Environmental Assessment
DOE/EA-1611

Interconnection Request for the Colorado Highlands Wind Project

Logan County, Colorado

U. S. Department of Energy
Western Area Power Administration
Rocky Mountain Region
Loveland, Colorado

January 2009

EXECUTIVE SUMMARY

Project Location

The Colorado Highlands Wind Project (the Project) would be constructed on private land located northeast of Fleming, in Logan County, Colorado.

Project Participants

Colorado Highlands Wind, LLC (CHW) applied (via predecessor project owner Wind Energy Prototypes) to the Western Area Power Administration (Western) to interconnect a 90-megawatt (MW) wind power facility to Western's existing Sterling-Frenchman Creek 115 kV transmission line. Western is the lead Federal agency for compliance with the National Environmental Policy Act of 1969 (NEPA) as amended. There are no cooperating agencies. This Environmental Assessment (EA) was prepared in accordance with NEPA to assess the impacts of constructing and operating the wind Project, which would be enabled by Western's execution of the interconnect agreement (a Federal action).

Western is a Federal agency under the U.S. Department of Energy (DOE) that markets and transmits wholesale electrical power from 56 Federal hydropower plants and one coal-fired plant. Western sells about 40 percent of regional hydroelectric generation in a service area that covers 1.3 million square miles in 15 states. To provide this reliable electric power to most of the western half of the United States, Western markets and transmits about 10,000 megawatts of hydropower across an integrated 17,000-circuit mile, high voltage transmission system. Customers include municipalities, cooperative, public utility and irrigation districts, Federal and state agencies, Native American tribes, investor-owned utilities (only one of which has an allocation of Federal hydropower from Western) and marketers. They, in turn, provide retail electric service to millions of consumers in Arizona, California, Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas, Utah and Wyoming. Electric power marketed by Western is generated by the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, and the U.S. State Department's International Boundary and Water Commission (Western 2006).

Purpose and Need

Wind Energy Prototypes, LLC (WEP), submitted an interconnection request in January 2005 to Western to interconnect the proposed Colorado Highlands Wind Project (Project or CHW Project) to the existing Sterling-Frenchman Creek 115 kV transmission line. CHW acquired all interest of WEP in the Project in June 2008. Western is required to respond to Wind Energy Prototype, LLC's application for interconnection submitted in January 2005 to interconnect the proposed wind energy Project with Western's transmission system. CHW acquired the Project from WEP in June 2008. Western adopted an Open Access Transmission Tariff for its transmission system, which is generally consistent with the Federal Energy Regulatory Commission's *pro forma* open access tariff. Under Western's tariff, procedures for new interconnections to Western transmission system apply to all eligible customers, consistent with all Western requirements and subject to environmental review under NEPA. In responding to

the request, Western must apply the terms and conditions of its Open Access Transmission Tariff and Interconnection Guidelines in considering that request.

NEPA requires Federal decision-makers to consider the environmental effects of their actions. The agency responsible for complying with NEPA for this proposed action is Western. Western's decision is limited to deciding if the specific wind Project proposed by the applicant can be interconnected with Western's transmission system. Western's approval of this interconnection would enable the Colorado Highlands Wind Project to proceed. Because Westerns' action would enable the Project, Western is required to analyze the potential environmental effects associated with the construction, operation and maintenance of all project-related facilities regardless of ownership.

The primary purpose of the Colorado Highlands Wind Project is to provide wind-generated electricity from a site in Colorado to further the objectives of the President's National Energy Policy to diversify energy sources by making greater use of non-hydroelectric renewable sources such as wind power (National Energy Policy Development Group 2001) and to meet customer demand for competitively priced energy from renewable resources.

Alternatives

Proposed Project. The proposed Project would include sixty (60) General Electric (GE) 1.5 megawatt (MW) SLE wind turbines with a total Project output nameplate capacity of ninety (90) MW of renewable energy. Due to the wind regime at the site, the average MW output is considerably less. The GE 1.5MW SLE wind turbine is a monopole tower design with an 80-meter hub height and a 77-meter rotor diameter. Total maximum blade tip height for the GE 1.5MW SLE wind turbine is 117.5 meters (385 feet). Figure 2-1 illustrates the proposed distribution of monopole towers in the Project area. Seven alternate locations have been proposed in the event that certain of the initial locations are not viable during Project implementation.

At the Project site support facilities would include a Collector Substation and an Operations and Maintenance facility. A system of internal collector cables that transmit electricity from each turbine to the Collector Substation is planned as 34.5-kV, with a step-up to 115-kV at the Collector Substation. The Collector Substation would have an approximate footprint of 1 acre. The Operations and Maintenance building would be warehouse/garage-type construction and the facility would have an approximate footprint of 1-2 acres. The locations for the Collector Substation and the Wildhorse Creek Switchyard are illustrated on Figure 2-1. The Operations and Maintenance facility would be located adjacent to the Collector Substation. The detailed design of the support facilities is currently in process by CHW. Western would construct the Wildhorse Creek Switchyard to connect the Project's new overhead 115-kV transmission line with Western's existing Sterling-Frenchman Creek transmission line. The Wildhorse Creek Switchyard would be constructed south of US Highway 6 near the intersection with CR 87 and would be constructed on approximately 6 acres.

Access to the Project area would be via US Highway 6 and a network of existing County and private roads within the Project area. Access to Project facilities, including individual turbines,

would be provided by new access roads to be constructed for the purposes of Project construction and operation.

CHW proposes to implement Western's standard construction, operation and maintenance practices, where applicable, to avoid and minimize impacts to the environment to the extent practicable. These measures are part of CHW's proposed Project and Western's Proposed Action and those measures are considered in this EA's impact analysis. CHW also proposes to implement additional mitigation measures to avoid, reduce or eliminate impacts related to CHW's Proposed Action.

Alternative Turbine Locations: The Project proposed alternative turbine arrays in the Project Study area. Based on agency comments on potential resource impacts, particularly to raptor nests, and leks, alternative turbine arrays were designed and adopted as described above under the Proposed Project.

Alternative Project Generation Capacity: The Project originally approached Western with a proposal for a Project with 120 MW of capacity (Western Area Power Administration. December 2005. Wind Energy Prototypes, LLC. Fleming 120 MW Wind Farm System Impact Study.) The impact study showed that a 120 MW project would require expensive system upgrades to mitigate undesirable electrical system performance. The cost of these upgrades was unacceptable to the Project. Based on powerflow analysis, the maximum wind farm design to be considered and installed in this area for interconnection with Western's system was recommended at 90 MW, to avoid adverse effects on Western's 115-kV transmission system in the area. The 120 MW Proposal was dropped in favor of the 90 MW Project.

Alternative Electrical System Interconnections Facilities: Western prepared a facility study for 90 MW and 120 MW options (Western Area Power Administration. January 2007. Final Facilities Study, Wind Energy Prototypes, Fleming Wind Farm; Wildhorse Creek Substation.). The results of the study indicated that the 90 MW option would require the construction of the proposed Wildhorse Creek Switchyard and other relatively minor system modifications. The addition of 30 MW to reach the 120 MW option would require, in addition to the improvements under the 90 MW option, reconductoring of a transmission line and other expensive system changes that were cost prohibitive for the Project.

Summary: The Project described as the Proposed Project in this EA would be the more economically feasible and would likely result in fewer environmental impacts when compared to other construction alternatives. The Proposed Project minimizes the length of new transmission lines that would be built to get power from the Project to Western's transmission system. There are no additional new transmission lines or upgraded transmission lines that are needed to accommodate the Project.

Alternative Project Locations. Wind Project developers go through an extensive and expensive site characterization study and financial analysis to identify potentially economically feasible wind sites. A Wind Energy Developer may have identified many potential sites but one of the important limiting factors in site development is the availability of economical transmission to get the energy from the Project to a buyer. The combination of a suitable, developable site with

good wind conditions, willing landowners, public acceptance, economic feasibility and relatively low environmental impacts narrows the opportunities for sites. The availability of economically feasible and accessible transmission further limits the development potential of these sites. This proponent-initiated Project is part of a discrete proposal for Western to consider under the requirements of its Tariff. No other alternative sites to the location of the Project are addressed in this EA.

No Action Alternative

Under the No Action Alternative, Western would not execute an interconnection agreement with CHW and the wind project would not be constructed and interconnected with Western's transmission system. Western's determination not to approve the interconnection request could make the proposed Project infeasible. CHW could continue to pursue the project by applying for interconnection with another transmission provider in the vicinity, however Western could not speculate on whether access to alternative transmission is a technically and economically feasible option for CHW. The electrical generation capacity of the project could change depending on the transmission capacity of the alternative transmission provider and other factors could make the Project infeasible. However, for the purposes of this EA, which discusses the potential impacts of Western's decision, the No Action Alternative is considered to result in the Project not being constructed and the environmental impacts associated with the Project would not occur.

Summary of Impacts for the Preferred Alternative

The Proposed Action is Western's preferred alternative and it would have no significant impacts based on the significance criteria and impact analysis presented herein. The Proposed Action would have certain potential impacts, some beneficial, which are summarized below.

Air Quality. Climate would not be adversely impacted by the proposed project. The Proposed Action would have beneficial impacts on air quality because greenhouse gases and other pollutants emitted by conventional fossil fuel combustion would not be produced. Construction and operation would result in direct and short term impacts from small amounts of dust and tailpipe emissions from vehicle traffic. Dust control measures during construction would minimize the potential for adverse impact; and operational traffic would be predominantly consistent with routine road travel for an agricultural area.

Topography. Short term and long term minor impacts to topography would include temporary or permanent changes in the land surface and slope due to cut-and-fill activities required to excavate foundations and build access roads.

Paleontology. Direct impacts to fossils could include the inadvertent destruction of scientifically important fossils during excavation. However, because the Project footprint is small (less than 180 hectares [446 acres] during construction) and no significant fossils were discovered during the field reconnaissance, the potential for loss of important fossils is considered low. Additionally, the review of archives at the Denver Museum of Natural History did not reveal the

presence of either current or historical fossil collection sites within 24 km (15 miles) of the Project.

Soils. The Project would encompass approximately 1,821 hectares (4500 acres). Approximately 180 hectares (446 acres) of soils would be impacted during initial construction. Impact to the approximately 180 hectares (446 acres) would be temporary (during construction and prior to re-vegetation). Approximately 19 hectares (47 acres) would remain under roads, turbines, and facilities for the life-of-Project (assumed to be 30 years). Therefore, impacts to soils due to the Project would be either minor and temporary or minor and long term (approximately 1% of the entire Project footprint). Impacts would include soil loss through erosion, compaction, and loss of structure in soils that are disturbed or driven on during construction. All surfaces that are disturbed or compacted in areas not needed for operation would be re-graded, loosened and re-vegetated in accordance with landowner wishes or easement agreements.

Water Resources. There are no expected impacts to surface water on site as there are no surface water bodies in the Project area. Impacts to off-site surface water are expected to be minimal during construction and operation. Potential impacts to surface water quality include increased turbidity, salinity and sedimentation of surface waters due to runoff and erosion from disturbed areas. Accidental spills of petroleum products or other hazardous materials could also impact surface water quality. Indirect impacts could occur if the Project resulted in water depletions in the South Platte River. The Project would require the consumption of surface and/or ground water during construction (e.g. concrete for turbine pads and dust control) and operation/maintenance activities. The Project estimates a one-time need for less than 25 acre feet of water during construction. Water for concrete for foundations and for dust control would come from off-site existing municipal or private sources, likely from Fleming or Sterling, Colorado which may derive its water from surface water, groundwater or a combination of the two. Neither Sterling nor Fleming are members of the South Platte Water Related Activities Program, Inc. (SPWRAP), which is a Colorado component of the South Platte River Recovery Program, described below. As a result, the Project has provided a one-time payment to participate in SPWRAP to cover both the construction and the minimal ongoing operational water depletions from the project. Based on the relatively limited quantity needed, none of these sources would be required to increase water production to meet Project needs. The limited quantity required over the duration of the Project is not expected to infringe on existing water rights or to cause undue depletion of these sources. Impacts to water resources due to the proposed Project would short term and minor.

Vegetation. Based on a habitat assessment conducted in June 2008, the Project area consists of five major vegetation types: Agricultural; CRP land; Grassland; Shelterbelt; and Playa. Direct impacts to vegetation would include 180 hectares (446 acres) of temporary surface disturbance during construction and 19 hectares (47 acres) of permanent loss of habitat for roads, turbine foundations, and facilities for the life-of-Project. Since the permanent life-of-Project footprint (19 hectares [47 acres]) would be relatively small compared with the overall size of the Project area (over 1,619 hectares [4,000 acres]), amounting to one percent of the Project area, these direct, and long term impacts would be minimal. Permanent impacts to agricultural lands would be less than 0.04 hectares (0.1 acre). The Project would not impact any riparian vegetation, including the vegetation of playas or depressional wetlands, because no riparian vegetation

occurs within the Project footprint. All of the temporary disturbance areas would be reclaimed and revegetated.

Floodplains and Wetlands. Floodplains and wetlands are not located in the Project area and would not be impacted either by construction or operation of the Project.

Wildlife. Impacts to mammals, reptiles, and amphibians are expected to be minimal because the land is primarily agricultural and has been subjected to regular human activity from farming and ranching activities. Mammals are relatively mobile, amphibians and reptiles are a little less so, and, while mortality due to collisions with vehicles or during excavation is possible, these occurrences are anticipated to be infrequent. As with big game, the overall agricultural management system within the Project area already strongly influences forage/prey availability, therefore the short-term 180 hectares (446 acres) of loss of habitat (19 hectares [47 acres] over the life-of-Project) from the Project footprint would probably have a minimal effect on other mammals and reptiles. Birds may be directly impacted due to collisions with turbines, meteorological towers, overhead power lines, and substation structures and through both direct and effective habitat loss. Direct habitat loss is the footprint of habitat lost due to roads, turbine pads, etc. Effective habitat loss is the loss of use of the habitat as may occur due to disturbance such as human presence and noise. This occurs when animals avoid a buffer zone around a road or other man-made structure.. The potential impact of wind power development on birds is well-documented, but wind power-related mortality is low compared with other sources of bird mortality. Bats may be impacted due to collision-related mortality associated with operating wind turbines. Other wind projects are known to cause substantial bat mortality, especially during migration by tree-roosting species (hoary bat, red bat, and silver-haired bat). Because bats are not known to roost in the area and no Federal or state-listed threatened, endangered, proposed, or candidate (TEP or C) species are anticipated to occur, impacts to bats may not be significant. However, the three migratory tree-roosting bats likely migrate through the Project area and thus may be at risk. Bat acoustical monitoring is being conducted in the fall and spring on the CHW Project site and would serve to determine whether this Project site is in a migratory pathway for the hoary bat, red bat, and silver-haired bat. The project is in general conformance with state and Federal recommendations for avoiding and minimizing impacts to wildlife from wind turbines. Coordination with FWS and CDOW resulted in letters outlining desirable approaches and mitigation for protection of wildlife resources. The layout and Project schedule presented for the wind farm and associated turbines reflects this coordination with the agencies. Activities for surface occupation and timelines impacted by construction are consistent with agency requirements for timing restrictions and activity buffers. The resulting impacts to wildlife due to the proposed Project would result from both long and short term effects on their habitats including vegetation impacts, human disturbance and the construction, operation and maintenance of the project. Overall impacts are expected to be minor.

Special Status Species No Federal TEP or C plant species are expected to occur in Logan County, and the State of Colorado has no listed plant species or communities. No habitat for pallid sturgeon, interior least tern, piping plover, or whooping crane occurs in the Project area, but these species are of concern because water depletions in the South Platte River may affect the species and/or critical habitat downstream. The pallid sturgeon and least tern do not occur in the Project area. The piping plover and the whooping crane are unlikely to occur in the Project area

and there is no breeding or nesting habitat, critical habitat or suitable habitat for them on the Project site. The installed Project facilities would not affect these species.

Indirect impacts to listed species could occur if the Project resulted in water depletions in the South Platte River. The Project estimated a one-time use of less than 25 acre-feet of water during construction. During the Operations and Maintenance phases, the Project estimates that there will be ongoing need for water. Impacts from such water uses will be addressed by CHW's participation in the Federally-approved Platte River Recovery Implementation Program, under the SPWRAP one time use certification and annual membership options. The Project may, if feasible, install an on-site well that would tap groundwater for minor ongoing operational needs, which would also be covered by the SPWRAP.

