessed November 2019. Information and maps online: https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states

US Fish and Wildife Service (USFWS). 2019. Northern Long-Eared Bat Final 4(D) Rule, White-Nose Syndrome Zone around WNS/Pd Positive Counties/Districts. Map created July 25, 2019. Accessed October 2019. Available online: http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNS_Zone.pdf

US Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. December 2008. Division of Migratory Bird Management, Arlington, Virginia. Available online: https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf

US Fish and Wildlife Service (USFWS). 2013. Rufa Red Knot (*Calidris canutus rufa*). Northeast Region Endangered Species, USFWS, Hadley, Massachusetts. September 2013. Available online: https://www.fws.gov/northeast/redknot/pdf/Redknot_BWfactsheet092013.pdf

US Fish and Wildlife Service (USFWS). 2017. South Dakota Listed Species by County List. South Dakota Field Office, Pierre, South Dakota. Last updated January 11, 2017. Available online: https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf

US Fish and Wildlife Service (USFWS). 2018. Least Tern (Interior Population) *Sterna antillarum* Fact Sheet. Endangered Species, Midwest Region, USFWS. May 29, 2019. Accessed June 2019. Available online: https://www.fws.gov/midwest/endangered/birds/leasttern/IntLeastTernFactSheet.html

US Fish and Wildlife Service (USFWS). 2019a. Information for Planning and Consultation (IPaC). USFWS Environmental Conservation Online System (ECOS). Accessed November 2019. Information online: http://ecos.fws.gov/ipac/

US Fish and Wildlife Service (USFWS). 2019b. Recovery Outline for the Rufa Red Knot (*Calidris canutus rufa*). March 2019. 33 pp. Available online: https://ecos.fws.gov/docs/recovery_plan/20190409%20Red%20Knot%20Recovery%20Outline%20final%20signed.pdf

US Fish and Wildlife Service (USFWS) Cooperative Whooping Crane Tracking Project (CWCTP). 2018. Whooping Crane Sightings through Spring 2018. GIS Layer from CWCTP Database. USFWS Ecological Services, Grand Island, Nebraska.

US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). 2018. Seamless Wetlands Data by State. Updated May 1, 2018. Accessed December 2019. Geodatabase and Shapefile data available online: http://www.fws.gov/wetlands/data/State-Downloads.html

US Geological Survey (USGS) Protected Areas Database of the United States (PAD-US). 2019. Protected Areas Data. USGS National Gap Analysis Program (GAP) - Protected Areas Data Portal. Accessed October 2019. Information online: http://gapanalysis.usgs.gov/padus/data/

US National Vegetation Classification System (NVCS). 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. Accessed December 9, 2019. Available online: http://usnvc.org/explore-classification/

Visser, E., Perold, V., Ralston-Paton, S., Cardenal, A.C. and Ryan, P.G., 2019. Assessing the Impacts of a Utility-Scale Photovoltaic Solar Energy Facility On Birds in the Northern Cape, South Africa. Renewable energy, 133, pp.1285-1294.

Wearn, O.R. and Glover-Kapfer, P., 2019. Snap happy: camera traps are an effective sampling tool when compared with alternative methods. Royal Society open science, 6(3), p.181748.

Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. Adaptive Management: The US Department of the Interior Technical Guide. Adaptive Management Working Group, US Department of the Interior (USDOI), Washington, D.C. 84 pp.

Wyoming Game & Fish Department. 2004. Fencing Guidelines for Wildlife. Habitat Extension Bulletin 53. Accessed on-line on January 2, 2020 at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_026480.pdf

Yang, L., S. Jin, P. Danielson, C. Homer, L. Gass, S. M. Bender, A. Case, C. Costello, J. Dewitz, J. Fry, M. Funk, B. Granneman, G. C. Liknes, M. Rigge, and G. Xian. 2018. A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and Implementation Strategies. ISPRS Journal of Photogrammetry and Remote Sensing 146: 108-123. doi: 10.1016/j.isprsjprs.2018.09.006.

1.2 Acts, Laws, and Regulations

81 Federal Register (FR) 9: 1900-1922. 2016. Endangered and Threatened Wildlife and Plants; 4(D) Rule for the Northern Long-Eared Bat; Final Rule. 50 CFR 17. Department of the Interior, Fish and Wildlife Service. 81 FR 1900. January 14, 2016. Available online: http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) Section (§) 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, § 2, 54 Statute (Stat.) 250; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. [as amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.].

Endangered Species Act (ESA). 1973. 16 United States Code (USC) §§ 1531-1544, Public Law (PL) 93-205, December 28, 1973, as amended, PL 100-478 [16 USC 1531 *et seq.*]; 50 Code of Federal Regulations (CFR) 402.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code (USC) §§ 703-712. July 13, 1918.

Appendix 1. Agency Correspondence

From:	Morey, Hilary
To:	Gomer, Christina
Subject:	[EXTERNAL] Wild Springs Solar Scoping Comments
Date:	Friday, April 3, 2020 2:32:07 PM
Attachments:	To Geronimo Fr SDGFP_comments on Wild Springs_2019-10-22.pdf WildSpringsSolar-GFP comment Letter 7-17.pdf Wild Springs Solar WAPA Scoping Comments-SDGFP-4-3-20.pdf

---

Hi Christina-

Attached, please find South Dakota Game, Fish and Parks' comments for consideration and inclusion in the preparation of a draft Environmental Assessment for Wild Springs Solar Project in Pennington County, South Dakota. I have included three attachments to this e-mail. The file dated 4-3-20 is our official comment letter for the draft EA. The other two attachments, dated 7-7-17 and 10-22-19 are two letters sent directly to Geronimo Energy, LLC from biologists at Game, Fish and Parks. In our letter dated 4-3-20, I referenced these letters, and wanted to attach them to this email. If you have any questions, please let me know. Thanks!