The project is expected have low to no impacts on state-listed species, including plains sharp-tailed grouse, American peregrine falcon, bald eagle, burrowing owl, greater sandhill crane, long-billed curlew, mountain plover, western yellow-billed cuckoo, black-tailed prairie dog, swift fox, and yellow mud turtle. Impacts to ferruginous hawks are expected to be low. Post-construction monitoring would be conducted to determine if ferruginous hawk mortality is occurring. For these species discussed above, with impacts assessed as very low or unlikely, CHW would coordinate with CDOW and FWS. Should fatalities arise, CHW would cooperate with the agencies to find a feasible and appropriate solution.

Cultural Resources. The Project identified cultural sites in the Project area that require management action during construction and operation of the Project. One Historic site will be further evaluated in coordination with the State Historic Preservation Officer (SHPO). Impacts to cultural resources will be minimized through avoidance and compliance with Federal protection requirements. If unexpected resources are discovered during construction, activities will cease in the area of the discovery and the Project will consult with the SHPO. The Project commits to supporting Western with completion of consultation under Section 106 of the National Historic Preservation Act.

Land Use, Recreation and Transportation. The Project would result in the initial disturbance of approximately 180 hectares (446 acres) and life-of-project disturbance of 19 hectares (47 acres). Land use within the Project area is primarily undeveloped with uses such as agricultural, grazing, native prairies and CRP land. There is limited residential development in the Project area. These existing land uses would continue, as they currently exist prior to development, with only minor long term impacts. There would be minor loss of land use under permanent structures and roads affecting grazing, agriculture activities would be more difficult around towers and transmission structures and minor loss of CRP land and prairie would occur.
There are no state or National Parks, Wild and Scenic rivers or other areas of recreational, scenic or aesthetic importance in the Project area.

Traffic would increase on the roads leading to and within the Project area during the construction stage, as equipment and materials are transported into the area. Large pieces of equipment such as rotor blades that are oversized loads may temporarily slow traffic on U.S. Highway 6 and some county roads as they are moved into the Project area. This additional heavy traffic would also cause additional wear on existing roads, but transportation would be conducted in

accordance with Colorado Department of Transportation regulations and therefore adverse impacts to roads are not anticipated. The increase in traffic would not cause a major change in the transportation network in the Project area. Impacts to land use, transportation and recreation due to the Proposed Project would be short term and minor. Some land use impacts would be long term but minor. Transportation impacts would be short term and are expected to be minor. Impacts to recreation, especially in the form of hunting may be long term but are expected to be minor.

All recreational land uses would continue as they are prior to development, with the possible exception of hunting, which would be precluded in the vicinity of wind turbines due to the potential for damage of transformers and other facilities by ammunition fired during hunting. This may have a minor effect on a landowner's income, as well as the recreational use of the area by hunters, the income impacts would be more than offset by the rent paid by CHW. The reduction in hunting opportunity would be insignificant.

Public Health and Safety. Public access to private lands is already restricted by landowners and would continue to be restricted in accordance with easement agreements. This would prohibit members of the general public from accessing the wind farm facility located on private property. Existing safety hazards would include traffic on county roads, potential for fires, possible accidents related to agricultural and recreational activities, and electric and magnetic (electromagnetic) fields. The Project team would consist of qualified contractors and subcontractors who employ trained and competent personnel. All contractors, subcontractors and their personnel are required to comply with all state and Federal worker safety requirements, specifically all of the applicable requirements of the Occupational Safety and Health Administration (OSHA). There is good, improved access to the Project area via the County Road system from the State Highways and Interstate Highways. Traffic in the area of the Project site is generally limited to local residents and visitors as there is little reason for non-residents to be traveling in the Project area. Traffic accidents and interference with local school buses or emergency vehicles are not anticipated to be likely impacts due to the fact that the county roads in the Project area are not heavily used as a result of the sparse population in the general area. There is only one school bus that uses the area and the likelihood that emergency vehicles utilize the road is low. The potential for fire or explosion from the wind energy facility is minimal. The electrical effects of the proposed 115-kV transmission line can be characterized as current-induced magnetic fields and voltage-induced electrical fields. There are no Federal or Colorado State standards governing electric or magnetic fields. Local aircraft or radar or television signals within the area can be impacted by EMF produced by electrical equipment and transmission lines. The Project area is not located in the vicinity of a local or regional airport or a military air base. In the event that the Project results in impact to radar, microwave, television or radio transmissions, CHW would work with the owner of the impacted communication system to resolve the problem.

Noise. Construction noise would exceed ambient noise levels and may be heard for some distance within the Project area. Truck traffic, heavy equipment and possibly foundation excavation (or the unlikely possibility of blasting) would cause elevated noise levels at and near construction sites.

The closest active raptor nest is approximately 541 meters (1,776 feet) to the closest turbine (Turbine 7) and the nearest residence is over 280 meters (920 feet) to the closest turbine (Turbine 65, west). Consequently, wind turbine noise levels would be on the order of 40 A-weighted decibels (dBA), similar to rural night-time ambient noise levels. Generally, the sound of the wind will mask turbine noise, especially since turbines only operate when wind speeds reach a certain threshold. CHW would use state-of-the-art turbines that have been designed to minimize noise levels (e.g., upwind rotors, thinner blade tips, streamlined towers and nacelles). Wind turbine and substation noise would be at or below ambient levels at the nearest residences. Due to the temporary and intermittent nature of noise effects and the presence of similar noise sources within the Project area, noise impacts to residents and wildlife would be minor.

Visual Resources. The Project Site is visible from U.S. Hwy 6 and from County Roads. The Wildhorse Creek Switchyard would be visible in the foreground at the intersection of U.S. Hwy 6 and CR 87. The Project transmission line would be visible as it crosses U.S. Hwy 6 to interconnect with the Wildhorse Creek Switchyard. The proposed Project would not impact any national or state parks or designated scenic areas with recognized regionally important viewsheds. U.S. Highway 6 is located approximately 4 miles south of the Project wind site and runs just north of the proposed Wildhorse Creek Switchyard. Several county roads traverse the area generally on section lines. This area of eastern Colorado is home to numerous wind turbines and the site of wind farms in the area is common. There are reportedly 339 wind turbines in the county already (Logan County). The visual elements of the proposed Project area are quite common in northeastern Colorado. The substation, access roads, overhead power lines, vehicles and dust during construction would impact visual resources. The Collector Substation located along County Road 85, between County Roads 42 and 44 would be viewed most frequently by local landowners, and it would represent an industrial facility in a rural landscape. All power connections within the Project area (from the individual turbines to the Collector Substation) would be placed underground and would not result in an adverse effect on visual resources. The only overhead transmission line associated specifically with the Project would be the approximately 5-mile long interconnection line from the Project southward to the Wildhorse Creek Switchyard located adjacent to State Highway 6. The construction of an additional 19 miles of access roads to the turbines would constitute a minor increase in the number of roads (County and private) in the Project area.

All structures more than 61 meters (200 feet) tall must have aircraft warning lights in accordance with requirements specified by the Federal Aviation Administration (FAA) (AWEA 2004a). However, in the case of wind power developments, it will allow a strategic lighting plan that provides complete conspicuity to aviators but does not require lighting every turbine. The lights would be installed on the nacelle prior to lifting the nacelle onto the turbine tower. In order to meet FAA requirements, CHW plans to light perimeter wind turbine generators along with the highest elevation turbine.

Socioeconomics. No new community or county infrastructure would be required to support Project construction or O&M. The Project would generate sales and use taxes for goods and services purchased during construction and operation. It also would provide property taxes to the town of Fleming and to Logan County. The Project would employ an estimated 150 workers during construction and would create 8-10 permanent O&M jobs. All of these impacts would be

beneficial to the affected towns/cities, to Logan County and to the state of Colorado. Logan County and the City of Fleming are low income communities in the area of potential effect, but the Project is expected to generate revenue needed by the county and the city, so no adverse effects to low income communities would occur. Furthermore, the Project would generate revenue for the private landowners on whose land the Project is located, further benefiting the area's economy.

Cumulative Impacts. No significant cumulative impacts are identified.

Unavoidable Adverse Effects. Unavoidable adverse effects – residual impacts that likely would remain after mitigation – would include the following:

- The consumption of fossil fuels and water and labor and materials would be expended during construction and to a much lesser extent, during operation (e.g., fuel for O&M vehicles, energy to heat O&M building). This would be offset by renewable energy produced through wind rather than consumption of fossil fuel.
- Some damage to, or illegal collection of, paleontological or cultural resources may occur during construction.
- Up to 180 hectares (446 acres) of soil and vegetation disturbance would occur, resulting in some soil loss and some stream sedimentation, until surface disturbed areas are successfully reclaimed (271 hectares [670 acres]). Up to 19 hectares (47 acres) of vegetation would be lost for the life-of-Project.
- Some additional emissions of fugitive dust, sulfur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide and volatile organic compounds would occur, mostly during construction of the Project.
- Some wildlife mortality could occur during construction (e.g. vehicle related accidents) and during operation.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACSR	Aluminum conductor steel reinforced (conductor designation)
AD	*Anno Domini* ("in the year of our Lord"
AM	Amplitude Modulated
AMNH	American Museum of Natural History
ANSI	American National Standards Institute
APCD	Air Pollution Control Division
AQD	Air Quality Division
ASTM	American Society for Testing and Materials
ATV	All-terrain vehicle
AWEA	American Wind Energy Association
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
C.F.R.	*Code of Federal Regulations*
CAA	Clean Air Act
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CGS	Colorado Geological Society
CHW	Colorado Highlands Wind
CNDIS	Colorado Natural Diversity Information Source
CNHP	Colorado Natural Heritage Program
CO	Carbon Monoxide
Corps	U.S. Army Corps of Engineers
CRP	Conservation Reserve Program
CU	Colorado University
CWA	Clean Water Act
DAU	Data Analysis Unit
dBA	Decibels
dBuV/m	Decibels above one microvolt per meter
DMNH	Denver Museum of Natural History
DMNS	Denver Museum of Nature & Science
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EMI	Electromagnetic interference
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Association
FM	Frequency modulated
FONSI	Findings of No Significant Impact
FR	*Federal Regulations*
FWS	U.S. Fish and Wildlife Service

GIS	Geographical Information Systems
GLO	General Land Office
GMU	Game Management Unit
gpm	Gallons per minute
GPS	Global positioning system
IEEE	Institute for Electrical and Electronic Engineers
IPCEA	Insulated Power Cables Engineers Association
KOP	Key Observation Point
kV	Kilovolt(s)
kV/m	Kilovolts per meter
MBTA	Migratory Bird Treaty Act
MM	Modified Mercalli Intensity
MP	Milepost
mph	Miles per hour
MVA	Megavoltampere (line capacity)
MVAR	Megavoltampere reactive (line capacity)
MW	Megawatt(s)
NAAQS	National Ambient Air Quality Standards
NEMA	National Electrical Manufacturer's Association
NEPA	*National Environmental Policy Act*
NESC	National Electrical Safety Code
NETA	National Electrical Testing Association
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWCC	National Wind Coordinating Committee
NWI	National Wetlands Inventory
OAHP	Office of Archaeology and Historic Preservation
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PDEIS	Preliminary Draft Environmental Impact Statement
PM	Particulate matter
ppb	Parts per billion
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PFYC	Probable Fossil Yield Classification
REA	Rural Electric Association
RMP	Resource Management Plan
ROW	Right of Way
RV	Recreational Vehicle
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SEO	Colorado State Engineers Office
SHPO	State Historic Preservation Office

SIP	State Implementation Plans
SPCC	Spill Prevention, Control and Countermeasures Plan
SR	State Route or State Highway
SWA	State Wildlife Area
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and endangered
TCP	Traditional Cultural Property
TEP or C	Threatened, endangered, proposed, or candidate
TVI	Television interference
UBC	Unified Building Code
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
V	Volt(s)
V/m	Volts per meter
VRM	Visual Resources Management
WAPA	Western Area Power Administration
WECC	Western Electricity Coordinating Council
WEP	Wind Energy Prototypes
Western	Western Area Power Administration
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
WUS	Waters of the U.S.

1.0 PURPOSE AND NEED

1.1 Introduction

Wind Energy Prototypes, LLC (WEP), submitted an interconnection request in January 2005 to the U.S. Department of Energy (DOE), Western Area Power Administration (Western) to interconnect the proposed Colorado Highlands Wind Project (Project or CHW Project) to the existing Sterling-Frenchman Creek 115-kV transmission line. Colorado Highlands Wind, LLC (CHW) acquired all interest of WEP in the Project in June 2008. The Project is located approximately 5.8 kilometers (3.6 miles) northeast of the town of Fleming in east central Logan County, Colorado (Figure 1.1). The Project area encompasses approximately 1,821 hectares (4,500 acres) of agricultural land.

The National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] 1500-1508) establish procedures that ensure environmental information is available to decision makers, regulatory agencies, and the public before implementation of Federal actions. Western is the lead Federal agency for compliance with the NEPA. The DOE NEPA Implementing Procedures (10 CFR 1021) require that an EA be prepared for contracts for the addition of new generation resources, such as the proposed CHW Project, of 50 average megawatts or less.

This EA identifies and analyzes the consequences of Western's proposed action and alternatives and the CHW Project on the human and natural environment and suggests mitigation strategies for potential adverse impacts. The EA is not a decision document, but an information document, written in plain language to inform the public and decision makers regarding the environmental effects of the proposed action. Western will use this EA to decide whether to prepare an Environmental Impact Statement (EIS) or to issue a Finding of No Significant Impact (FONSI). Scientific studies and other verified background information used to support this EA are incorporated by reference and summarized in the document.

Western is a Federal agency under the U.S. Department of Energy that markets and transmits wholesale electrical power from 56 Federal hydropower plants and one coal-fired plant. Western sells about 40 percent of regional hydroelectric generation in a service area that covers 1.3 million square miles in 15 states. To provide this reliable electric power to most of the western half of the United States, Western markets and transmits about 10,000 megawatts of hydropower across an integrated 17,000-circuit mile, high voltage transmission system. Customers include municipalities, cooperative, public utility and irrigation districts, Federal and state agencies, Native American tribes, investor-owned utilities (only one of which has an allocation of Federal hydropower from Western) and marketers. They, in turn, provide retail electric service to millions of consumers in Arizona, California, Colorado, Iowa, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas, Utah and Wyoming. Electric power marketed by Western is generated by the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, and the U.S. State Department's International Boundary and Water Commission (Western 2006).

1.2 Purpose and Need

1.2.1 Western's Purpose and Need

Western is required to respond to Wind Energy Prototype, LLC's application for interconnection submitted in January 2005 to interconnect the proposed wind energy Project with Western's transmission system. CHW acquired the Project from WEP in June 2008. Western adopted an Open Access Transmission Tariff for its transmission system, which is generally consistent with the Federal Energy Regulatory Commission's *pro forma* open access tariff. Under Western's tariff, procedures for new interconnections to Western's transmission system apply to all eligible customers, consistent with all Western requirements and subject to environmental review under NEPA and other applicable laws. In responding to the request, Western must apply the terms and conditions of its Open Access Transmission Tariff and Interconnection Guidelines in considering that request.

NEPA requires Federal decision-makers to consider the environmental effects of their actions. The agency responsible for complying with NEPA for this proposed action is Western. Western's decision is limited to deciding if the specific wind Project proposed by the applicant can be interconnected with Western's transmission system. Western's approval of this interconnection would enable the Colorado Highlands Wind Project to proceed. Because Westerns' action would enable the Project, Western is required to analyze the potential environmental effects associated with the construction, operation and maintenance of all project-related facilities regardless of ownership.

1.2.2 CHW Purpose and Need

The primary purpose of the Colorado Highlands Wind Project is to provide wind-generated electricity from a site in Colorado to further the objectives of the President's National Energy Policy to diversify energy sources by making greater use of non-hydroelectric renewable sources such as wind power (National Energy Policy Development Group 2001) and to meet customer demand for competitively priced energy from renewable resources.

1.3 Public Scoping

Public and regulatory agency involvement is critical in analyzing the proposed Colorado Highlands Wind Project. During the early stages of the Project planning, CHW notified stakeholders of the Project and solicited information on their concerns. Every landowner was personally contacted about the Project and CHW has entered into Option Agreements for easements with landowners in the Project Area for the purposes of construction and operation of the wind turbines, as well as the interconnection transmission line.

On April 11, 2008, Western and CHW sent notices to the public announcing Western's decision to prepare an environmental assessment, to request comments on Western's proposal to approve the interconnection request and on the CHW Project. The notice was sent to affected landowners, adjacent landowners, state and local government agencies and officials. Comments received

from the public were considered in this EA. Persons requesting copies of the EA will receive copies for review during the public comment period.