Hilary Morey | Environmental Review Senior Biologist
South Dakota Game, Fish and Parks
523 East Capitol Avenue | Pierre, SD 57501
605.773.6208| Hilary.Morey@state.sd.us

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

22 October 2019

Mellissa Schmit
7650 Edinborough Way, Ste 725
Edina, MN 55435

RE: Wild Springs Solar Energy Project
Pennington County, South Dakota

Dear Melissa,

The South Dakota Department of Game, Fish and Parks, Division of Wildlife has reviewed the information provided in your letter dated 4 October 2019 regarding the Wild Springs solar energy project. This project would involve the construction and operation of a proposed utility scale solar energy project in Pennington County, South Dakota.

As in our letter dated 7 July 2017, we continue to have the same concerns and recommendations regarding the proposed project. In particular, we reiterate the conservation value of untilled grasslands. We also recommend a search of the South Dakota Natural Heritage Database since almost two years has passed since our last correspondence and new data are continually entered into the database.

The proposed siting and operation of solar projects have the potential to directly and indirectly impact area wildlife. This may occur by altering habitats, influencing behavior patterns and directly killing individuals. To insure impacts remain at a minimum, we would recommend conducting at least two years of appropriately-timed pre-construction wildlife surveys to document current conditions and help assess any potential impacts to wildlife. If major impacts are predicted, development in the area should be avoided. If less serious impacts are anticipated, mitigation is recommended to reduce these impacts. Post-construction studies should be conducted to assess actual impacts, evaluate mitigation effectiveness and evaluate predictions. Bird and bat mortality surveys should be conducted at least two years post-construction.

We recommend avoiding areas of untilled grasslands. The project area should be surveyed for untilled tracts of native prairie and every effort should be made to avoid placement of solar panels, roads, collection lines, and facilities in these areas.

In North America, grassland birds have experienced consistent and long term declines (Peterjohn and Sauer 1999). Placement of a solar farm in the proposed project area may reduce habitat suitability for grassland birds by increasing habitat fragmentation and introducing invasive species. Some grassland bird species have been shown to favor large grassland patches and sensitivity to habitat fragmentation. We recommend properly timed, species-appropriate surveys for breeding grassland birds (songbirds and grouse) be conducted. Many privately owned areas in South Dakota have not been surveyed for grassland songbirds or prairie grouse leks. We respectfully request a written summary of the first round of grouse surveys that were conducted in April of 2017, if they have not already been provided. Post-construction surveys should monitor lek presence and document the number of grouse attending each lek.

We recommend that any new power lines or transmission lines be buried. If this is not possible, placement of above-ground transmission lines should be located along existing corridors such as within existing disturbed areas. Electrocution of birds that perch, roost, or nest on power lines continues to be a source of mortality, especially for eagles, hawks, and owls (Avian Power Line Interaction Committee 2006). The Avian Power Line Interaction Committee (APLIC) has developed two documents that provide useful information on how to reduce power line strikes and electrocutions: 1) Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 and 2) Mitigating Bird Collisions with Power Lines. Both of these documents are available from the Edison Institute (http://www.aplic.org).

A least thirteen bat species occur in South Dakota, including the federal threatened Northern long-eared bat. We suggest pre-construction surveys of the area for potential bat habitat and bat activity levels using acoustic detectors. Avoiding bat habitat (especially water and wooded areas) and areas with high bat activity are recommended.

If surveys indicate that state endangered, threatened, or rare species may occur in the project area, South Dakota Codified Law 34A-8-8 allows for only limited and specific authorized take of threatened and endangered species for scientific, zoological, or educational purposes. For more information, please visit https://gfp.sd.gov/licenses/other-permits/endangered-species-permit.aspx.

If survey and monitoring activities include live trapping or the collection of wildlife species, you must first obtain a collection permit from our agency. If these activities include bats, specific sampling and collection protocols must be followed for a collectors permit to be issued. More information can be found at the following websites:

- Scientific Collectors Permit -https://gfp.sd.gov/licenses/other-permits/scientific-collectors.aspx
- Bat Sampling and Collection Protocol Guidelines and Requirements - https://gfp.sd.gov/wildlife/docs/bat-protocol.pdf

Our agency has concerns regarding direct and indirect impacts to wildlife and habitats in association with the proposed project. If development of this project continues to be pursued, a joint meeting with

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

SDGFP and U.S. Fish and Wildlife Service representatives is recommended to further discuss project details and wildlife concerns. This may be especially pertinent before transmission line, rack and access road layout is finalized. We appreciate the opportunity to provide comments.

Sincerely,

Silka Kempema

Silka Kempema
Wildlife Biologist
523 East Capitol Ave
Pierre, SD 57501
Silka.Kempema@state.sd.us

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

April 3, 2020

Christina Gomer
Western Area Power Administration
2900 4th Avenue North
Billings, MT 59101

RE: Proposed Wild Springs Solar Project

Dear Christina,

Thank you for contacting the South Dakota Department of Game, Fish and Parks (SDGFP) regarding the above-mentioned project involving the construction of a 128 megawatt solar energy system, substation, underground transmission line, access roads and a maintenance and operation center in Pennington County, South Dakota. We have prepared the following comments and suggestions to be considered as part of the environmental assessment (EA) to be prepared by Western Area Power Administration.

Siting and operation of solar projects has the potential to directly and indirectly impact area wildlife. This may occur by altering habitats, influencing behavior patterns and directly killing individuals through collisions with project infrastructure. In particular, SDGFP is concerned about habitat alteration as a result of this proposed project, and effects on grassland dependent species. SDGFP has provided two letters (dated 7/7/17 and 10/22/19) to the project developer (Geronimo Energy LLC; hereafter the developer) stating our concerns regarding habitat alterations. We ask that these two letters from SDGFP are incorporated by reference.