The CHW project team and Western met with the Colorado Division of Wildlife, U.S Fish and Wildlife Service, Colorado State Historic Preservation Office and Logan County to discuss specific issues for the development of the site.

Consultation with Native American tribes occurred through written correspondence to the Rosebud Sioux Tribal Council, the Eastern Shoshone Tribe, the Northern Arapaho Tribe, the Ute Tribe, the Northern Cheyenne Tribe, the Oglala Lakota Nation, the Standing Rock Sioux, the Crow Tribe, and the Shoshone-Bannock Tribes. Western arranged for representatives of the Northern Cheyenne Tribe to visit the site at their request.

CHW held a public meeting on Tuesday September 30, 2008 at the Northeastern Junior College in Sterling, Colorado where representatives from Western and the CHW project team were available to meet with interested members of the public to discuss the environmental assessment activities and the project in general. Approximately 50 people were in attendance and were supportive of the Project.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Western's Proposed Action

Western's proposed action is to approve the CHW interconnection request. Approval of the request would enable CHWP to proceed; denial of the request would not allow the Project to proceed. The description of the CHW Proposed Wind Project in the following sections describes each of the project features and includes standard mitigation actions to reduce environmental impacts. Western would need to construct, operate and maintain a switchyard (the Wildhorse Creek Switchyard) at the point of interconnection of the Project facilities with Western's existing Sterling-Frenchman Creek 115-kV transmission line. Western's facilities are described below along with CHW project facilities and their impacts are described along with the impacts of the Project.

2.2 Description of the Proposed Action

2.2.1 Overview of the Project

The proposed Project would include sixty (60) General Electric (GE) 1.5 megawatt (MW) SLE wind turbines with a total Project output nameplate capacity of ninety (90) MW of renewable energy. Due to the wind regime at the site, the average MW output is considerably less. The GE 1.5MW SLE wind turbine is a monopole tower design with an 80-meter hub height and a 77-meter rotor diameter. Total maximum blade tip height for the GE 1.5MW SLE wind turbine is 117.5 meters (385 feet). Figure 2.1 illustrates the proposed distribution of monopole towers in the Project area. Seven alternate locations have been proposed in the event that certain of the initial locations are not viable during Project implementation.

At the Project site support facilities would include a Collector Substation and an Operations and Maintenance facility. A system of internal collector cables that transmit electricity from each turbine to the Collector Substation is planned as 34.5-kV, with a step-up to 115-kV at the Collector Substation. The Collector Substation would have an approximate footprint of 1 acre. The Operations and Maintenance building would be warehouse/garage-type construction and the facility would have an approximate footprint of 1-2 acres. The locations for the Collector Substation and the Wildhorse Creek Switchyard are illustrated on Figure 2.1. The Operations and Maintenance facility would be located adjacent to the Collector Substation. The detailed design of the support facilities is currently in process by CHW. Western would construct the Wildhorse Creek Switchyard to connect the Project's new overhead 115-kV transmission line with Western's existing Sterling-Frenchman Creek transmission line. The Wildhorse Creek Switchyard would be constructed south of US Highway 6 near the intersection with CR 87 and would be constructed on approximately 6 acres. The layout of the Wildhorse Creek Switchyard is provided in Figure 2.2.

The Project footprint (i.e., the area to be disturbed during construction and throughout the 30-year life-of-Project) would be limited to the areas immediately adjacent to turbines, access roads, and other facilities (Table 2.1).

Table 2.1 Estimated Surface Disturbance Acreage

Disturbance Type	Initial Disturbance (acres)	Life-of-Project Disturbances (acres)
Turbine assembly areas/pads[1]	300	0.2
Turbine string corridors (collection line trenches and access roads)[2]	81	37
Other access roads (outside turbine corridors)[3]	8	4
Collection line trenches (outside turbine corridors)[4]	1.5	0
Crane paths[5]	0	0
Overhead collection lines[6]	36	<0.01
O&M Building	2	2
Collector Substation	1	1
Wildhorse Creek Switchyard	6	3
Temporary Concrete Batching Plant	10	0
TOTAL	446	47

[1] Assumes a 5 acre assembly area during construction and a 15 m (48 foot) octagonal foundation with only 5 m (15-foot) diameter foundation extending to grade; assumes 60 1.5MW turbines.
[2] Assumes approximately 30 km (19 miles of corridors), approximately 10 m (35 ft) wide during construction, reclaimed to approximately 5 m (16 ft) wide for the life-of-Project.
[3] Assumes conservatively that approximately 3 km (2 miles) of additional access roads outside of turbine corridors, approximately 10 m (35 ft) wide during construction, reclaimed to approximately 5 m (16 ft) wide for the life-of-Project.
[4] Assumes approximately 5 km (3 miles) of collection line trenches outside turbine corridors, up to approximately 1.25 m (4 ft) wide during construction, completely reclaimed for the life-of-Project.
[5] Crane paths would not be constructed but would result from the overland passage of the large crane over the roads constructed for the Project.
[6] Assumes approximately 10 km (6 miles) of overhead transmission line, approximately 7.6 m (50 ft) wide during construction, reclaimed for pole locations for life-of-Project (98 poles spaced at approximately 100 m (325 ft) apart each occupying 0.6x0.6 m (2 ft x 2 ft – 0.009 acre).

2.2.2 Construction

The specific requirements of construction are site dependant. Construction of the Project would involve the following major actions:

- Establishing site access;
- Grading the sites;

- Constructing lay-down areas and an on-site road system;
- Removing vegetation from construction and lay down areas (for fire safety);
- Installing a concrete batch plant;
- Excavating for tower foundations;
- Installing tower foundations;
- Erecting towers;
- Installing nacelles and rotors;
- Installing permanent meteorological towers (as necessary);
- Constructing electrical substations;
- Constructing transmission lines;
- Interconnecting towers, a control building, meteorological towers and substations with power-conducting cables and signal cables;
- Constructing Operations and Maintenance building; and
- Performing start-up and testing.

Additional activities may include constructing a temporary office and sanitary facilities.

2.2.2.1 Site Access, Clearing and Grade Alterations

Access roads would be constructed in accordance with landowner easement agreements and would be constructed to withstand the expected weights of the trucks transporting turbine components and the construction and lifting equipment that would be used during construction. Roads would be located to minimize disturbance and maximize transportation efficiency and to avoid sensitive resources and steep topography. An estimated 30.5 km (19 miles) of new access roads would be required for the Project (see Figure 2.1 and Table 2.1).

Roads would be built and maintained to provide safe operating conditions at all times. The minimum full surfaced travel-way width would be approximately 5 m (16 feet); overall surface disturbance could be up to approximately 10 m (35 feet) wide (see Table 2.1 and Figure 2.1). Disturbance width may increase in steeper areas due to cuts and fills necessary to construct and stabilize roads on slopes. The combination of turning clearance requirements and maximum grade (maximum grade becomes a critical road design parameter due to the anticipated weight of the turbine components and electrical transformers that would be brought to the site) would guide road layout.

Topsoil removed during new road construction would be stockpiled within road easements. Topsoil would be re-spread on cut-and-fill slopes and these areas would be reclaimed in accordance with easement agreements.

During construction and O&M of the wind Project, traffic on the Project site would be restricted to the roads developed for the Project (i.e., no off-road vehicle traffic permitted). Use of unimproved roads would be restricted to the roads developed for the Project and would be restricted to emergency situations. Speed limits would be restricted to 15 mph to ensure safe and efficient traffic flow. Signs would be placed along the roads, as necessary, to identify speed limits, travel restrictions, and other standard traffic control information.

2.2.2.2 Foundation Excavations and Installations

A geotechnical investigation was performed to establish foundation specifications for each of the towers (CTL Thompson 2008). The subsurface conditions varied across the Project site. The borings at each of the preliminary turbine locations penetrated from ground surface to nearly 15 m (48 feet) of wind-blown clean to silty sand over silty gravelly sand and sandy clay from the Ogallala formation. Occasional thin caliche-cemented lenses of sandy clay were interlayered with the silty to gravelly sand and clay. According to CTL Thompson, the medium dense to very dense silty to gravelly sand and very stiff clay has comparatively good support characteristics for the proposed wind turbine structures.

The preliminary design of the structures includes an approximate 15 m (48-foot) diameter octagonal-shaped footing. The footings would be founded approximately 2.3 m (7.5 feet) below the final grade of the ground surface. The turbine foundation would weigh approximately 790 metric tons (870 tons) and the total weight of the foundation plus structure would be approximately 999 metric tons (1,100 tons).

Three different foundation designs were recommended depending on the site-specific ground conditions and generally includes:

- Spread foundation on native soil;
- Spread foundation on improved ground; and
- Deep foundation.

Based on the variable nature and depths of the soils at the Project site, a thorough open excavation observation would be performed at each wind turbine location prior to forming for foundations. It is anticipated that an area of 2 hectares (5 acres) would be disturbed at each turbine location for material and equipment lay-down and access. An allowable bearing pressure of 14,646 kg/square meter (3,000 psf) is recommended for foundations to be supported on firm native soil with an allowable increment of 33% for short term loading. Ground improvement options presented in the report include over excavation and replacement with structural fill, dynamic compaction and use of stone columns. For deep foundations, the use of driven piles was recommended in the geotechnical report.

The project estimates that a one time use of less than 25 acre-feet of water would be needed during the construction phase of the Project. This includes approximately 0.05 acre-feet of water would be used to produce concrete for each turbine foundation, for approximately 3.2 acre-feet for all turbines. Approximately 12.3 acre-feet of water would be used for soil compaction for roads, crane pads, foundations and substations. Approximately 7.09 acre-feet of water would be used for dust suppression. Water for concrete for foundations, soil compaction and for dust control would come from off-site existing municipal or private sources, likely from Fleming or Sterling, Colorado which may derive its water from surface water, groundwater or a combination of the two. Once the concrete has cured (nominally 28 days), the excavation would be backfilled with the excavated materials. While this would accommodate much of the volume of the

material initially excavated, some excavated material would remain and would need to be redistributed on the site.

Throughout the period of foundation installation, precipitation that accumulates within the open excavations would need to be removed and would be covered under the Stormwater Management Plan.

A temporary concrete batching plant would be constructed within the Project area as haul distances from existing concrete plants are excessive. The concrete components (aggregate, sand and cement) would be hauled to the on-site batching plant. Electrical power for the batching plant would be provided by a temporary connection to area power lines. The land area required for a batching plant and aggregate material storage areas are typically on the order of 10 acres or less. Similar to the equipment lay-down areas, surface vegetation would need to be removed, some regrading of surface soils might be required, and soils are expected to be heavily compacted as a result of batching plant activities, including associated truck traffic.

Foundations for the O&M Building and any other on-site material storage buildings, if necessary, as well as pads for each electrical transformer, may be placed concurrent with tower foundation construction. On-site buildings would be of modest proportion and require only slab-on-grade foundations augmented by frost-resistant perimeter footings.

The batching plant and any excess concrete constituents would be removed at the end of the concrete placing phase and may be recycled or otherwise used on other projects by the construction contractor.

2.2.2.3 Tower Erection and Nacelle and Rotor Installation

Typically the same lifting equipment would be used for tower erection and for nacelle and rotor installations. The cranes would operate in the planned 2 hectares (5 acre) area around each turbine location and would move between tower locations on the roads constructed for the Project. Gravel and rock likely would need to be placed on the areas around the planned tower locations to support the weight of the crane and to provide all-weather access in the areas that the crane would operate. Turbine towers would be anchor-bolted to concrete foundations. Towers for the CHW Project would arrive on site in segments (typically, segments would be no longer than 20 m [66 ft] in length) and would be welded/bolted together as the tower is erected. The nacelles would contain an already assembled drive-train. The hub and blades would be installed on the nacelle. It is anticipated that very small amounts of paints, lubricants and grease would be used during installation.

2.2.2.4 Miscellaneous Ancillary Construction

Additional construction activities would include the installation of electric transformers and substations and power-conducting cables and signal wires. Power cables would be connected from each turbine to the Collector Substation. Five or more separate circuits are planned to be connected to the Collector Substation. Underground electrical and communications cables would be placed in approximately 1 m (2- to 4- ft) wide trenches along the length of each turbine

string corridor. The proposed circuits for connecting the turbines to the Collector Substation are indicated on Figure 2.1. Trenches would be excavated to below frost line to a depth of approximately 4 feet, and electric distribution and communications cables would be placed in the trench using trucks. Trenches for electrical distribution/collection and communications cables would be installed using conventional excavation and backfilling procedures or using a "plow" method which excavates a narrow trench and installs the cable in one complete process. Trenches would be re-vegetated concurrently with re-vegetation of other disturbed areas.

Most of the Project's electrical and communications systems would be installed underground. However, some overhead collection lines would be installed near the Collector Substation and from the Collector Substation to the Interconnect Substation located at the intersection with US Route 6 approximately 10 km (six miles) to the south. All overhead collection lines would be installed in conformance with Western's standards, the National Electric Safety Code, the American National Standards Institute and Suggested Practices for Raptor Protection on Power Lines – the State of the Art in 1996 (Avian Power Line Interaction Committee 1996). Wooden poles with 14- to 17-m (45- to 55-ft) installed height would be erected to the substation. Temporary disturbance would average 15 m (50 ft) and all disturbance would be confined to the 40 m (130-ft) easement.

Conventional construction methods are expected to be sufficient for the Collector Substation, Wildhorse Creek Switchyard and the pad-mount transformers at the base of each WTG. In general, at each location, the ground vegetation would be cleared, the land re-graded and rock or gravel would be placed over the entire area to ensure drainage. The Collector Substation would be constructed on the Project site. Wildhorse Creek Switchyard would be constructed on private land at the junction of the Project power line and Western's 115- kV transmission line, at the corner of CR 87 and US Highway 6 (Figure 2.1). The Switchyard would house transformers and other facilities to step up medium voltage power from the wind Project's 34.5 kV power lines to high voltage for delivery to the 115-kV transmission line. The Switchyard would be constructed on a 6-acre parcel within an approximately 90 m (300 feet) by 122 m (400 feet) fenced area. The Switchyard would be fenced with a 2 m (7.0-ft) high chain-link fence toped with three strands of barbed wire, for a total fence height of 2.4 m (8.0 ft). A control house and communication tower would be located within the fences switchyard. Access gates would be locked at all times and warning signs would be posted for public safety.

One or more grounding rods may be installed for electrical safety at each of the facilities. Alternatively, a metal grounding grid or metal net may be installed over the entire footprint of the Switchyard and Substation. These grounding features would also provide for lightning grounding. Each turbine tower would have similar lightning grounding needs. Either ground rods, grounding grids, or, if necessary, grounding wells would need to be installed for each tower. Concrete pads would be installed for the transformers installed at the base of each WTG. The transformers would be sealed. Transformer bushings, switches, capacitors and other dielectric fluid-containing electrical devices would be mineral-oil-based dielectric oils with no polychlorinated biphenyls (PCBs).

2.2.2.5 Final Testing

Start up and testing would involve mechanical, electrical and communications inspections to ensure that all systems are working properly. Performance testing would be conducted by qualified windpower technicians and would include checks of each wind turbine and the control system prior to final turbine commissioning. Electrical tests of the wind Project components (i.e., turbines, transformers and collection systems) and the substation would be performed by qualified electricians to ensure that all electrical equipment is operational within industry and manufacturer's tolerances and is installed in accordance with design specifications. All installations and inspections would be in compliance with applicable codes and standards, including:

- National Electrical Safety Code (NESC);
- National Electrical Manufacturer's Association (NEMA);
- American Society for Testing and Materials (ASTM);
- Institute for Electrical and Electronic Engineers (IEEE);
- National Electrical Testing Association (NETA);
- American National Standards Institute (ANSI);
- State and Local Codes and Ordinances;
- Insulated Power Cables Engineers Association (IPCEA); and
- Occupational Safety and Health Administration (OSHA) Part 1910, Subpart S, 1910.308.

2.2.3 Public Access and Safety

A potential public safety issue is unauthorized or illegal access to the Project facilities and the potential for members of the pubic to attempt to climb towers, open electrical panels or encounter other hazards. Public access to private lands is already restricted by landowners and would continue to be restricted in accordance with easement agreements. The substations and any other critical equipment would be fenced as required for public safety, but no other fencing is proposed at this time within the Project area.

All structures more than 61 m (200 ft) tall must have aircraft warning lights in accordance with requirements specified by the Federal Aviation Administration (FAA) (AWEA 2004a). However, in the case of wind power developments, it will allow a strategic lighting plan that provides complete visibility to aviators but does not require lighting every turbine. The lights would be installed on the nacelle prior to lifting the nacelle onto the turbine tower. In order to meet FAA requirements, CHW plans to light all perimeter wind turbine generators along with the highest turbine. Due to the planned distribution of turbines at the Project, CHW estimates 45 turbines would be lighted.