In a January 22nd, 2020 meeting with the project developer, representatives of SDGFP and the US Fish and Wildlife Service South Dakota Ecological Services Office discussed the project and potential impacts to wildlife. During this meeting, SDGFP made the developer aware of concerns regarding alteration of grassland habitat, potential sensitive species that could occur in the project area, exclusion of big game from the project area and urged the developer to exclude prairie dog colonies from the project. We have included additional information related to these concerns below.

The developer is proposing to conduct one year of pre-construction breeding bird surveys at the project site. In our letter dated October 22 2019, SDGFP recommended completing two years of pre-construction surveys. Pre-construction survey data usually incorporates a small snap-shot in time but is used to assess risks for the life of a project (~30 years) therefore, it is important to perform surveys with a high degree of scientific rigor, and to capture temporal variation in wildlife use of the project area. SDGFP would prefer if a minimum of two years of pre-construction breeding bird surveys were completed within the project area.

If major impacts are predicted from these surveys, development in the area should be avoided. If less serious impacts are anticipated, mitigation is recommended to reduce these impacts. The developer proposed that post-construction wildlife use studies may be completed in-lieu of post-construction mortality monitoring. SDGFP believes that some level of post-construction mortality monitoring would still be useful to determine impacts to wildlife. We recommend that post-construction wildlife use studies be designed and conducted to assess impacts of the project, compare to predictions from pre-construction surveys, and to evaluate potential mitigation measures. We also recommend that post-construction surveys use methods that are directly comparable to pre-construction survey methods. Little research exists on the impacts of solar energy facilities sited in grassland and herbaceous habitat, and post-construction wildlife use studies would be valuable to assist with future project review and planning. Information on efforts to survey for and document sensitive species and habitats, as well as how risk will be avoided or mitigated should be included in the EA.

Landcover and Landuse

A desktop review of the project indicated that most of the proposed area is classified as grassland/herbaceous cover in the 2011 National Land Cover Database (https://www.mrlc.gov/). Remnant prairie tracts have high conservation value, especially those that contain a high diversity of both plant and animal species, and rare or non-existent invasive species. The project area could contain untilled native grasslands. Impacts to these habitats may be unavoidable, but SDGFP would still recommend the project area be surveyed for untilled tracts of native prairie and recommend efforts be taken not to place solar panels, roads, collection lines and facilities in these areas. The EA should provide information on the extent of grassland in the area, ways to avoid direct loss of grassland acres and ways to reduce degradation and fragmentation.

Rare and Protected Species

We have conducted a search of the SD Natural Heritage Database (NHD) within the project boundary. This database monitors species at risk, specifically those species that are legally designated as threatened or endangered or rare. Rare species are those that are declining and restricted to limited habitat or a jurisdiction, may be isolated or disjunct due to geographic or climatic factors that are classified as such due to lack of survey data. A list of monitored species can be found at http://gfp.sd.gov/natural-heritage-program.

No records of threatened, endangered or rare species were found in the project area. Many places in South Dakota have not been surveyed for rare or protected species and the absence of a species from the database does not preclude its presence from the project area. If surveys indicate that state endangered, threatened or rare species may occur in the project area, South Dakota Codified Law 34A-8-8 allows for only limited and specific authorized take of threatened and endangered species for scientific, zoological or educational purposes. For more information, please visit https://gfp.sd.gov.licenses/other-permits/endangered-species-permit.aspx.

Avian Species

In North America, grassland birds have experienced consistent and long-term declines (Peterjohn and Sauer 1999, Rosenberg et al. 2019). The USFWS publishes a list of bird species of habitat fragmentation concern (Bakker 2020). These species are those which research and literature indicate are negatively affected by loss and fragmentation of habitat. Fragmentation includes cutting habitats into smaller, more isolated blocks and the creation of barriers (such as the inclusion of trees in prairies, barren land in forested areas, wind turbines, roads, etc.). The effects of fragmentation on species of concern include avoidance of fragmented areas or decreased density, survival, and/or reproduction in fragmented habitats. Species of habitat fragmentation concern that may inhabit the project area include:

Burrowing owl (*Athene cunicularia*)
Upland Sandpiper (*Bartramia longicauda*)
Longbilled Curlew (*Numenius americanus*)
Western Meadow Lark (*Sturnella neglecta*)
Lark Bunting (*Calamospiza melanocorys*)
Sharp-tailed grouse (*Tympanuchus phasianellus*)
Grasshopper Sparrow (*Ammodramus savannarum*)
Northern Harrier (*Circus cyaneus*)
Sprague's Pipit (*Anthus spragueii*)
Chesnut-collared Longspur (*Calcarius ornatus*)
Savannah Sparrow (*Passerculus sandwichensis*)

Additionally, a search of the NHD indicated that there are nesting burrowing owl (*Athene cunicularia*) located west of the project. Although no records of burrowing owl were found in the immediate project area, the presence of prairie dog towns within and adjacent to the project boundary could provide suitable habitat for this species. In addition to being a species of habitat fragmentation concern, the burrowing owl is listed as a species of greatest conservation need in South Dakota. Burrowing owls nest in grasslands with few trees, and inhabit prairie dog towns larger than 25 acres (Griebel and Savidge 2007, Thiele et al. 2013). The breeding season in South Dakota is mid-May to early August. SDGFP suggests avoiding construction within 0.25 miles of an active burrowing owl nest, if any are identified during breeding bird surveys. These recommendations for burrowing owl nest avoidance measures should be included in the EA

Prairie Grouse

SDGFP generally recommends two years of prairie grouse lek surveys in a project area prior to development. Prairie grouse (sharp-tailed grouse and greater prairie chicken (*T. cupido*)) inhabit large intact blocks of native grassland. Development (roads, power lines, solar panels, buildings, etc.) in and around prairie grouse habitat can fragment otherwise suitable habitat and displace birds. Prairie grouse are indicators of high quality grassland habitat and a robust ecological community due to their specific habitat needs. The developers of the project completed an initial prairie grouse lek survey in 2017 and

plan to conduct an additional year of surveys in 2020. If prairie grouse leks are found during the 2020 surveys, we suggest a two mile no construction buffer during the lekking and subsequent nesting season (1 March to 30 June). Sharp-tail grouse are sensitive to noise, and construction near leks could cause birds to abandon leks. If the developer determines it is not feasible to cease construction within the two mile buffer during the lekking season, SDGFP asks that construction activities are limited to the period 3 hours after sunrise to 1 hour before sunset. These recommendations for sharp-tailed grouse lek avoidance measures should be included in the EA.