Dry vegetation and high winds may combine to cause a potential fire hazard around the Project. All fires would be extinguished immediately by CHW personnel if there is no danger to life or personal safety, and the appropriate landowner and the county sheriff's department would be notified immediately. Some fire-fighting equipment would be located in vehicles and in the O&M Building. If the fire cannot be extinguished by CHW personnel, the landowner and sheriff

would be so advised. Fire deterrents with the wind Project would include access roads, which may serve as fire breaks and regular clearing of vegetation from areas around transformers, towers and the substations.

Safety signing would be posted around all towers (where necessary), transformers and other high-voltage facilities, and along roads in conformance with applicable state and Federal regulations.

2.2.4 Operations and Maintenance

CHW would operate and maintain the wind Project upon completion. All turbines, collection and communications lines, substations and transmission lines would be operated in a safe manner according to standard industry operation procedures. Routine maintenance of the turbines would be necessary to maximize performance and identify potential problems or maintenance issues. Each turbine would be remotely monitored daily to ensure operations are proceeding efficiently. Any problems would be reported immediately to O&M personnel, who would perform both routine maintenance and most major repairs. Most servicing would be performed up-tower, without using a crane to remove the turbine from the tower. In addition, all roads, pads and trenched areas would be regularly inspected and maintained to minimize erosion.

Access roads would be maintained during O&M to keep the roads in good passable condition free of ruts, washouts, holes, etc. Roads would be inspected during each site visit and any problem areas noted for future maintenance and subsequently repaired as needed. Road maintenance requirements would be based on weather conditions and usage. Maintenance would be performed to maintain roads in a condition acceptable to the County (for county roads) and the landowners (for private roads). All fuels and/or hazardous materials would be properly stored during transportation and at the Project site. All on-site personnel would be instructed in good housekeeping practices in order to keep the job site clean in a sanitary and safe condition. Workers would be expected to respect the property rights of private landowners.

2.2.5 Work Force

Construction of the 90-MW Project would create approximately 150 jobs and would last approximately 6 months. Construction crews would likely work 10- or 12-hour work days, six days per week depending on the weather. The Project team would consist of qualified contractors and subcontractors who employ trained and competent personnel. All contractors, subcontractors and their personnel are required to comply with all state and Federal worker safety requirements, specifically all of the applicable requirements of the Occupational Safety and Health Administration (OSHA). Each contractor would be required to provide a site specific health and safety plan as required by Part 1910 – Occupational Safety and Health Standards. In addition, due to the multiple employers that would have employees on site, safety would be coordinated on a Project-wide basis through activity-specific hazard assessments and Job Safety Assessments (JSAs).

O&M would require estimated 8 to 10 full-time personnel.

2.2.6 Traffic

A variety of transportation operations are necessary to support wind energy development. The majority of transportation operations would involve material and equipment transported to the site during the construction phase. In general, the heavy equipment and materials needed for site access, site preparation, and foundation construction are typical of road construction projects and do not pose unique transportation considerations. The types of heavy equipment required would include bulldozers, graders, excavators, front-end loaders, compactors and dump trucks. Typically, the equipment would be transported to the site by flatbed combination truck and most would remain on site through the duration of construction activities. Typical construction materials hauled to the site would include gravel, rock, sand and water, which are generally available locally. Ready-mix concrete might also be transported to the site, if available, but would likely be batched on site. The movement of equipment and materials to the site during construction would cause a relatively short-term increase in the traffic levels on local roadways during the construction period. Transportation of materials such as gravel, concrete and water would not be expected to significantly affect local primary and secondary road networks.

The delivery of the erection cranes and wind turbine generators could affect traffic temporarily due to the size of the crane and turbine tower components and blades. However, the delivery of the oversized equipment and WTG components would be intermittent and cause only temporary traffic delays

Construction of wind Project facilities would occur simultaneously, using single vehicles for multiple tasks. The average number of daily vehicle trips to the site would vary, but would be on the order of 75vehicles, while the number of vehicles actually working on site would be on the order of 20.

During normal O&M, traffic to and on the site would be limited and infrequent and include three to five four-wheel drive pickup trucks. During both construction and O&M, CHW and its contractors would use water, as necessary, to control dust from traffic on the Project site roads located on private property. Snow removal equipment (pickup trucks equipped with wing-style blades) would be utilized as needed during winter.

2.2.7 Water Use

Water would be used in the construction of the turbine tower foundations and the substation foundations and for dust control during construction. For construction of the 90-MW Project, the Project estimated that less than 25 acre-feet of water would be required as described above. Most of this water use would occur during the approximate 6-month construction period. Minimal, if any, dust control is anticipated during the O&M phase of the Project.

Small amounts of water are used to clean wind turbine rotor blades in arid climates (where rainfall does not keep the blades clean). The purpose of blade cleaning is to eliminate dust and insect buildup, which otherwise deforms the shape of the airfoil and degrades performance. Water usage for cleaning is as low as 0.004 liters (0.001 gallons) per kWh (AWEA, undated). It is estimated that up to 2,000 gallons of water per year would be used to clean the wind turbine

rotor blades. In addition, the Project estimated water usage would be on the order of 375 gallons per day during the O&M phase. If feasible, the Project may install an on-site groundwater well, the depletions from which would be covered and mitigated by the Project's membership in the SPWRAP, as described above.

2.2.8 Hazardous Materials

Hazardous materials are not anticipated to be used or stored on site with the exception of chemical constituents contained in fuels (gasoline and diesel fuel), coolants (ethylene glycol), and lubricants (oils and greases). CHW and its contractors would comply with all applicable hazard communication and hazardous materials laws and regulations regarding these chemicals and would implement a Spill Prevention, Control and Countermeasure Plan (SPCC Plan) as necessary. In addition, CHW would comply with all applicable Federal and state regulations regarding notices to Federal and local emergency response authorities and development of applicable emergency response plans, if required. To mitigate impacts from leaks of hazardous materials during on site storage, materials storage and dispensing areas, any fuels, coolants or lubricants storage would be equipped with secondary containment features in accordance with all applicable laws and regulations and appropriate engineering practice. Good housekeeping practices would be utilized during the duration of the Project. Vehicle refueling and minor maintenance would only be performed by trained and qualified personnel outside of any drainage areas.

2.2.9 Reclamation and Abandonment

Reclamation would be conducted on all temporarily-disturbed areas to comply with easement agreements and the Project's Stormwater Management Plan ("SWMP"). All temporarily-disturbed areas at the Project would be permanently stabilized by measures set forth in the SWMP which may include re-seeding, permanent matting, or pavement. The ultimate goal is to return the Project site to approximate pre-disturbance conditions.

Following construction, temporary work areas would be graded to match the pre-disturbance contours and the areas would be seeded with appropriate native seed blends to match or enhance the vegetative cover present prior to construction. Prior to development of the SWMP, CHW would consult with the local Natural Resources Conservation Service (NRCS) office for recommendations on appropriate vegetation options and obtain approval from the landowners to implement the recommended practices. Specific re-seeding requirements would be included in the SWMP. During and after construction, slopes would be stabilized as provided in the SWMP. Post-construction revegetation would include scarifying soils to reduce compaction, amending the soil as necessary and reseeding disturbed areas including portions of turbine pads not required for O&M, road cuts-and-fills, underground power line trenches and overhead power line routes. More than 90% of construction-related disturbance would be reclaimed upon construction completion. The Project would de-activate its stormwater management permit only after assuring that all silt fencing and other temporary sediment control measures have been removed from the Project site and assuring that all areas permanently stabilized by revegetation have re-grown to 70% of pre-disturbance individual plant density levels.

At the end of the Project estimated life (about 30 years), CHW would obtain any necessary authorization from the appropriate regulatory agency or landowners to abandon the wind Project and would again apply for a stormwater management permit to cover demolition and removal of Project-related improvements. Turbines, towers and transformers would be removed and recycled or disposed of at approved licensed facilities. Foundations would be abandoned in place to a depth of four feet below grade unless allowed to remain in place by the landowner. All private Project roads would be removed or, upon landowner request, revert to landowner control. Underground power and communication lines would be abandoned in place; overhead power lines and poles would be removed. Reclamation procedures would be similar to reclamation measures used to permanently stabilize temporarily-disturbed soils and would be based on site-specific requirements and techniques commonly employed at the time. This EA does not address the potential that the Project could be re-powered (i.e., new or refurbished turbines could be installed after the life-of-Project). Additional environmental analysis and permitting would be required if the site is not abandoned as currently proposed.

2.2.10 Western's Standard Construction, Operation and Maintenance Practices

CHW proposes to implement Western's standard construction, operation and maintenance practices, where applicable, to avoid and minimize impacts to the environment to the extent practicable (Table 2.2). These measures are part of CHW's proposed Project and Western's Proposed Action and is considered in this EA's impact analysis.

Table 2.2 Western Standard Construction Project Practices and Mitigation

Mitigation Action Identifier	Mitigation Action
GEN-1	The construction contractor shall limit the movement of crews and equipment to the ROW, including access routes. The contractor shall limit movement on the ROW to minimize damage to residential yards, grazing land, crops, orchards, and property, and shall avoid damage to property. The construction contractor shall coordinate with the landowners to avoid impacting the normal function of irrigation devices and other agricultural operations during Project construction.
GEN-2	When weather and ground conditions permit, the construction contractor shall obliterate all construction caused deep ruts that are hazardous to farming operations and to movement of equipment. Ruts shall be leveled, filled and graded, or otherwise eliminated as approved by Western. Ruts, scars, and compacted soils in hay meadows, alfalfa fields, pastures, and cultivated productive lands shall have the soil loosened and leveled by scarifying, harrowing, disking, or other approved methods. Damage to ditches, tile drains, terraces, roads, and other features of the land shall be corrected. At the end of each construction season and before final acceptance of the work in these agricultural areas, all ruts shall be obliterated, and all trails and areas that are hard-packed as a result of construction operations shall be loosened and leveled. The land and facilities shall be restored as nearly as practicable to the original grade condition.

Table 2.2 Western Standard Construction Project Practices and Mitigation

Mitigation Action Identifier	Mitigation Action
EROSION-1	Water turnoff bars or small terraces shall be constructed across all ROW trails on hillsides to prevent water erosion and to facilitate natural re-vegetation on the trails.
ENV-1	The construction contractor and Western shall comply with all Federal, state, and local environmental laws, orders and regulations. Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural and environmental resources. To assist in this effort, the construction contract would address: a) Federal and state laws regarding antiquities and plants and wildlife, including disturbance, collection and removal; and b) the importance of these resources and the purpose and need to protect them.
ENV- 2	The construction contractor shall exercise care to preserve the natural landscape. Construction activities shall be conducted to minimize scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, approved construction roads, or excavation operations, vegetation shall be preserved and shall be protected from damage by the contractor's construction operations and equipment.
VEG-3	On completion of the work, all work areas except access trails shall be scarified or left in a condition that would facilitate natural re-vegetation (unless reseeding, mulching or other specific requirements apply), provide for proper drainage, and prevent erosion. All destruction, scarring, damage, or defacing of the landscape resulting from the contractor's operations shall be repaired by the contractor.
GEN-3	Construction trails not required for maintenance access shall be restored to the original contour and be left in a state acceptable to the landowner. The surfaces of these construction trails shall be scarified as needed to provide conditions that would facilitate natural re-vegetation, provide for proper drainage, and prevent erosion.
GEN-4	Construction staging areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On abandonment, all storage and construction materials and debris shall be removed from the site. The area shall be re-graded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that would facilitate natural re-vegetation, provide for proper drainage, and prevent erosion.
GEN-5	Borrow pits shall be excavated so that water would not collect and stand therein. Before being abandoned, the sides of borrow pits shall be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance. Piles of excess soil or other borrow shall be shaped to provide a natural appearance.
WASTE-1	Construction activities shall be performed by methods that prevent accidental spills of solid matter, liquids, contaminants, debris, and other pollutants and wastes into flowing streams or dry water courses, lakes, playas, and underground water sources. These pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution (temperature change in local water bodies).

Table 2.2 Western Standard Construction Project Practices and Mitigation

Mitigation Action Identifier	Mitigation Action
WATER-1	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or water courses would not be performed without prior notice to appropriate state agencies and compliance with applicable NPDES requirements.
WATER -2	Excavated material or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines, or other water course perimeters where they could be washed away by high water or storm runoff or can in any way encroach upon the actual water source itself. As required by state agencies, the contractor shall comply with all NPDES requirements and obtain the appropriate permits.
WATER-3	Waste waters from construction operations shall not enter streams, water courses, or other surface waters without use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, filter fences, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates, or other approved methods. Any waste waters discharged into surface waters shall be essentially free of suspended material. These actions shall comply with all applicable NPDES permitting requirements.
AIR-1	The construction contractor shall use such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants. This includes particulates from soil disturbance and construction activities, excessive exhaust from internal combustion engines, etc.
AIR-2	Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, shall not be operated until corrective repairs or adjustments are made.
WASTE-2	Burning or burying of waste materials on the ROW or at the construction site is not allowed. The construction contractor shall remove all waste materials from the construction area. All materials resulting from the contractor's clearing operations shall be removed from the ROW and disposed of in accordance with applicable regulations.
GEN-6	The construction Contractor shall make all necessary provisions in conformance with safety requirements for maintaining the flow of public traffic and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic. At no time shall obstruction of emergency vehicles be permitted.
EMF-1	Western and the Project would design and include necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing a ROW, to the mutual satisfaction of the parties involved. Western and the Project would install fence grounds on all fences that cross or are parallel to the proposed line and in which induced currents are a potential problem.
WATER-4	Minimize activities in riparian areas or span riparian areas. Avoid disturbance to riparian vegetation whenever practical. Minimize the crossing of riparian areas with Equipment and vehicles during construction and maintenance activities.

Table 2.2 Western Standard Construction Project Practices and Mitigation

Mitigation Action Identifier	Mitigation Action
WILDLIFE-1	Western and the Project would design transmission lines in conformance with Suggested Practices for Protection of Raptors on Power lines (APLIC 1994) and Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006).

2.2.11 Applicant-committed Mitigation Measures

CHW proposes to implement the following mitigation measures to avoid, reduce or eliminate Project impacts related to CHW's Proposed Action. These mitigation measures may be waived on a case by case basis when deemed appropriate by Western after thorough analysis determines that the resource for which the measure was put in place would not be significantly impacted.

2.2.11.1 Fire Control

CHW would notify the appropriate landowners and the sheriff's office of any fires observed during construction. In the event of a fire, CHW or its contractors would initiate fire suppression actions in the work area. Suppression would continue until the fire is out or until the crew is relieved by an authorized representative of the landowner on whose land the fire occurred. Heavy equipment would not be used for fire suppression outside of the Project area without prior approval of the landowner unless there is imminent danger to life or property. CHW or its contractors would be responsible for all costs associated with the suppression of fires and the rehabilitation of fire damage resulting from its operations.

CHW would designate a representative to be in charge of fire control during construction. The fire representative would ensure that each construction crew has appropriate types and amounts of fire fighting tools and equipment, such as extinguishers, shovels, and axes available at all times. CHW would, at all times during construction and operation, require that satisfactory spark arresters be maintained on internal combustion engines.

2.2.11.2 Cultural Resources

A Class III cultural resource inventory has been completed on all lands that may be subjected to surface disturbance related to the proposed undertaking. Facilities that were inventoried include wind turbine pads, corridors for access roads and buried utilities, and an overhead transmission line corridor. CHW and its contractors would train their employees about Federal regulations relevant to protection of cultural resources. Any cultural resources (prehistoric or historic site or object) discovered by CHW or any person working on its behalf would be reported immediately to Western. All operations in the immediate vicinity of the discovery would be suspended at once, and the area would be secured with temporary fencing and/or flagging. Western would document and evaluate the discovery and would determine appropriate actions to be taken in

order to prevent the loss of significant cultural or scientific values. Western may consult with the Colorado State Historic Preservation Office (SHPO) to determine National Register of Historic Places eligibility or mitigation measures. CHW would be responsible for the cost of evaluation, and any decision as to proper mitigation measures would be made by Western after consulting with CHW. Operations in the vicinity of the discovery would not resume until written authorization to proceed has been received from Western.