Avian Mortality and Powerlines

The developer proposes to use underground transmission lines, which will reduce impacts to avian species. We include the following information for the reviewers and developers to consider if any above-ground power lines will be a part of the project. Avian use of energized poles includes perching (for hunting and roosting), nesting, and resting (including shelter during inclement weather). Large birds (e.g. eagles, hawks) that use energized poles can be electrocuted if energized equipment is not insulated properly to minimize risks. Other avian species could potentially collide with the lines, including waterfowl, and sharp-tailed grouse, which do not generally perch on tall transmission lines. If any above-ground transmission lines are built in addition to the proposed underground transmission line, SDGFP recommends all new construction should follow or exceed Avian Power Line Interaction Committee (APLIC) construction design standards for avian-safe passage and use. See https://www.aplic.org/ for specific guidance on how to mitigate collision and electrocution risks to avian species. Ways to reduce or mitigate the impacts of power line strikes and electrocutions should be provided in the EA, including the suggestions from APLIC.

Mammals

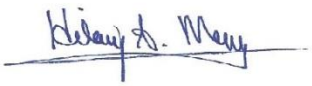
Swift fox (*Vulpes velox*) are listed as state threatened by SDGFP. Swift fox typically inhabit short grass to midgrass prairies with gently rolling topography. Swift fox will enlarge burrows of other burrowing animals (e.g. black tailed prairie dogs) or create their own dens in loose soils (Higgins et al. 2000). Habitat loss is the greatest threat to swift fox populations throughout its range. No records of swift fox occur within the project area, however swift fox can be difficult to detect. If a swift fox den is discovered during construction of the project, SDGFP recommends avoiding construction in the immediate area (0.25 mile buffer), if feasible.

During the January 2020 meeting, the developer indicated that prairie dog towns were identified in the project area. We recommend not siting project components within prairie dog colonies (if feasible) to reduce disturbance to swift fox and burrowing owl habitat, as well as to reduce the risk of collision for avian predators that may forage in prairie dog colonies. Collisions with vehicles associated with construction, operation, and maintenance activities are also a concern if swift fox are found in the project area. We recommend reducing speed limits within the project during construction, operation and maintenance activities. SDGFP requests that recommendations for avoiding risks to swift fox are included in the EA.

The project area is also home to populations of mule deer (*Odocoileus hemionus*), whitetail deer (*O.virginianus*) and antelope (*Antilocapra americana*). We do not anticipate this project to pose a significant impact to these species. However, the developer indicated that a security fence will be installed around the project boundary. We suggest a woven wire/chain link fence be at least 7-8' tall to exclude deer and antelope. We also request that biologists and/or construction crews assure big game animals (particularly fawns, depending on construction timing) are void of the facility before fencing is permanently closed. The wire should be installed tight to the ground, or possibly buried. For more information on building wildlife-friendly fencing please see: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_026389.pdf. SDGFP requests that recommendations for avoiding impacts to deer and antelope are included in the EA.

We appreciate the opportunity to provide comments on this project. Please keep SDGFP involved in all future correspondence. For any additional questions or information, please feel free to contact me at 605.773.6208 or Hilary.Morey@state.sd.us.

Sincerely,



Hilary Morey
Environmental Review Senior Biologist
523 East Capitol Avenue
Pierre, SD 57501
hilary.morey@state.sd.us

cc: Natalie Gates (USFWS)

Literature Cited

Bakker, K.K. 2020. South Dakota Species of Habitat Fragmentation Concern: Grassland Birds. Report developed for: U.S. Fish and Wildlife Service, South Dakota Ecological Services Field Office, Pierre, SD, 38 pp.

Griebel, R.L., and J.A. Savidge. 2007. Factors influencing burrowing owl reproductive performance in contiguous shortgrass prairie. Journal of Raptor Research 41:212-222.

Harrison, C., H. Lloyd, and C. Field. 2016. Evidence review of the impacts of solar farms on birds, bats and general ecology. Technical report, Manchester Metropolitan University, UK.

Peterjohn, B.G., and J.R. Sauer. 1999. Population status of North American grassland birds from the North American breeding bird survey. Studies in Avian Biology 19:27-44.

Rosenberg, K.V., A.M. Dokter, P.J. Blancher, J.R. Sauer, A.C. Smith, P.A. Smith, J.C. Stanton, A. Panjabi, L. Helft, M. Parr and P.P. Mara. 2019. Decline of the North American Avifauna. Science 336: 120-124.

Samsal, I. 2011. Population viability analysis of swift fox (*Vulpes velox*) at the Badlands National Park. Master's thesis. South Dakota State University, Brookings, USA.

Thiele, J.P., K.K. Bakker, and C.D. Dieter. 2013. Multiscale nest site selection by burrowing owls in western South Dakota. The Wilson Journal of Ornithology 125:763-774.

Walston, L.J. Jr, K.E. Rollins, K.E. LaGory, K.P. Smith and S.A. Meyers. 2016. A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. Renewable energy 92:405-414.