2.2.11.3 Paleontological Resources

Any paleontological resource discovered by CHW or any person working on its behalf would be immediately reported to Western. Construction personnel would be instructed about the types of fossils that may be encountered and the steps to take if fossils are discovered during construction. Instruction would stress the nonrenewable nature of paleontological resources and that fossils are part of Colorado's prehistoric heritage and should be preserved for study. If paleontological resources are encountered, additional avoidance and mitigation measures are described in Section 3. While unlikely, if oversight is deemed necessary, monitors would also receive training in the identification of paleontological resources specific to the site.

2.2.11.4 Air Quality/Noise

All vehicles and construction equipment would be maintained to minimize exhaust emissions and would be properly muffled to minimize noise. Dust suppression using water or other approved material would be performed in disturbed areas, as required.

2.2.11.5 Vegetation

The following measures would be implemented to minimize impacts to vegetation.

- All surface-disturbed areas would be restored to the approximate original contour and reclaimed in accordance with the SWMP and landowner easement agreements.
- Procedures would be implemented to restore native prairie, including topsoil salvage and replacement.
- Removal or disturbance of vegetation would be minimized through site management to only that which is necessary for safe and efficient construction (e.g., by utilizing previously disturbed areas, designating limited equipment/ materials storage yards and staging areas, and scalping) and reclaiming all disturbed areas not required for operations.

2.2.11.6 Noxious Weeds

The following measures would be implemented to minimize impacts due to noxious weeds.

- All disturbed areas would be reclaimed with a native, or Conservation Reserve Program (CRP) vegetation if agricultural or CRP land, seed mixture at the first

practicable opportunity following disturbance in order to minimize the potential for noxious weed invasion.

- Weed-free seed mixtures and mulches would be utilized.
- Noxious weeds would be mechanically controlled if necessary in all surface-disturbed areas if determined to be a concern.
- If herbicides are needed to control weeds following reclamation, they would be applied by a licensed contractor in accordance with all applicable laws and requirements.
- Equipment would be washed at a commercial facility prior to being brought to the site and onsite during construction if weeds are encountered in the Project area.

2.2.11.7 Streams, Wetlands and Floodplains

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the United States. The Corps of Engineers and the EPA regard the use of mechanized earth-moving equipment to conduct land clearing, ditching, channelization, in-stream mining or other earth-moving activity in the United States as resulting in a discharge of dredged material unless Project-specific evidence shows that the activity results in only incidental fallback. No streams or wetlands are located within the Project footprint area; only overland surface drainage features (sheet flow) are present. In addition, there are no critical action (100 year) floodplains in the Project area. The use of heavy equipment would be required in these surface drainage areas. To minimize impacts from these activities, CHW would implement the following measures:

- Refueling and staging as well as the location of the temporary concrete batch plant would occur at least 91 m (300 feet) from any defined drainage feature.
- Sediment and erosion control measures would be utilized.
- Disturbance of vegetation would be limited to only that which is necessary for construction.

2.2.11.8 Soils

To minimize impacts to soils, the following measures would be implemented:

- Construction or routine maintenance would not be conducted when soil is too wet to adequately support construction equipment (i.e., if equipment creates excessive ruts).
- Silt fences, water bars, straw mulches (certified weed-free), hay bale barriers (certified weed-free), or other appropriate alternatives would be used to control soil erosion.
- Soil erosion control measures would be monitored, especially after storms, and would be repaired or replaced if needed.
- Surface disturbance would be limited to that which is necessary for safe and efficient construction.
- All disturbed areas would be restored to the approximate pre-construction conditions and restored in accordance with the SWMP and landowner easement agreements.

- Construction activities in areas of moderate to steep slopes would be avoided where possible.

2.2.11.9 Wildlife

The following measures would be implemented to minimize impacts to wildlife.

- CHW would adhere to Colorado Division of Wildlife (CDOW) and U.S. Fish and Wildlife Service (FWS) guidelines as agreed to in our letter to the CDOW dated July 18, 2008, in addition to the Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines (FWS 2003), letters received from both the CDOW and FWS as provided in Appendix A and the numerous meetings and discussions held with staff from both agencies.
- Surface occupancy (i.e. structures) and surface-disturbing activities would be prohibited as follows for the following species:
  - great horned owls - no surface occupancy within 402 m (0.25 mi) of nest; no construction within 805 m (0.5 mi) of nest from January 1 to July 15;
  - red-tailed hawk - no surface occupancy within 402 m (0.25 mi) of nest; no construction within 805 m (0.5 mi) of nest from February 15 to July 15;
  - Swainson's hawk - no surface occupancy within 402 m (0.25 mi) of nest; no construction within 805 m (0.5 mi) of nest from April 1 to July 15;
  - burrowing owl – no construction within 46 m (150 feet) of an active nest area from March 1 through October 31; and
  - greater prairie chicken lek – no surface structures or overhead construction within 805 m (0.5 mi) of lek.
- Additional mitigation for raptors would be designed on a site-specific basis, as necessary, in consultation with the FWS and CDOW. CHW would notify the FWS or CDOW immediately if raptors are found nesting on Project facilities (i.e., power poles, towers).
- Power line construction would follow the recommendations of the Avian Power Line Interaction Committee (APLIC 2006) to avoid electrocution of raptors and other avifauna.
- CHW would minimize noise, prohibit hunting, fishing, dogs, or possession of firearms by its employees and its designated contractor(s) in the Project area during construction, operation, and maintenance.
- Surface disturbance would be avoided or minimized in areas of high wildlife value (e.g., prairie dog colonies, playas, shelterbelts, and stock ponds).
- Potential increases in poaching would be minimized through employee and contractor education regarding wildlife laws. If violations are discovered, the offending employee or contractor would be disciplined and may be dismissed by CHW and/or prosecuted by the CDOW.
- CHW would set and enforce speed limits on roads to minimize wildlife mortality due to vehicle collisions, travel would be restricted to designated roads; no off-road travel would be allowed except in emergencies.
- Where practical, CHW would use state-of-the-art wind turbines and wind industry standard practices.

- CHW would conduct raptor nest searches and avoid activities in buffer areas around active nests. The raptor nest searches would be conducted monthly in February and March, and every two weeks from April through July. These searches coincide with other ongoing surveys (winter raptor surveys, spring avian surveys, etc.).
- CHW would minimize surface disturbance and conduct prompt reclamation, including restoration of shortgrass prairie.
- CHW would use best management practices to minimize erosion and harm from spills.
- CHW would conduct post-construction mortality monitoring (for both avian and bat species) in accordance with National Wind Coordinating Committee recommendations. If unacceptable avian mortality occurs, as determined by Western, mitigation would be developed in accordance with current best management practices.

If other species are found nesting in the Project area, CDOW or FWS recommended standard buffer would be applied unless otherwise approved by these agencies. The buffer distance and restriction dates may vary on a case-by-case basis as determined by the FWS or CDOW, depending on such factors as the activity status of the nest, species involved, natural topographic barriers, line-of-sight distances, and other conflicting issues such as cultural values. Exceptions may be granted in writing by the FWS and/or CDOW.

2.2.11.10 Federally Listed Threatened, Endangered, Proposed and Candidate Species and State-listed Threatened and Endangered Species

The following measures would be implemented to minimize impacts to raptors and other Federal- and state-listed threatened, endangered, proposed, or candidate (TEP or C) species or sensitive wildlife species.

- CHW would minimize surface disturbance and conduct prompt reclamation, including restoration of shortgrass prairie and use of best management practices to minimize erosion and harm from any spills that occur.
- CHW would minimize noise, and prohibit hunting, dogs, and possession of firearms by employees.
- CHW would set and enforce speed limits, and limit traffic to designated roads.
- Western would assist the Project in consultation and coordinate with FWS and CDOW for all mitigation activities related to TEP or C species, and their habitats.
- Raptor nest surveys would be conducted within a 1.6 km (1.0-mi) radius of proposed construction areas during the raptor nesting season (January 1 through July 31) to determine nest location, activity status, and, if possible, species prior to construction.

2.2.11.11 Sanitation

Good housekeeping practices would be utilized at all times and the construction site would be maintained in a sanitary condition. Waste materials (e.g., human waste, trash, garbage) would be

disposed of promptly at an appropriate permitted waste disposal site. CHW and its contractors would prohibit littering in the Project area.

2.2.11.12 Existing Utilities

CHW would notify other authorized easement users of any structures planned near existing utilities. Care would be taken, including hand/shovel excavation/air knife, etc. where appropriate, for all construction work that is located in the vicinity of existing subsurface utilities (e.g., pipelines, cables, power lines).

2.2.11.13 Miscellaneous

Ditches and Culverts

If encountered, all irrigation, overflow and roadway ditches; lead-offs from culverts or cut sections; and lead-in ditches that are intersected or crossed by the Project construction activities would be cleared of any material that may obstruct water flow. Work would be accomplished so that reasonable conformance to the previous line, grade, and cross section is achieved. If any culverts clog due to Project activities, the culvert would be cleaned to provide an unobstructed flow to and through the culvert. Any loose material on the backslope adjacent to the entrance of culverts would be removed.

Litter

Contractors would be instructed to maintain good housekeeping practices and would be informed that any littering in the Project area would not be tolerated and repeated infractions may result in their dismissal. Construction vehicles would be equipped with litter disposal containers. Garbage and other refuse would be disposed of at authorized disposal sites or permitted landfills. Construction sites would be maintained in a sanitary condition at all times.

Stormwater Management Plan

Stormwater Management Plans (SWMPs) are required for any construction Project with land disturbance of one acre or more. A SWMP would be prepared to ensure that erosion is minimized during storm events and it would be kept on site at all times, as well as in the construction contractor's offices. Routine inspections as mandated in the SWMP would be performed in accordance with the requirements of the County and the State government.

Traffic and Public Safety

Construction and operation are not expected to cause safety hazards or to inconvenience motorists or other adjacent users because construction-related traffic would be restricted to existing roads and routes constructed on private land. Temporary use permits for access to interstate, state and county roads would be obtained prior to construction. No traffic related or other public safety problems were encountered during construction of the existing wind Projects in Logan County with one minor exception. According to Mr. Allan Pierce, Under Sheriff for Logan County, there was a parking problem with large trucks parking in Sterling overnight in areas not equipped to handle overnight parking. However, the County worked out an arrangement for the trucks to park on a County road outside of town as long as the truck drivers remained with their trucks and left the safety flashers on (personal communication, September 4, 2008, with Mr. Allan Pierce, Under Sheriff of Logan County). The Project would fully cooperate with local ordinances and requirements to resolve similar issues, if they arise.

2.3 Alternatives Considered but Eliminated from Further Consideration

2.3.1 Alternative Turbine Locations

The Project proposed alternative turbine arrays in the Project Study area. Based on agency comments on potential resource impacts, particularly to raptor nests, and leks, alternative turbine arrays were designed and adopted as described above under the Proposed Project.

2.3.2 Alternative Project Generation Capacity

The Project originally approached Western with a proposal for a Project with 120 MW of capacity (Western Area Power Administration. December 2005. Wind Energy Prototypes, LLC. Fleming 120 MW Wind Farm System Impact Study.) The impact study showed that a 120 MW project would require expensive system upgrades to mitigate undesirable electrical system performance. The cost of these upgrades was unacceptable to the Project. Based on powerflow analysis, the maximum wind farm design to be considered and installed in this area for interconnection with Western's system was recommended at 90 MW, to avoid adverse effects on Western's 115-kV transmission system in the area. The 120 MW Proposal was dropped in favor of the 90 MW Project.

2.3.3. Alternative Electrical System Interconnections Facilities

Western prepared a facility study for 90 MW and 120 MW options (Western Area Power Administration. January 2007. Final Facilities Study, Wind Energy Prototypes, Fleming Wind Farm; Wildhorse Creek Substation.). The results of the study indicated that the 90 MW option would require the construction of the proposed Wildhorse Creek Switchyard and other relatively minor system modifications. The addition of 30 MW to reach the 120 MW option would require, in addition to the improvements under the 90 MW option, reconductoring of a transmission line and other expensive system changes that were cost prohibitive for the Project.

Summary: The Project described as the Proposed Project in this EA would be the more economically feasible and would likely result in fewer environmental impacts when compared to other construction alternatives. The Proposed Project minimizes the length of new transmission lines that would be built to get power from the Project to Western's transmission system. There are no additional new transmission lines or upgraded transmission lines that are needed to accommodate the Project.

2.3.4 Alternative Project Locations. Wind Project developers go through an extensive and expensive site characterization study and financial analysis to identify potentially economically feasible wind sites. A Wind Energy Developer may have identified many potential sites but one of the important limiting factors in site development is the availability of economical transmission to get the energy from the Project to a buyer. The combination of a suitable, developable site with good wind conditions, willing landowners, public acceptance, economic feasibility and relatively low environmental impacts narrows the opportunities for sites. The availability of economically feasible and accessible transmission further limits the development potential of these sites. This proponent-initiated Project is part of a discrete proposal for Western to consider under the requirements of its Tariff. No other alternative sites to the location of the Project are addressed in this EA.

2.4 No Action Alternative

Under the No Action Alternative, Western would not execute an interconnection agreement with CHW and the wind project would not be constructed and interconnected with Western's transmission system. Western's determination not to approve the interconnection request could make the proposed Project infeasible. CHW could continue to pursue the project by applying for interconnection with another transmission provider in the vicinity, however Western could not speculate on whether access to alternative transmission is a technically and economically feasible option for CHW. The electrical generation capacity of the project could change depending on the transmission capacity of the alternative transmission provider and other factors could make the Project infeasible. However, for the purposes of this EA, which discusses the potential impacts of Western's decision, the no action alternative is considered to result in the Project not being constructed and the environmental impacts associated with the Project would not occur.

2.5 Summary of Environmental Impacts

Table 2.3 presents a summary of environmental impacts and mitigation measures for the Proposed Action and the No Action Alternative. A detailed analysis of Project impacts and mitigation measures is provided in Chapter 3.

Table 2.3 Summary of Environmental Consequences

Resource	Possible Impacts from Proposed Action	Possible Impacts from No Action Alternative	Mitigation (includes mitigation measures discussed in Chapters 2.0 and 4.0)
Climate and Air Quality	Climate would not be impacted; temporary increases in fugitive dust during construction; long-term minor increases in fugitive dust during O&M; beneficial impacts to air quality from generating electricity from a non-polluting resource	Loss of beneficial impacts to air quality from generating electricity from a non-polluting resource	Dust suppression during construction; proper maintenance of construction equipment; proper site restoration and reclamation
Geology	No impacts to physiography; some direct long term changes in topography due to cuts and fills; negligible impacts to stream channels as none are located in immediate vicinity of the site; no impacts to geologic hazards or mineral resources	No impacts to physiography, topography, stream channels, geologic hazards or mineral resources	Avoid steep slopes; proper reclamation
Paleontology	Possible inadvertent destruction of fossils during construction	No impacts	Preconstruction survey for fossils; if a site is discovered, halt construction and evaluate for significance; determine treatment as appropriate; employee education.
Soils	Temporary disturbance of 180 hectares (446 acres); life-of-Project disturbance of 19 hectares (47 acres); minor short term erosion and soil compaction	No impacts	Avoid areas with high erosion potential where feasible; avoid activities when soils are too wet to support equipment; use of weed-free mulches, straw bales, silt fences and water bars to control erosion; design and construct Project roads properly; minimize disturbance; implement soil erosion best management practices until sites are permanently reclaimed; prompt stabilization and reclamation

Table 2.3 Summary of Environmental Consequences

Resource	Possible Impacts from Proposed Action	Possible Impacts from No Action Alternative	Mitigation (includes mitigation measures discussed in Chapters 2.0 and 4.0)
Water Resources	Some increased runoff and sediment would likely reach local drainages; accidental spills may occur; construction consumption of of water; negligible impacts to stream channels as none are located in immediate vicinity of site	No impacts	Avoid erosion prone areas; stabilize and reclaim promptly; appropriate road and turbine location design and maintenance; locating the concrete batch plant and refueling and staging areas at least 91 m (300 ft) from drainage features; utilize sediment control measures; adhere to SWMPs and SPCCPs
Floodplains and wetlands	No impacts	No impacts	No mitigation is warranted
Vegetation including Noxious Weeds	Initial disturbance of 180 hectares (446 acres) of vegetation; life-of-Project disturbance of 19 hectares (47 acres); potential for spread of non-native invasive species on surface disturbed areas	No impacts	Minimize surface disturbance; manage construction sites; control noxious weeds; wash equipment; use weed-free seed mixtures and mulches; revegetate with native, adapted species; implement procedures to restore native prairie, including topsoil salvage and replacement
Wildlife and fisheries	Direct effects from collision-related mortality or electrocution; direct and indirect effects from 180 hectares (446 acres) of temporary and 19 hectares (47 acres) of life-of-Project habitat loss; temporary displacement during construction; long-term displacement during operations; potential loss of breeding, nesting, and brood-rearing habitat; habitat fragmentation; inadvertent destruction of grassland bird nests; potential reduction in breeding and brood rearing success; no impacts to fisheries	No impacts	Adhere to CDOW and US FWS guidelines, as described in the July 18, 2008 letter; use state of the art wind turbine generators and wind industry standard practices; minimize noise; prohibit hunting, dogs and possession of firearms by employees; set and enforce speed limits; limit traffic to designated roads; conduct raptor nest search and avoid activities in buffer around active nests; minimize surface disturbance; prompt reclamation including restoration of shortgrass prairie; use best management practices to minimize erosion and harm from spills

Table 2.3 Summary of Environmental Consequences

Resource	Possible Impacts from Proposed Action	Possible Impacts from No Action Alternative	Mitigation (includes mitigation measures discussed in Chapters 2.0 and 4.0)
Special Status and Sensitive Species	Minor impacts to state-listed species; direct effects from collision-related mortality or electrocution; direct and indirect effects from 180 hectares (446 acres) of temporary and 19 hectares (47 acres) of life-of Project habitat loss; temporary displacement during construction; long-term displacement during operations; potential loss of breeding, nesting, and brood-rearing habitat; habitat fragmentation; inadvertent destruction of grassland bird nests; potential reduction in breeding and brood-rearing success.	No impacts	Adhere to CDOW and US FWS guidelines, where practical; use state-of-the-art turbines and wind industry standard practices; minimize noise; prohibit hunting, dogs, and possession of firearms by employees; set and enforce speed limits; limit traffic to designated roads; conduct raptor nest searches and avoid activities in buffer around active nests; minimize surface disturbance; prompt reclamation, including restoration of shortgrass prairie; best management practices to minimize erosion and harm from spills.
Cultural Resources	Some unidentified sites and artifacts may be disturbed or destroyed; beneficial impacts if significant cultural sites are discovered and recorded during construction	No impacts; potential loss of beneficial impacts	If a site is discovered, halt construction and evaluate for eligibility to National Register of Historical Places; determine treatment as appropriate; employee education
Land Use, Transportation, and Recreation	No change in land ownership; loss of about 19 hectares (47 acres) of life-of-Project cropland, rangeland, grazing land, wildlife habitat and recreation; increased traffic and increased wear-and-tear on existing roads; beneficial additional land use of generating electricity from a renewable resource	No impacts	Project-related traffic yields to emergency vehicles and the one school bus; repair roads that are impacted by Project activities; avoid heavy traffic when roads are too wet to support traffic without creating ruts greater and 4-inches deep
Noise	Temporary short-term construction related increases in noise; long-term turbine and substation noise and noise from O&M traffic	No impacts	Properly muffle all construction equipment; use state-of-the-art wind turbine generators to reduce noise emissions; avoid noise sensitive areas at critical times
Visual Resources	Change in landscape due to presence of tall towers and rotating blades and flashing lights; presence of substation and Project roads	No impacts	Adhere to FAA lighting requirements including but not limited to nighttime lighting and no lights during the day

Table 2.3 Summary of Environmental Consequences

Resource	Possible Impacts from Proposed Action	Possible Impacts from No Action Alternative	Mitigation (includes mitigation measures discussed in Chapters 2.0 and 4.0)
Socioeconomics	Temporary beneficial economic impacts to local and state economies during construction and operation; long term benefits due to increased employment and tax base; no environmental justice concerns; long-term royalty payments to landowners	Loss of beneficial impacts to local and state economies	Use local workers and contractors, where feasible; buy locally, where feasible
Hazardous Materials	Possible spills	No impacts	Implementation of appropriate spill prevention and control measures
Public Health and Safety	No impacts anticipated	No impacts	Light turbines in accordance with FAA requirements; fence high voltage facilities; maintain Project area in sanitary condition at all times; prohibit littering; set and enforce speed limits; extinguish fires unless dangerous to life or limb
Worker Health and Safety during Construction	Possible injuries during construction	No impacts	All qualified contractors, subcontractors and personnel required to follow all state and Federal regulations, specifically all requirements of OSHA, and ensure project-wide safety through activity-specific hazard assessments and Job Safety Assessments (JSAs)

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Descriptions of the natural, human and cultural environmental resources present in the Project area are presented below by resource. For the purposes of this analysis, the Project area for each resource includes all land within the Project boundary as shown on Figure 2.1 unless noted otherwise. Direct and indirect impacts of the Proposed Action and the No Action Alternative are identified for each resource. Where additional mitigation measures beyond the standard mitigation measures are recommended, they are specific to the affected resources and are discussed. Cumulative effects of the Project with other foreseeable past, present and future developments are disclosed at the end of this chapter.

This chapter describes the affected environment and environmental consequences of the proposed action and Project. Project impact areas are identified for resource topics to account for the areas that may be affected by the construction and operation of the project. Impacts are described according to whether the effects would be short-term or long-term, direct or indirect. Cumulative impacts of the project with other foreseeable past, present, and future development in the overall region are discussed at the end of this chapter. Each of these types of impacts is briefly defined below.

Direct Impacts. These impacts occur at the same time and the same place as the project. For example, soil compaction occurs during construction, and results directly from the activities occurring during the project.

Indirect Impacts. These impacts are not a direct result of the project, but may occur away from the original source of impact or as a result of a complex pathway. Indirect impacts are often called secondary impacts because there is typically one step in between the original source and its impact. For example, construction of a power plant (direct impact) leads to declines in coniferous forest health (indirect impact) due to increased pollution deposition.

Short-Term Impacts. These are impacts that generally occur only during construction or for a limited time thereafter, generally not for longer than 1 or 2 years. For example, air quality impacts from the use of heavy equipment occur during construction and intermittently during routine maintenance.

Long-Term Impacts. These are impacts that are expected to occur for the life of the project, or for more than two years after construction, dependent upon the resource. For example, a long-term impact to vegetation would include the removal of vegetation where a new structure is constructed, resulting in a long term loss of vegetation in that area.

Cumulative Impacts. These are the additive impacts to a resource by the Project to impacts from other actions in the project area. For example, surface water quality degradation from the project, plus all other unrelated construction projects, land uses, and other activities in the project area, contributing to an incremental decrease in surface water quality.

3.1 Climate and Air Quality

3.1.1 Environmental Setting for the Proposed Project

3.1.1.1 Climate

The climate of Logan County is semiarid continental. Because the county is separated from major sources of moisture by large distances and mountain ranges, its climate is characterized by low humidity, wide variations in precipitation and temperature and abundant sunshine.

Logan County is usually warm in summer with frequent hot days. The highest temperature occurs during July and August (Table 3.1). In winter, periods of very cold weather are caused by Arctic air moving in from the north or northeast. Cold periods alternate with milder periods that occur often when westerly winds are warmed as they move downslope. In winter, the average temperature is -2.5 degrees Celsius (27.5 degrees F) and the average daily minimum is -10.2 degrees Celsius (13.7 degrees F). In summer, the average temperature is 22 degrees Celsius (71 degrees F) and the average daily maximum is 30.2 degrees Celsius (86.3 degrees F) (USDA, 1977).

Most precipitation falls as rain during the warmer part of the year and is normally heaviest in late spring and early summer. Winter snowfalls are frequent, but snow cover usually disappears during mild periods. The mean annual precipitation in Logan County ranges from 33 cm (13 inches) in the western part to nearly 48 cm (19 inches) in the eastern part (Table 3.1). Most of the precipitation occurs during the growing season, commonly as thunderstorms.

Average seasonal snowfall is 76 cm (29.9 inches) (Table 3.1). Some years, blizzards with high winds and drifting snow occur in the county, and the snow remains on the ground for a few weeks.

The average relative humidity is mid-afternoon in spring is less than 45 percent; during the rest of the year is about 55 percent. Humidity is higher at night in all seasons, and the average at dawn is about 80 percent.

The prevailing direction of the wind is from the northwest. Average wind speed is 16 kilometers per hour (10 miles per hour). The highest average, 19 kilometers per hour (12 miles per hour), is in April.

Class 3 and 4 annual average wind power is found on the high plains and uplands of eastern Colorado and eastern New Mexico. Strong northerly and southerly winds in this area are usually associated with the intense surface pressure gradients that are prevalent during the winter and spring. Plains areas farther west that are within the sheltering influence of the Rocky Mountains and river drainages generally have less wind power. New site data throughout northeastern Colorado indicate an extensive area with class 4 annual average wind power. This is an upland region between the South Platte River to the north and the Arkansas River to the south. Seasonal average wind power over the upland plains of eastern Colorado and New Mexico ranges from a

maximum of class 4 and 5 in spring to a minimum of class 2 and 3 in summer (NREL, RRDC 1986).

The site is located in a Class IV wind area (National Renewable Energy Laboratory 2004); Class IV areas are defined as having good wind power development potential (Figure 3.1). Wind speeds at 50 m (164 feet) above ground average 26.7 to 28.5 kilometers per hour (16.6 to 17.7 miles per hour).

Table 3.1 Monthly Climate Summary for Sterling, Colorado

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Average Max Temperature[1]	38.8	44.5	49.4	61.3	71.7	82.3	89.0	87.5	77.0	66.0	50.2	40.7	63.2
Average Min Temperature[1]	10.8	16.5	22.0	32.7	43.9	53.1	58.2	56.0	45.1	34.0	22.1	13.7	34.0
Average Total Precipitation[2] (inches)	0.42	0.46	1.05	1.57	3.21	3.07	2.68	1.8	1.22	0.91	0.63	0.41	17.48
Average Total Snow Fall[2] (inches)	5.6	5.6	8.7	4.9	0.7	0.1	0.0	0.0	0.4	2.2	5.9	5.2	39.3
Average Snow Depth[2] (inches)	2	1	1	0	0	0	0	0	0	0	1	1	1

[1] – USDA, Soil Survey of Logan County, Period of Record from Sterling: 1951-1973

[2] – Western Regional Climate Center, Period of Record from Fleming: 4/1/1894-10/31/1998

3.1.1.2 Air Quality

Air quality changes over time as economic development occurs and regulatory programs affect the emissions from sources. The affected air environment can be characterized in terms of concentrations of the criteria pollutants carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), ozone (O_3) and lead (Pb). The EPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants. There are two standards for particulate matter, one for particulates less than 10 µm in diameter (PM_{10}) and one for particulates less than 2.5 µm in diameter ($PM_{2.5}$). One of the goals of air quality regulatory programs is to ensure that concentrations of pollutants in the air do not exceed these standards.

Areas where air quality exceeds the NAAQS are called nonattainment areas, and states must develop plans (called State Implementation Plans or SIPs) for attaining and maintaining the NAAQS. These plans generally include emissions reduction measures, such as limitation on stationary source emissions and work practice standards. The NAAQS establish maximum pollutant levels that should not be exceeded. The Prevention of Significant Deterioration (PSD) program limits the deterioration of existing air quality in areas with air cleaner than the NAAQS levels. This program establishes a baseline level of air quality and specifies increments that cap

the increases in pollutant levels above that baseline. The program applies to sulfur oxides, PM_{10} and NO_2 emitted by new or modified major sources. Smaller increments apply in special areas, such as National Parks and Wilderness Areas (Class I areas), than in other areas (Class II areas). An operating wind energy development Project would not be considered a major source.

According to the USEPA air quality division, air quality in the Project vicinity is designated as attainment for all criteria pollutants including sulfur dioxides, nitrogen oxides, particulate matter and ozone (USEPA 2008). Mobile and area sources from Front Range urban areas may impact the more rural areas in eastern Colorado. Other pollutant sources include the nine large power plants that operate within the airshed, oil and gas development, urbanization, agricultural activities, prescribed burning, dust and particulate emissions from roads, tailpipe emissions, and off-road vehicle traffic.

3.1.2 Environmental Impacts and Mitigation Measures

3.1.2.1 Significance Criteria

Impacts to air quality would be considered significant if emissions from construction would violate state or Federal air quality standards.

3.1.2.2 Impacts of the Proposed Project

Climate would not be impacted by the proposed Project (Keith et al. 2004).

Possible adverse impacts to air quality would occur during construction and operation due to short-term increases in particulates (e.g., dust from excavation and vehicle traffic) and tailpipe emissions from construction and operations vehicles.

During operation, the use of wind power instead of burning fossil fuels to generate electricity would have beneficial impacts on air quality because greenhouse gases and other pollutants emitted by conventional fossil fuel combustion would not be produced. The term "beneficial" is used to describe the favorable impact of using a nonpolluting resource to generate electricity; it does not reflect any proactive clean-up to improve air quality. Operation of the wind facility also would result in direct and short term impacts from small amounts of dust and tailpipe emissions from O&M vehicle traffic.

It is not anticipated that any state or Federal air quality standards would be exceeded due to the construction or operation of the Project. The Project is expected to be in compliance with National Ambient Air Quality Standards.

3.1.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, no dust or tailpipe emissions would occur due to Project construction or operation. Conversely, the opportunity to generate electricity using a non-polluting resource and potentially reduce, or not increase, overall greenhouse gas emissions would be lost.

3.1.2.4 Mitigation Measures

Mitigation for impacts to air quality would include the following:

- Dust abatement techniques (e.g., water spray) would be used on unpaved and un-vegetated surfaces to minimize dust emissions;
- CHW and its contractors would post and enforce a speed limit of 24 km/hr (15 mph) on roads developed for the Project to reduce fugitive dust emissions from traffic;
- Disturbed soils or construction material (e.g., concrete) would be covered if they become a source of fugitive dust;
- Disturbed areas would be reclaimed and re-vegetated as soon as possible after construction.

3.2 Geology, Paleontology and Soils

3.2.1 Environmental Setting for the Proposed Project

3.2.1.1 Geology

Regional Geology

Aquifers in the general Project area are present in geologic units that are varied and complex primarily because of extensive deformation of the Earth's crust associated with the uplift of the Rocky Mountains. Prior to the mountain-building uplifts, most of the area was covered by an extensive layer of sediments that had been deposited during the previous millions of years. These layers of sediment were gradually buried and altered to form layers of rock. Today, the Great Plains area of eastern Colorado and eastern New Mexico is still underlain by a relatively flat and undeformed sequence of these rocks.

The most recent uplift of the Rocky Mountains, which began about 70 million years ago, faulted, deformed, and elevated the land surface and the underlying ordered layers of rock. Faulting was prevalent, and a few faults developed more than 6.1 km (20,000 feet) of vertical offset. As uplift continued, erosion removed the uppermost rocks and, in some areas, exposed the underlying crystalline-rock core of the mountains. Today these older crystalline rocks form many of the principal mountain ranges in the area. Uplift of the Colorado Plateaus steepened stream gradients and accelerated the down-cutting of the Colorado River and its principal tributaries.

The northeastern Colorado region is underlain by a thick sequence of Quaternary and Tertiary clastic rocks. Information on these units was compiled from Scott (1978 and 1982), and Koenig (2002). Local geologic mapping by Scott (1978) suggests that only two of the regional geologic units crop out at the Project site: the Eolian Sand and Loess deposits, and the Ogallala Formation (Figure 3.2).

Site Specific Geology

Information regarding geologic conditions was obtained by CTL Thompson, Inc. as part of the geotechnical investigation for the individual wind turbine towers. The geology of the site was mapped by Glenn R. Scott (USGS Map I-1092, 1978). The South Platte River drainage system is located several miles north of the Project site. Soils at the Project site consist from ground surface to about 48 feet of eolian (wind-deposited) fine to medium grained silty sand over more consolidated gravelly sand and sandy clay. The eolian sand was likely deposited during the last interglacial period, less than 8,000 to 10,000 years ago. The eolian soil has relatively low density and can be subject to settlement when loaded. The underlying dense to very dense gravelly sand and clay consists of the upper part of the Ogallala formation. The Ogallala formation is a Miocene-age sedimentary unit deposited in braided streams about 2 to 5 million years ago. In the Project area the Ogallala formation is uncemented clayey sand with gravel and sandy clay, with a few thin lenses of caliche-cemented sandy clay or gravelly sand. The material behaves as a highly compact soil. The eolian sand was found to be relatively loose and generally unsuitable for foundation support while the fluvial deposits are dense or stiff and suitable for foundation support.

Groundwater was not encountered during the drilling of the 60 borings advanced to 15 to 18m (50 to 60 feet) below ground surface. Groundwater was also not encountered when the borings were checked several days later.