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

July 7, 2017

Ms. Melissa Schmit
Geronimo Energy, LLC
7650 Edinborough Way, Suite 725
Edina, MN 55435

RE: Wild Springs Solar Energy Project
Pennington County, South Dakota

Dear Melissa,

The South Dakota Department of Game, Fish and Parks, Division of Wildlife, has reviewed the above project involving the construction and operation of a proposed utility scale solar energy project in Pennington County, South Dakota. At this time, the transmission line route, racking layout, access roads, and electrical connections have not been finalized.

The proposed siting and operation of solar projects have the potential to directly and indirectly impact area wildlife. This may occur by altering habitats, influencing behavior patterns and directly killing individuals. To insure impacts remain at a minimum, we would recommend conducting at least two years of appropriately-timed pre-construction wildlife surveys to document current conditions and help assess any potential impacts to wildlife. If major impacts are predicted, development in the area should be avoided. If less serious impacts are anticipated, mitigation is recommended to reduce these impacts. Post-construction studies should be conducted to assess actual impacts, evaluate mitigation effectiveness and evaluate predictions. Bird and bat mortality surveys should be conducted at least two years post-construction.

A drive-by site visit of the project revealed that most of the study area appears to be farmed or hayed. However, if any remnant prairie tracts remain, we recommend avoidance of these areas. Remnant prairie tracts have high conservation value, especially those that contain a high diversity of both plant and animal species with non-native, invasive plant species being rare or absent. The project area should be surveyed for untilled tracts of native prairie and every effort should be made to not place solar panels, roads, collection lines, and facilities in these areas.

In North America, grassland birds have experienced consistent and long term declines (Peterjohn and Sauer 1999). Placement of a solar farm in the proposed project area may reduce habitat suitability for grassland birds by increasing habitat fragmentation and introducing invasive species. Some grassland bird species have been shown to favor large grassland patches and sensitivity to habitat fragmentation. We recommend properly timed, species-appropriate surveys for breeding grassland birds (songbirds and grouse) be conducted. Many privately owned areas, such as the project site, have not been surveyed for grassland songbirds or prairie grouse leks. It is my understanding that the first round of grouse surveys were conducted in April of 2017. Our agency would respectfully request a written summary of these survey findings when they become available. Post-construction surveys should monitor lek presence and document the number of grouse attending each lek.

We recommend that any new power lines or transmission lines be buried. If this is not possible, placement of above-ground transmission lines should be located along existing corridors such as within existing disturbed areas. Electrocution of birds that perch, roost, or nest on power lines continues to be a source of mortality, especially for eagles, hawks, and owls (Avian Power Line Interaction Committee 2006). The Avian Power Line Interaction Committee (APLIC) has developed two documents that provide useful information on how to reduce power line strikes and electrocutions:

Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 and *Mitigating Bird Collisions with Power Lines*

Both of these documents are available from the Edison Institute (http://www.aplic.org).

Several bat species, hoary, silver-haired, eastern red, and northern long-eared, are known to occur in South Dakota. We suggest pre-construction surveys of the area for potential bat habitat and species followed by post-construction mortality surveys.

A search of the Natural Heritage Database indicated that there are no known threatened, endangered or rare species in the project boundary, therefore we anticipate that the project as described will have no effect to listed or proposed protected species. However, please note that many places in South Dakota have not been surveyed for rare or protected species and the absence of a species from the database does not preclude its presence from your project area. If surveys indicate that state endangered, threatened, or rare species may occur in the project area, South Dakota Codified Law 34A-8-8 allows for only limited and specific authorized take of threatened and endangered species for scientific, zoological, or educational purposes. For more information, please visit https://gfp.sd.gov/licenses/other-permits/endangered-species-permit.aspx. If survey and monitoring activities include live trapping or the collection of wildlife species, you must first obtain a collection permit from our agency. If these activities include bats, specific sampling and collection protocols must be followed for a collectors permit to be issued. More information can be found at the following websites:

Scientific Collectors Permit –
https://gfp.sd.gov/licenses/other-permits/scientific-collectors.aspx

Bat Sampling and Collection Protocol Guidelines and Requirements –
https://gfp.sd.gov/wildlife/docs/bat-protocol.pdf

Our agency has concerns regarding direct and indirect impacts to wildlife and habitats in association with the proposed project. If development of this project continues to be pursued, a joint meeting with SDGFP and the U.S. Fish and Wildlife Service representatives is recommended to further discuss project details and wildlife concerns.

We appreciate the opportunity to provide comments. If you have any questions, please contact me at 605.773.6208.

Sincerely,

Leslie Murphy

Leslie Murphy
Environmental Review Coordinator
523 East Capitol Avenue
Pierre, SD 57501
Leslie.Murphy@state.sd.us

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

Literature Cited

Avian Power Line Interaction Committee. 2006. Suggested Practices for Avian Protections on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC and the California Energy Commission, Washington, D.C. and Sacramento, CA.

Peterjohn, B.G, and J.R. Sauer. 1999. Populations status of North American grassland birds from the North American breeding bird survey. Studies in Avian Biology No. 19:27-44.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Dakota Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

IN REPLY REFER TO:
WILD SPRINGS
SOLAR PROJECT

March 9, 2020

Christina Gomer
Western Area Power Administration
Upper Great Plains Customer Service Region
2900 4th Avenue North
Billings, Montana 59101

Dear Ms. Gomer:

This letter is in response to your request dated February 11, 2020, for environmental comments regarding the proposed Wild Springs Solar Project, a photovoltaic ground-mounted solar energy system and associated facilities, potentially generating up to 128-megawatt (MW). The project is proposed on private lands south of New Underwood in Pennington County, South Dakota.