3.2.1.2 Paleontology

Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include, but are not limited to, mineralized, partially mineralized, or unmineralized skeletal material, soft tissues, shells, wood, leaf impressions, and footprints. Fossils are considered a non-renewable resource because they represent the remains of organisms that have been extinct for greater than 5,000 years.

The Society of Vertebrate Paleontology (SVP, 1995) categorizes geologic rock units into three sensitivity categories:

- High Potential Rating – Rock units that are known to have yielded vertebrate fossils within the region. This does not necessarily imply that vertebrate fossils will always be recovered from a High Potential-rated rock unit, but only that there are recorded occurrences within the unit.

- Moderate Potential Rating – A Moderate Potential rating is applied to rock units possessing some degree of potential, such as a favorable depositional environment or resource preservation or possessing characteristics of lithologically similar rock units in the region that have yielded vertebrate fossils

- Low Potential Rating – A Low Potential rating is applied to rock units containing lithologies that do not commonly preserve significant fossil resources (i.e., welded tuffs). Intrusive igneous rocks, such as granite, are precluded from

preservation of paleontological resources, due to their genesis within a magmatic environment.

To determine the paleontological sensitivity of the Project site, two main activities were undertaken: 1) review of published literature, documents, maps, and museum archives to determine the potential presence of paleontological resources at the Project site, and 2) performance of a field survey to determine the existence of high and moderately sensitive geologic rock units at the site. The following sections summarize the results of these activities.

Literature Review

The review included a review of literature published regionally by the Colorado Geological Survey (CGS), academically reviewed journal indexes, and national information published by the United States Geological Survey (USGS). Additionally, the Denver Museum of Natural History (DMNH) was contacted for a query of existing fossil localities near the site.

Eleven main rock units make up the Paleogene and Neogene stratigraphy in Northeastern Colorado. Then using the geologic and paleontological descriptions in the literature review, a paleontological sensitivity rating was ascribed. Of these rock units, only four had a high paleontological sensitivity and one had a moderate paleontological sensitivity. Furthermore, of all the rock units anticipated to be exposed or near the surface at the Project, all had a low paleontological sensitivity rating with the exception of the Miocene Ogallala Formation. Table 3.2 contains a list of Rock units found in eastern Colorado, and their respective paleontological sensitivities. Though there are other high paleontological sensitive rock units in the region, they were not observed during the site visit or are anticipated to be found within the subsurface at the site. Additionally, a review of Museum archives at the Denver Museum of Natural History revealed that there are no historical or active fossil collection sites within a 24 km (15 mile) radius of the Project site.

Though the literature review revealed a range of low to high potential for paleontological resources to be onsite, the outcrop and shallow subsurface existence of the Ogallala Formation suggests that there is a potential for site activities to contact paleontological resources.

In terms of this Project, a significant paleontological resource would be any vertebrate fossil that is identifiable, and would provide taphonomic, taxonomic, phylogenetic, ecologic, and/or stratigraphic information about the taxon it represents. Additionally, any other fossil found in association with a vertebrate fossil (such as a plant fossil) that would provide ecological, behavioral, and/or other information about the taxon it represents.

Table 3.2 Paleontological Sensitivity of Stratigraphic Units Found Near the Colorado Highlands Wind Project Area

Geologic Unit	Geologic Description	Geologic Age	Paleontological Sensitivity
Alluvium	Composed of alluvial deposits of two ages that are not mapped separately	Holocene	Moderate
Post/Piney Creek Alluvium	Yellowish-gray, loose gravel, sand, and silt. Clasts composed of quartz, feldspar, granite, gneiss, pegmatite and chert. Alluvium contains many vertebrate fossils.	Holocene	High
Eolian Sand	Pale-brown, yellowish-brown, or dark yellowish brown, locally silty, well-sorted loose wind-blown sand.	Holocene/ Pleistocene	Low
Broadway Alluvium	Yellowish-gray, stony, coarse sand along Timpas Creek.	Pleistocene	Moderate
Peoria Loess	Moderate yellowish brown, slightly clayey or fine sandy, blocky, non-stratified wind-blown calcareous silt.	Pleistocene	Low
Slocum Alluvium	Yellowish-brown, pebbly gravel 27 m (90 feet) above Arkansas River	Pleistocene	High
Rocky Flats Alluvium	Cobbly gravel and silty sand in terraces 64 and 104 m (210 and 340 feet) above the Arkansas River and its major tributaries.	Pleistocene	High
Ogallala Formation	Contains an upper pale-red or very pale orange, dense, pisolitic caliche layer; mortar beds; grayish-orange-pink, pebbly sand and silt firmly cemented by calcium carbonate or locally opal and forms many resistant ledges; nonconsolidated gravel is abundant; layers of light-brown and yellowish-gray silt; beds of silver-gray and of biotite-rich volcanic ash and fairly abundant vertebrate fossils.	Miocene	High
Arikee Formation	Fluvial deposit, gray to brown, moderately well consolidated conglomerate, sandstone, siltstone, and claystone, but also contains some gravel and sand.	Miocene	Low

Table 3.2 Paleontological Sensitivity of Stratigraphic Units Found Near the Fleming Wind Project Area

Geologic Unit	Geologic Description	Geologic Age	Paleontological Sensitivity
White River Group	Gray to pale-brown or reddish-brown, sandy to slightly clayey, ashy mica-bearing siltstone; light-gray, greenish-gray, light olive-gray, palebrown or dark yellowish-brown, olive-gray or yellowish-gray, hard silica-cemented, coarse- to medium-grained sandstone or conglomerate that forms resistant ledges and sinuous channels.	Oligocene	Low
Pierre Shale	Dark-gray marine, calcareous silty shale or claystone, shaly sandstone, and sandy shale	Cretaceous	Low

Field Survey

Surface mapping by Scott (1978) suggests that there is limited potential for shallow excavations to contact moderate or high-risk paleontological resource bearing rock units.

A site visit was performed on June 6, 2008 to assess the geologic mapping performed by Scott (1978), and to determine the existence and/outcrop of rock units that carry a high or moderate paleontological sensitivity. The site visit also provided additional geologic characterization the Project site with respect to the rock units encountered

The date of the field survey was performed after the preliminary turbine locations had been located and staked, and coincided with geotechnical drilling at the site. A conversation with drill rig geologists and observation of drilling activities at the site provided additional and valuable subsurface characterization information.

No fossils or other paleontological resources were observed during the site visit, however a highly sensitive geologic rock unit: the Miocene Ogallala formation was observed in outcrop at the site.

Rock Units exposed at the site

Two rock units were observed at the Project site. Exposures of Holocene Eolian Sand deposits (including active landforms) and the Miocene Ogallala formation were observed in outcrop and as poorly to well-developed soils at the Project site.

1. Holocene Eolian Sand (not formally named) - The Eolian sand consisted of light to medium-brown, fine-grained, well-sorted, sand and silt. Calcareous pedogenic soil development near the surface was observed at several distinct and separate

locations but was not prevalent across the site. The eolian sand forms dunes and low hills, though blowouts and some active dunes were observed. The geotechnical drilling revealed that within the Project area, the eolian sand is present to depths of 15 m (48 feet).

2. The Miocene Ogallala Formation – The Ogallala formation was primarily observed in pits and excavations near the intersection of County Road 46 and County Road 85, and along County road 42 near the southern portion of the Project site. Within excavations, the Ogallala formation consisted of pink-red and rust-brown loose and poorly indurated coarse sand and pebble conglomerates. It does not form any resistant ledges or resistive outcrop patterns. In mapped areas where there has been no sign of excavation, the Ogallala is distinguished by its coarse grain size, color, and grain composition.

3.2.1.3 Soils

Information regarding soil types in the vicinity of the site was obtained from the Soil Survey of Logan County, Colorado (USDA, 1977). Nine different soil types, all predominantly sandy material, occur within the Project area (Figure 3.3) and include:

- Bayard-Canyon complex, 1 to 9 percent slopes;
- Dailey loamy sand, 0 to 3 percent slopes;
- Dailey loamy sand, 3 to 9 percent slopes;
- Dailey loamy sand, thick surface;
- Haxtun loamy sand, 0 to 3 percent slopes;
- Haxtun loamy sand, 3 to 5 percent slopes;
- Julesburg loamy sand, 0 to 3 percent slopes;
- Julesburg loamy sand, 3 to 9 percent slopes; and
- Valent loamy sand, 3 to 15 percent slopes

These soils are used primarily for grazing, irrigated and non-irrigated cropland. However, due to the low available water capacity and limited precipitation, irrigation is typically required for any crop production. Table 3.3 provides a summary of the soil types and with a description of the permeability, surface runoff, water erosion hazard and soil blowing hazard.

Table 3.3 Soil Types Present in Project Area Footprint

Soil Type	Permeability	Surface Runoff	Water Erosion Hazard	Soil Blowing Hazard
Bayard	Rapid	Slow	Slow	Moderate
Canyon	Moderate	Moderate to Rapid	High	High
Dailey Loamy Sand, 0-3%	Rapid	Slow	Slight	Moderate

Table 3.3 Soil Types Present in Project Area Footprint

Soil Type	Permeability	Surface Runoff	Water Erosion Hazard	Soil Blowing Hazard
Dailey Loamy Sand, 3-9%	Rapid	Slow	Slight	Moderate
Dailey Loamy Sand, thick sur.	Rapid	Slow	Slight	Moderate
Haxtun Loamy Sand, 0-3%	Moderate	Slow	Slight	Moderate
Haxtun Loamy Sand, 3-5%	Moderate	Slow	Slight	Moderate
Julesburg Loamy Sand, 0-3%	Moderately Rapid	Slow	Slight	Moderate
Julesburg Loamy Sand, 3-9%	Moderately Rapid	Slow	Slight	Moderate
Valent Loamy Sand	Very Rapid	Slow	Slight	High

3.2.2 Environmental Impacts and Mitigation Measures

3.2.2.1 Significance Criteria

- Impacts associated with geologic features or soils would be considered significant if the Project negatively impacted the area's physiography or caused significant erosion.
- Impacts associated with geological features would be considered significant if undercutting or subsidence caused the collapse of a turbine.
- Impacts to mineral resources would be considered significant if economic extraction of mineral, petroleum or geologic resources are precluded.
- Impacts to paleontological resources would be considered significant if important paleontological resources are disturbed without appropriate scientific data discovery. Impacts to soils would be considered significant if highly erosive soils on moderate to steep slopes (15-20% slopes) are disturbed and cannot be stabilized to predisturbance conditions within five years or vegetative productivity is eliminated due to compaction caused by construction activities.

3.2.2.2 Impacts of the Proposed Project

Geology

The proposed Project would not impact the area's physiography. Minor impacts to topography would include temporary or permanent changes in the land surface and slope due to cut-and-fill activities required to excavate foundations and build roads. Any cut-and-fill areas that are not

needed for operations would be re-graded to the approximate original contour and reclaimed in accordance with landowner wishes. During construction and operation, erosion control measures would be undertaken and temporary drainage structures would be utilized including, but not limited to: ditches, culverts, waterbars, and/or check-dams to divert runoff around wind Project facilities, but overall drainage patterns would be preserved. As such, potential impacts to stream channel morphology would be minor for the 30-year life-of-Project.

Soils

Approximately 180 hectares (446 acres) of soils would be impacted during initial construction and approximately 19 hectares (47 acres) would remain under roads, turbines and facilities for the 30-year life-of-Project. Some of the soils are currently cultivated and are disturbed annually as they are tilled and used for agricultural production, although this is a relatively small percentage of the Site. Impacts to soils due to the Project would be either minor and temporary or minor and long-term (in Project footprint). Impacts would include soil loss through erosion, compaction and loss of structure in soils that are disturbed or driven on during construction. All surfaces that are disturbed or compacted in areas not needed for operation would be re-graded, loosened and re-vegetated in accordance with landowner wishes or easement agreements. Long-term impacts would occur where facilities are installed (e.g., along new roads and at tower sites). As the overall footprint of the Project is small relative to the size of the Project area, long-term impacts to soils would be minor.

Geologic Hazards

No geologic features are known to occur in the Project area that could cause turbine collapse. The eolian sands in the Project area would require the design of roads and turbine foundations that take into consideration the soil type.

Mineral Resources

There are currently no active mineral extraction operations in the Project area and they are not anticipated to occur in the future. Consequently, the Project would not impact mineral resources.

Paleontology

Direct impacts to fossils could include the inadvertent destruction of scientifically important fossils during excavation. The loss of scientifically important fossils would be an adverse effect. Overall, however, because the Project footprint is small (less than 180 hectares [446 acres] during construction) and no significant fossils were discovered during the field reconnaissance, the potential for loss of important fossils is considered low. Additionally, the review of archives at the Denver Museum of Natural History did not reveal the presence of either current or historical fossil collection sites within 24 km (15 miles) of the Project. Indirect impacts to paleontological resources could occur from the loss of important fossil materials due to private collection or vandalism of newly exposed areas. Employee education about the value of these resources would minimize any indirect effects. Beneficial impacts could result from the discovery and analysis of fossils during Project implementation. Due to the lateral

expansiveness and the thickness of the eolian sand throughout much of the site, it is unlikely that significant paleontological resources would be encountered during construction and maintenance operations at the site. The Ogallala formation is exposed in portions of Sections 17, 18, 90, and 20 T9N R48W, and Section 13 of T9N, R49W.

Road construction and the building of turbines and additional site activities would require shallow excavations into the subsurface. Because of this, avoidance and mitigation measures would be utilized. These measures have been designed to reduce the potential for impact to paleontological resources at the Project site.

3.2.2.3 Impacts of the No Action Alternative

No impacts to geology or mineral resources would occur under the No Action Alternative. No impacts to the Project from geologic hazards would occur. Impacts to paleontology and soils would continue at pre-existing levels due to agricultural activities that occur on a portion of the Project area.

3.2.2.4 Mitigation Measures

It is unlikely that significant paleontological resources would be encountered during construction and maintenance operations at the site. However, additional mitigation measures for avoidance and mitigation of paleontological resources are provided in the event they are encountered.

Paleontological Resources Avoidance Measures

- All construction personnel would be given training that would include instruction regarding what fossil resources may be encountered during construction. If oversight is deemed necessary, monitors would also receive training in the identification of paleontological resources specific to the site. The Project managers or other onsite oversight personnel may also receive additional instruction in fossil identification.

- The Term "Project Paleontologist" refers to the person who is qualified to identify and assess the resource value of fossils encountered during site activities. The Term "project manger" refers to person(s) who are in charge of conducting site activities (e.g. Construction Manager). The Term "Paleontological Monitor" refers to person(s) who have been trained by the Project Paleontologist to identify paleontological resources in the field. They may conduct oversight, and they would report findings to the Project Paleontologist.

- Construction personnel would be instructed that, if fossils are seen in areas when the Paleontologist Monitor is not present, the Paleontologist Monitor would immediately be notified, and the fossils would be avoided by further construction activities until a determination of the significance of the discovery can be made and a plan of action can be formulated.

- Construction personnel would also be instructed that excavation spoils surrounded by exclusion fencing or survey flagging are to be avoided under all circumstances, and that any intrusions into an exclusion zone by personnel or equipment other than under the direction of the Paleontologist Monitor are strictly prohibited.

- If the Paleontologist Monitor or Project Manager notes an unusually large number of fossils or an individual highly significant specimen being excavated or disturbed by earth-moving operations, he or she would immediately contact the Project Paleontologist. The Project Manager would temporarily halt construction activities until consultation with the Project Paleontologist to determine whether site-specific mitigation requirements are warranted.

- Depending on the specific circumstances, the mitigation procedure could either: move construction away from the fossil locality and return later to carefully excavate the fossil site under the direction of the Project Paleontologist; or in consultation with the Project Paleontologist excavate through the fossil site, destroying a portion of the site, and salvaging a representative collection of significant fossils from an adjoining portion of the site.

Other General Mitigation Measures

- In the event that paleontological resources are identified, a Paleontologist Monitor would monitor invasive site activities such as excavation work, drilling, road grading, etc. in the event that paleontological resources are identified. During excavation in stratigraphic units with fossil-bearing potential, the Paleontologist Monitor would examine freshly exposed surfaces. The Paleontologist Monitor would salvage significant fossils exposed during construction after consultation with the Project Paleontologist.

- Each significant salvaged fossil would be preliminarily identified to the lowest taxon possible by the Project Paleontologist before curation into a retrievable storage system. Specimens preserved in rock matrix would be prepared only sufficiently to provide a taxonomic identification.

- During Project construction, the Paleontological Monitor would prepare field reports that would be summarized by the Project Paleontologist into a brief report. In this summary report, the Project Paleontologist would briefly describe the results of the paleontological resource mitigation program during construction.