We previously provided a letter to the developer of this project, Geronimo Energy, dated July 3, 2017, that had been copied to your office; a second copy is enclosed for your convenience. That letter provides information regarding the species and resources of concern that may occur in the project area (federally listed species, eagles, migratory birds, Birds of Conservation Concern, wetlands) as well as some recommendations to reduce impacts to those resources. The comments in that July 3, 2017, letter still apply to this project, with exception of language regarding incidental take of migratory birds per the December 17, 2017, U.S. Department of Interior, Solicitor's Opinion, M-37050 (online: https://www.doi.gov/solicitor/opinions/). Note, that M-37050 addresses incidental take of migratory birds under the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), but incidental take does not include habitat impacts such as removal of habitat nor displacement of wildlife from habitat.

We also recently provided you with a report titled *South Dakota Species of Habitat Fragmentation Concern: Grassland Birds*. Species listed in that document are likely to be affected by activities on the landscape that reduce the size of contiguous grasslands into smaller and more isolated patches. Some of these species are likely to occur at the Wild Springs Solar project area and placement of solar panels effectively blanketing grassland habitat will likely be to the detriment of these sensitive species. Many are also currently recognized as species of concern by our agency and the State of South Dakota.

Activities that alter or destroy grassland bird nesting habitat may fall under the Service's 1981 mitigation policy, available online at: https://www.fws.gov/policy/a1npi89_02.pdf. This policy

assures consistent and effective mitigation recommendations that facilitate mitigation by Federal action agencies and developers early in the action process, thereby avoiding delays and assuring equal consideration of fish and wildlife resources with other project features and purposes. Our policy adopts the definition of the term "mitigation" as stated in the NEPA regulations which includes: "(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments."

During a January 22, 2020, meeting with Geronimo representative Melissa Schmit regarding this project, we reiterated a primary recommendation in our July 3, 2017, letter: to avoid intact grassland areas as much as possible. Grasslands compose the dominant habitat type (75.5% per reports provided to us by Geronimo) within the Wild Springs Solar Project area; ideally project boundaries would be shifted or a new location would be chosen to reduce this impact. We continue to recommend measures to reduce the footprint of this project on grassland habitats.

Also during that meeting, we reiterated another recommendation: to offset the impacts to migratory birds, particularly grassland nesting species, expected to result from this development. Some information is available from other solar farms regarding environmental impacts, but few project are established in South Dakota at this time. The Wild Springs project, should it proceed, provides an opportunity in South Dakota to gather data that could inform the level of offsets needed to address anticipated change in avian diversity, density, and/or species composition. Incidental take of migratory birds would also be valuable information to understand that aspect of solar project effects in South Dakota, but the primary focus would be the impact of this site to birds via habitat impacts. Geronimo has provided some information indicating post-construction surveys will be completed; we recommend the resulting information be used to develop a habitat offset plan for the benefit of grassland birds.

Our emphasis on grassland birds and habitat offsets is reinforced by the recent finding that the majority of North American bird species are in decline, exhibiting a 29% reduction in abundance or a loss of 2.9 billion birds across almost all biomes since 1970 (Rosenberg et al. 2019). Among those, grassland nesting birds have experienced the greatest population losses: approximately 53% declines in populations across North America, equating to more than 700 million breeding individuals encompassing 31 species (Rosenberg et al. 2019). Conserving native prairie for the benefit of grassland nesting birds is an environmental priority in South Dakota.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 227.

Sincerely,

Natalie Gates

For Scott Larson
Field Supervisor
South Dakota Field Office

Literature Cited

Rosenberg, K. V., A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, M. Parr, and P. P. Marra. 2019. Decline of the North American Fauna. Science 10.1126/science.aaw1313.

Enclosure

cc: SDDGFP, Pierre, SD, Attn: Hilary Morey

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Dakota Ecological Services

420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

IN REPLY REFER TO:
Wild Springs Solar,
Pennington County

July 3, 2017

Ms. Melissa Schmit
Wild Springs Solar
7650 Edinborough Way, Suite 725
Edina Minnesota 55435

Dear Ms. Schmit:

This letter is in response to your request received June 5, 2017, for environmental comments regarding the above referenced Wild Springs Solar project near New Underwood, Pennington County, South Dakota. The project proposal includes solar facilities, fencing, roads, a substation, collection lines and weather station(s) as well as a 115 kV (presumably overhead) transmission line to connect to the existing New Underwood Substation (route yet to be determined). The federal nexus for this project is an interconnection with Western Area Power Administration's (Western) transmission system, thus we have provided a copy of this correspondence to Western's Billings, Montana, office.

Threatened/Endangered Species
In accordance with section 7(c) of the Endangered Species Act, as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

Species	Status	Expected Occurrence
Whooping Crane (*Grus americana*)	Endangered	Migration
Northern Long-eared Bat (Myotis septentrionalis)	Threatened	Summer resident, seasonal migrant, Black Hills winter resident

Whooping cranes migrate through South Dakota on their way to northern breeding grounds and southern wintering areas. They occupy numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which to stand and rest. Should construction occur during spring or fall migration, the potential for disturbances to whooping cranes exists. Disturbance (flushing the birds) stresses them at critical times of the year. We recommend remaining vigilant for these

birds. There is little that can be done to reduce disturbance besides ceasing construction at sites where the birds have been observed. The birds normally do not stay in any one area for long during migration. Any whooping crane sightings should be reported to this office.

The northern long-eared bat is a medium-sized brown bat listed as threatened under the Endangered Species Act. Northern long-eared bats are known to be present in South Dakota during the summer months, primarily roosting singly or in colonies underneath bark, in cavities or in crevices of both live and dead trees. Hibernacula have been documented in caves/mines in the Black Hills, and the species has been documented in other areas in the state during the summer months. White nose syndrome - a fungus affecting hibernating bats - is considered a significant threat to this species, but individuals may be harmed by other activities such as modifications to hibernacula, timber harvest, human disturbance, and collisions with wind turbines. A 4(d) rule has been published that exempts take of Northern long-eared bats in certain circumstances. For more information, see: https://www.fws.gov/Midwest/Endangered/mammals/nleb/index.html.

If Western or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office.

Wetlands

According to National Wetlands Inventory maps, (available online at https://www.fws.gov/wetlands/) wetlands exist at the proposed construction area. If a project may impact wetlands or other important fish and wildlife habitats, the U.S. Fish and Wildlife Service (Service), in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible, then minimization of any adverse impacts, and finally replacement of any lost acres, in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland acres to be impacted, and the methods of replacement should be prepared and submitted to the resource agencies for review.

Migratory Birds

Land use of the project area was not provided in your letter, but satellite imagery suggests hayland, pasture, and cropground exist within the project boundaries. Of concern within intact grasslands on the site are migratory birds and nesting habitat. In accordance with Executive Order 13186 regarding migratory bird protection, we recommend avoidance, minimization, and finally replacement of habitat to reduce the impacts to species protected by the Migratory Bird Treaty Act (MBTA). Impacts resulting from this project could include displacement, avoidance, and/or mortality of birds that reside in the area or migrate through it. We recommend evaluation of the proposed project area for migratory bird use prior to construction, followed by post-construction monitoring and evaluation of impacts. Results should be reported to this office. A mitigation plan that specifically addresses direct and indirect take of birds during and after

construction is also recommended, particularly if project impacts must occur within intact native grasslands. Such a plan could include prairie restoration, establishment of easements, or purchase of fee title lands. We can provide further guidance in this regard if the proposed project progresses.

Our Birds of Conservation Concern 2008 document identifies grassland nesting birds that may occur at your proposed project site. This document (available at the following website: https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf) is intended to identify species in need of coordinated and proactive conservation efforts among State, Federal, and private entities, with the goals of precluding future evaluation of these species for Endangered Species Act protections and promoting/conserving long-term avian diversity. Primary threats impacting grassland species that occur in South Dakota are habitat loss and fragmentation; these impacts are anticipated as a result of this proposed project.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed as a result of the proposed project even if all known reasonable and effective measures to protect birds are used. The Service's Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent and effective measures to avoid that take. Companies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction, operation, or similar activities.

Eagles

Eagles are also protected by the MBTA as well as the Bald and Golden Eagle Protection Act (BGEPA). Golden eagles (*Aquila chrysaetos*) are year-round residents in western South Dakota, and may be found throughout the state in winter or during migration, while Bald eagles (*Haliaeetus leucocephalus*) occur throughout South Dakota in all seasons. The MBTA and BGEPA protect eagles from a variety of harmful actions and impacts. The Service has guidance regarding means to protect eagles:

- Our 2007 *National Bald Eagle Management Guidelines* are available online: https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf. We recommend reviewing these guidelines as they advise of circumstances where these laws may apply and assist you in avoiding potential violations.

- Our 2009 final rule (50 C.F.R. §§ 22.26 and 22.27) authorizing issuance of permits to

take bald and golden eagles, where the take is compatible with the preservation of the bald eagle and the golden eagle, is associated with and not the purpose of an otherwise lawful activity, has been avoided to the maximum degree practicable, and the remaining take is unavoidable. We recently amended the eagle permit regulations; see: https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/pdf/2016-29908.pdf).

Power Lines

Your project includes construction of an overhead powerline, which are known to kill birds via electrocution and line strikes. Thousands of birds, including endangered species, are killed annually as they attempt to utilize overhead power lines as nesting, hunting, resting, feeding, and sunning sites. The Service recommends the installation of underground, rather than overhead, power lines whenever possible/appropriate to minimize environmental disturbances. For all new overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent avian electrocutions. The publication entitled *Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006* has many good suggestions including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute via their website at: http://www.eei.org/resourcesandmedia/products/Pages/products.aspx, or by calling 202-508-5000.

Please note that utilizing just one of the "Suggested Practices . . ." methods may not entirely remove the threat of electrocution to raptors. In fact, improper use of some methods may increase electrocution mortality. Perch guards, for example, may be only partially effective as some birds may still attempt to perch on structures with misplaced or small-sized guards and suffer electrocution as they approach too close to conducting materials. Among the most dangerous structures to raptors are poles that are located at a crossing of two or more lines, exposed above-ground transformers, or dead end poles. Numerous hot and neutral lines at these sites, combined with inadequate spacing between conductors, increase the threat of raptor electrocutions. Perch guards placed on other poles has, in some cases, served to actually shift birds to these more dangerous sites, increasing the number of mortalities. Thus, it may be necessary to utilize other methods or combine methods to achieve the best results. The same principles may be applied to substation structures.

Please also note that the spacing recommendation within the "Suggested Practices . . ." publication of at least 60 inches between conductors or features that cause grounding may not be protective of larger raptors such as eagles. This measure was based on the fact that the skin-to-skin contact distance on these birds (i.e., talon to beak, wrist to wrist, etc.) is less than 60 inches. However, an adult eagle's wingspan (distance between feather tips) may vary from 66 to 96 inches depending on the species (golden or bald) and gender of the bird, and unfortunately, wet feathers in contact with conductors and/or grounding connections can result in a lethal electrical surge. Thus, the focus of the above precautionary measures should be to a) provide more than 96 inches of spacing between conductors or grounding features, b) insulate exposed conducting features so that contact will not cause raptor electrocution, and/or c) prevent raptors from perching on the poles in the first place.

Additional information regarding simple, effective ways to prevent raptor electrocutions on power lines is available in video form. *Raptors at Risk* may be obtained by contacting EDM International, Inc. at 4001 Automation Way, Fort Collins, Colorado 80525-3479, Telephone No. (970) 204-4001, or by visiting their website at: https://www.edmlink.com/component/zoo/item/video-raptors-at-risk?Itemid=240.

In addition to electrocution, overhead power lines also present the threat of avian line strike mortality. Particularly in situations where these lines are adjacent to wetlands or where waters exist on opposite sides of the lines, we recommend marking them in order to make them more visible to birds. For more information on bird strikes, please see *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* which, again, may be obtained by contacting the Edison Electric Institute via their website at http://www.eei.org/resourcesandmedia/products/Pages/products.aspx, or by calling 202-508-5000.

Please note that, while marking of power lines reduces line strike mortality, it does not preclude it entirely. Thus, marking of additional, existing, overhead lines is recommended to further offset the potential for avian line strike mortality.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 227.

Sincerely,

Field Supervisor
South Dakota Field Office

cc: Matt Marsh, Western Area Power Administration, Billings, MT

MEETING	**Wild Springs Solar Project Introduction and Review**
DATE/TIME	**January 22, 2020, 9:00 AM-11:00 AM CST**
LOCATION	**SDGFP Office, Pierre SD**
PARTICIPANTS	**Melissa Schmit (Geronimo Energy)**
	Todd Mattson (WEST)
	Natalie Gates (USFWS)
	Hilary Morey (SDGFP)

- Meeting with USFWS and SDGFP to provide an update on Wild Springs Solar and discuss wildlife survey efforts.
- Geronimo provided an overview of the Project including project schedule, land use permitting that would be required (conditional use permit through Pennington County, Facility Permit though the South Dakota Public Utilities Commission and an Environmental Assessment in coordination with WAPA due to proposed federal interconnection), and surveys completed to date.
    - Surveys completed: wetland delineations in 2017 and 2019, cultural resources survey in 2017 and 2019, lek surveys in 2017, ground-based raptor nest surveys in 2017 and 2019, site characterization study/habitat assessment in 2019.
    - Provided an overview of solar components and construction. Wild Springs will construct a 128 MW facility that will utilize below-ground DC and AC collection lines or above-ground DC cabling that will be strung below the panels on hanging brackets and below-ground AC collection to the project substation. The project will also include an onsite operation and maintenance facility co-located with the project substation and likely require 4 full-time staff.
    - Provided an updated project map that reflects an expanded project area which resulted from avoidance of prairie dog towns, wetlands, drainages, and cultural resources that were identified during field surveys and provided an overview of solar facilities.
    - At this point, Wild Springs anticipates the project will begin construction in late 2021 and be in commercial operations by the end of 2022.
- WEST provided an overview of avian studies that have been completed for solar facilities providing the distinction between wind energy and solar energy impacts to avian species.
    - Solar facilities have low levels of direct mortality and most impacts appear to be related to alteration of habitat.
    - Raptor and large bird avoidance may occur but small bird diversity and richness may increase.

- Impacts/bat mortality is not a concern for solar facilities as they do not collide with stationary objects. The only risk to bats is through the removal of roosting habitat. Wild Springs Solar will not result in tree removal and does not propose acoustic bat surveys.
- Extensive avian mortality monitoring has occurred at operating solar facilities in the southwestern U.S. Less than 4% of discovered fatalities could clearly be attributed to collision with solar panels.
- Because some water-associate or water-obligate birds have been found at a few solar sites in the desert southwest, there is a "Lake effect" hypothesis that these birds mistake solar panels to be large waterbodies. WEST is currently studying this issue in more detail in California, but thus far it appears to be limited to a relatively small number of individual birds at a few sites in the Mojave Desert near the Salton Sea (and large waterbird wintering or migratory stop over site); there have not been other reports of a "lake effect" at solar sites outside this region.

- WEST is preparing a Natural Resource Strategy for Wild Springs that outlines avoidance and minimization of impacts as well as best management practices for construction and operation activities. Wild Springs is avoiding cultural resources, wetlands, and a prairie dog town identified during field surveys. Avoidance of the prairie dog town eliminates the need for additional field surveys of species that may utilize the area.
- Discussion on existing conditions, wildlife, and landcover/vegetation:
  - Landcover confirmed with field reconnaissance is ~75% pasture/hay and fallow grassland areas and ~20% alfalfa, hay, and wheat. Remaining area is open water associated with delineated wetlands, and barren land and shrub/scrub associated with the WAPA substation parcel.
  - Wild Springs plans to minimize grading as the site conditions allow and will revegetate all areas of temporary construction disturbance with a native grass mix. This will stabilize the soil and create/maintain wildlife habitat.
  - SDGFP noted that big game would be excluded from the solar facility once it was constructed; SDGFP recommended that steps be taken to avoid trapping big game within the fence line during initial construction.
  - USFWS recommends that Wild Springs consider mitigation to offset impacts to grasslands.
    - Because of the lack of conclusive studies on how wildlife would be impacted by the project, Wild Springs proposes to conduct pre- and post-construction breeding bird surveys to determine if any displacement or change in avian use would occur.
    - It is possible some buffer areas around the facility could be protected from overgrazing, potentially enhancing some wildlife habitat at this site.

- Prairie dog use within and/or adjacent to the project facility should be carefully considered. Fencing or vegetation height could impact how prairie dogs use the area and, ideally, the need for prairie dog control would be minimized.

- Discussion on additional surveys:
  - Wild Springs plans to conduct the following surveys in 2020: additional round of ground-based raptor nest surveys, additional round of prairie grouse lek surveys, and a breeding bird survey.
  - In lieu of post-construction mortality surveys, Wild Springs proposes conducting breeding bird surveys once the project is operational and vegetation is established. These surveys would be designed to better assess the potential change in wildlife habitat value and function after the project is constructed.

- Next steps:
  - Geronimo will provide finalized survey reports for the project to USFWS and SDGFP and work on incorporating input from meeting into the Project's Natural Resource Strategy.
  - Natalie will provide SD species of habitat fragmentation concern list.
  - Hilary will provide information on known big game migration in the area.