- During construction, if no fossil remains have been discovered after one-half of the excavations through any individual stratigraphic unit have been completed, then upon the recommendation of the Project Paleontologist, monitoring in that stratigraphic unit would be reduced or suspended entirely.

- In the event that paleontological resources are encountered, at the end of the Project, the Project Paleontologist would prepare a final report of findings that lists and places in a scientific perspective all significant salvaged materials.

3.3 Water Resources

3.3.1 Environmental Setting for the Proposed Project

Surface Water

Surface water drains from the Project area by sheet flow to the north, south, east and west depending on the location within the Project area. There are no defined drainage channels on the Project site and runoff only occurs as a result of snowmelt or precipitation (Figure 3.4). Unnamed tributaries to and Wildhorse Creek are located south and southeast of the Project site. The South Platte River and its unnamed tributaries are located north of the Project site. The area north of the Project site exhibits significant topographic grade changes between the Project site and the South Platte River. The Project site exhibits relatively minor grade changes across the site with an increase in grade changes on the northern portion of site.

The Project site is located within the South Platte Basin. The South Platte Basin (including the Republican River Basin) covers approximately 71,639 square kilometers (27,660 square miles) in northeast Colorado and drains 20 percent of the state of Colorado's land area. The basin is comprised of portions of 22 counties in the northeast corner of the state (Colorado Water Conservation Board 2002). The largest cities in the basin are Denver (population 560,882, Feb 2006), Aurora (population 287,216, Feb 2006), and Lakewood (population 144,150, Feb 2006). The topographic characteristics of the South Platte Basin are diverse. Elevations in the basin range from over 4,267 m (14,000 feet) at the headwaters near the Continental Divide to 1,036 m (3,400 feet) at the Colorado/Nebraska state line. The headwaters of the South Platte River originate at an elevation of about 3,505 m (11,500 feet) (Colorado Water Conservation Board 2006).

The Beneficial Use Water Quality Classification System is designed to implement the Colorado Water Quality Control Act and to ensure the suitability of Colorado's water for beneficial uses, including terrestrial and aquatic life, recreation, agriculture and water supply. Streams or stream segments, lakes and reservoirs can be classified for current or reasonably expected uses, and for uses for which the waters would become more suitable when a water quality goal is attained. All existing and classified uses are to be protected. The classifications are to be for the highest water quality, attainable through effluent limitations for point sources and through implementation of cost-effective and reasonable "best management practices" for non-point sources (CDPHE, 2008a). Table 3.4 displays the beneficial uses for streams in the Project area. The Project area lies within Region 1 in the Lower South Platte River Basin (CDPHE, 2008b).

Table 3.4 Colorado Designated Beneficial Uses for Streams in the Project Area		
Stream Segment Description	**Designation**	**Beneficial Use Classification**
All tributaries to the South Platte River, including all lakes, reservoirs and wetlands, from the Weld/Morgan County line to the Colorado/Nebraska border.	Use Protected	Aquatic Life Warm 2 Recreation 2 Agriculture

These beneficial uses have the following definitions:

Aquatic Life Warm 2: Waters that are not capable of sustaining a wide variety of warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

Recreation 2: These surface waters are not suitable or intended to become suitable for primary contact recreation uses, but are suitable or intended to become suitable for recreational uses on or about the water which are not included in the primary contact subcategory, including but not limited to wading, fishing and other streamside or lakeside recreation.

Agriculture: Waters that are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock.

The segment of South Platte River in the vicinity of the Project area is not listed on the Section 303(d) list water-quality-limited segments requiring TMDLs (CDPHE 2008c). However, the segment of the South Platte River from the Weld and Morgan County lines to the Colorado/Nebraska state line has also been identified on the Colorado Monitoring and Evaluation List (M&E List). This list was prepared as part of the effort to identify water bodies for which technology-based effluent limitations and other required controls are not stringent enough to implement water quality standards (those impaired waters requiring TMDLs). The parameter identified for monitoring and evaluation for the reach of the South Platte River in the vicinity of the Project area was listed as aquatic life use (CDPHE, 2008d).

Ground Water

The Great Plains Physiographic Province of the Central United States extends into eastern Colorado and New Mexico, where flat to rolling prairie with scattered hills and bluffs gradually rises westward to 1,524 to 2,134 m (5,000 to 7,000 feet) above sea level and abruptly gives way to the frontal ranges of the Rocky Mountains in the Southern Rocky Mountain and Basin and Range Physiographic Provinces. The South Platte River of the Missouri River system drains the eastern slope of northern Colorado.

The Project area is located within the High Plains aquifer of eastern Colorado and eastern New Mexico which is an aquifer system in unconsolidated sediments.

The High Plains aquifer underlies an area of about 450,660 square kilometers (174,000 square miles) that extends through parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. The aquifer is the principal source of water in one of the major agricultural areas of the United States. About 20 percent of the Nation's irrigated agricultural land overlies the High Plains aquifer, and about 30 percent of the ground water used for irrigation in the Nation is withdrawn from the High Plains aquifer. In 1980, about 17,800,000 acre-feet of water was withdrawn from the aquifer to irrigate about 5,261,100 hectares (13,000,000 acres) of cropland. The boundary of the aquifer approximates the boundary of the Great Plains Physiographic Province. The province is characterized by a flat to gently rolling land surface and moderate precipitation (USGS, 1995).

The Ogallala Formation is the principal geologic unit in the High Plains aquifer in eastern Colorado and New Mexico. The Ogallala generally consists of an unconsolidated and poorly sorted sequence of gravel, sand, silt, and clay. Moderately to well-cemented zones within the Ogallala are resistant to weathering and form ledges in outcrop areas. The most distinctive of these ledges, the Ogallala cap rock, is near the top of the Ogallala in large areas of New Mexico, where it can be as thick as 18 m (60 feet).

Groundwater was not encountered during the geotechnical investigation in borings advanced to 15 to 18 m (50 to 60 feet) below ground surface. In addition, groundwater was not observed in the borings several days after the borings were completed. According to Mr. Jarod Kuntz, Operations Manager for Kuntz Pump, a local potable water well driller, the depth to groundwater in the Project area averages 46 to 49 m (150 to 160 feet) below ground surface (personal communication, September 2008, Jarod Kuntz, Operations Manager for Kuntz Pump). Based on interviews conducted as part of the Phase I Environmental Site Assessment conducted for the Project site, all of the land owners interviewed reported having between one and four water wells for livestock (stock wells) on their properties. The stock wells reportedly range in depth from approximately 46 to 91 m (150 to 300 feet). (ENVIRON, 2008).

3.3.2 Environmental Impacts and Mitigation Measures

3.3.2.1 Significance Criteria

Impacts to water resources would be considered significant if:

- The quantity and quality of discharges to drainage features are modified by construction on or near the drainage features or accidental contamination (e.g., fuel or oil releases) to the extent that water use by established users (e.g., private water supplies and irrigation) is measurably reduced;
- Surface drainage patters or stream channel morphology is altered;
- Drilling foundations would create hydrologic conduits between aquifers used for water supply;

- Water consumption would exceed existing permitting levels or quantities of water required for concrete and dust suppression exceeded available supplies;
- Project activities violated the Clean Water Act; or
- Pesticide use contaminated surface waters.

3.3.2.2 Impacts of Proposed Project

There are no expected impacts to surface water on site as there are no surface water bodies in the Project area. Impacts to off-site surface water are expected to be minimal during construction and operation. Permanent facilities would not be located in drainage channels. If drainage features are crossed by access roads, appropriately sized culverts would be installed to maintain channel flows and protect channel morphology. Best management practices would be implemented to mitigate impacts from potential leaks of hazardous materials during on site storage, materials storage and dispensing areas; fuels, coolants or lubricants storage would be equipped with secondary containment features in accordance with all applicable laws and regulations and appropriate engineering practice. Good housekeeping practices would be utilized during the duration of the Project. Vehicle refueling and minor maintenance would only be performed by trained and qualified personnel outside of any drainage areas.

The Project may cause short term impacts to surface drainage patterns during construction. However, the Project would not cause long term changes to surface drainage patterns as surface drainage patterns and stream channel morphology would not be permanently altered. All disturbed areas that are not part of the Project infrastructure would be restored to pre-construction conditions to mimic preconstruction surface drainage patterns. In areas with permanent infrastructure, surface runoff would be routed around the facility so that drainage patterns would be preserved. There are no stream channels impacted by the project.

Eolian (wind deposited) fine to medium grained silty sand over more consolidated gravelly sand and sandy clay was encountered to depths of 15 m (48 feet) (CTL Thompson 2008), so foundation excavation would not encounter bedrock. And as groundwater was not encountered during the geotechnical investigation and is anticipated to be greater than 46 to 49 m (150 to 160) feet below ground surface, foundation excavation would also not encounter groundwater and local groundwater supplies are not anticipated to be affected.

Water for concrete for foundations, soil compaction, and for dust control would come from off-site existing municipal or private sources, likely from Fleming or Sterling, Colorado which may derive its water from surface water, groundwater or a combination of the two. Based on the relatively limited quantity needed, none of these sources would be required to increase water production to meet Project needs. The limited quantity required over the duration of the Project is not expected to infringe on existing water rights or to cause undue depletion of these sources.

An exempt commercial water well would be installed at the O&M building for minor sanitation and operational purposes for the on-site O&M personnel. Estimated water usage would be on the order of 375 gallons per day during the O&M phase. The limited quantity required for O&M over the duration of the Project is not expected to infringe on existing water rights or to cause undue depletion of these sources.

Based on the discussion above, the Project would be in compliance with the *Clean Water Act*.

Due to the native plants currently present on the Project area, pesticide/herbicide use is not anticipated. Therefore, no impacts to surface waters from pesticide/herbicide use would occur.

3.3.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, no impacts to surface or ground water would occur due to the Project.

3.3.2.4 Mitigation Measures

In addition to the standard practices to be used, a Storm Water Management Plan (SWMP) would be developed as required by the USEPA and the CDPHE, Water Quality Control Division. The Colorado program is referred to as the Colorado Discharge Permit System (CDPS), and regulated stormwater discharges from construction activities are regulated through the CDPS General Permit for Stormwater Discharges Associated with Construction Activities (the Stormwater Construction Permit). The Stormwater Construction Permit requires development of a SWMP which evaluates all areas or procedures that have the potential to contribute pollutants to stormwater discharges, including all disturbed and stored soils, vehicle tracking of sediments, loading and unloading operations, outdoor storage activities, vehicle and equipment maintenance and fueling, concrete truck/equipment washing, dedicated concrete batch plants, non-industrial waste sources such as worker trash and portable toilets, and other areas or procedures where potential spills can occur. The SWMP then identifies and describes the Best Management Practices (BMPs) that would be implemented to reduce the potential of any identified sources of potential pollution to contribute pollutants to stormwater discharges. Additional requirements are inspections at least once every fourteen calendar days, Annual Reports, discharge monitoring reports (in some cases) and annual fees. The owner or operator must apply for coverage under the Stormwater Construction Permit at least 10 days prior to the start of construction activities and must certify at the time of application that the SWMP for the construction site is complete. Colorado's Stormwater Construction permit authorizes the conditional discharge of concrete wash water and construction dewatering water to the ground provided that BMPs have been developed to ensure that no such waters are discharged from the site as surface runoff or to surface waters.

3.4 Floodplains and Wetlands

3.4.1 Environmental Setting for the Proposed Project

The Project area is located outside of the 500-year floodplain according to the Flood Insurance Rate Map for Logan County Colorado (Panel 300 of 500, Community Panel Number 0801100300B).

No wetlands are present in the Project area according to the National Wetland Inventory (NWI) maps for Fleming, Haxtun West, Crook and Tamarack Ranch, Colorado (USFWS, 1975).

Three small potential wetland areas were identified during the survey (Figure 3.5). Project area wetlands are characterized by playas, or eastern plains depressional wetlands. Playas are seasonally wet shallow depressions with a ring of riparian vegetation often dominated by sedge (Carex sp.) with other species including blue grama, common dandelion (Teraxacum officinale), western wheatgrass, and salsify (Tragopogon dubius). The three playas identified during the assessment include:

- East of County Road 89 in the NW ¼ of the NW ¼ of Section 16;
- Southeast of the intersection of County Road 85 and County Road 40 in the NE ¼ of the NE ¼ of Section 36; and
- Further south on the west side of County Road 85 opposite from the proposed interconnection transmission line (NE ¼ of Section 36).

It is important to note that all three playas are located outside of the Project area. The survey confirmed no wetlands were present in the Project area.

3.4.2 Environmental Impacts and Mitigation Measures

3.4.2.1 Significance Criteria

Impacts to floodplains and wetlands would be considered significant if:

- Facilities were constructed in a floodplain and caused an increase in the potential for flooding or violated any floodplain protection standards;
- A flood event would cause damage to wind Project facilities; or
- Construction resulted in long-term loss of wetlands or wetland vegetation.

3.4.2.2 Impacts of the Proposed Project

Since floodplains or wetlands do not occur within the Project footprint, these resources would not be impacted by the Project. CHW would use best management practices to prevent sedimentation in adjacent playas or downstream floodplains.

3.4.2.3 Impacts of the No Action Alternative

No impacts to floodplains or wetlands would occur under the No Action Alternative.

3.4.2.4 Mitigation Measures

No additional mitigation is proposed.

3.5 Vegetation

3.5.1 Environmental Setting for the Proposed Project

Based on a habitat assessment conducted in June 2008, the Project area consists of five major vegetation types: Agricultural; CRP land; Grassland; Shelterbelt; and Playa (Walsh 2008). Each is discussed in more depth below.

Agricultural lands are characterized by open fields with a flat or gently rolling topography. Typical crops are corn and grains, such as wheat.

CRP land occurs within the Project area, where large expanses of CRP-planted reclamation species such as smooth brome (*Bromopsis inermis*), switchgrass (*Panicum vergatum*), Indian ricegrass (*Achnatherum hymenodies*), sand bluestem (*Andropogon hallii*), and western wheatgrass (*Pascopyrum smithii*) dominate. Sand dropseed is the dominant naturally occurring grass species (Travis McKay, personal communication, May 2008). Sand dropseed dominated habitat occurs on open flat areas with sandy, well-drained soils. In many disturbed areas such as roadsides and fencelines within the Project area, sand dropseed occurs with smooth brome and less frequently with cheatgrass *(Anisantha tectorum).*

Grasslands are flat or gently rolling plains dominated by grass species with some forb and shrub components. The Project area's dominant grassland habitats are sand dropseed *(Sporobolis cryptandrus)*, sandsage prairie, and pasture. Remnant short-grass prairie, dominated by blue grama *(Bouteloua gracilis)* and buffalo grass *(Buchloe dactyloides)*, likely occurs in patches throughout and at the base of sandsage prairie ridges. Blowout grass *(Redfieldia flexuosa)* habitat is prevalent adjacent to the Project area.

Forbs are scarce but include purple prairie clover *(Dalea purpurea)*, chamomile *(Anthemis sp.)*, purple mustard *(Chorispora tenella)*, and alfalfa *(Medicago sativa)*. The dominant sub-shrub is sand sagebrush *(Artemisia filifolia [Oligosporus fillifolius])*.

Historically, sandsage prairie on Colorado's eastern plains was dominated by sand sagebrush. Associated grass, forb, and shrub species included Indian ricegrass, sand dropseed, sand bluestem, prairie sandreed *(Calimovilfa longifolia)*, blowout grass, little bluestem *(Schizachyrium scoparium)*, lemon scurfpea *(Psoralidium lanceolatum)* and rabbitbrush *(Chrysothamnus sp.)* (EPA undated). In the Project area, due to the prevalence of CRP-planted grasses and other changes to the landscape, sand sagebrush prairie is restricted to ridges. In flatter areas, sandsage prairie begins to co-occur with grasses including sand dropseed, switchgrass and little bluestem. Some yucca *(Yucca glauca)* and skunkbrush *(Rhus aromatic* var. *trilobata)* shrubs were observed.

Very few noxious weeds or introduced species occur on the site. In areas of higher disturbance such as roadway edges and adjacent field edges, species diversity tends to be lower with weedy species such as smooth brome dominating. Areas with discontinued human activities, such as abandoned farmsteads, tend to have a greater diversity of weeds including cheatgrass, Russian thistle *(Salsola sp)*, kochia *(Bassia sieversiana)* and purple mustard.

Shelterbelt lands, or windbreaks, are characterized by trees and shrubs planted to protect downwind habitat. In the Project area, shelterbelts are planted in closely spaced rows between fields or grasslands, or they are planted in groves around homesteads for wind protection or privacy. Dominant tree species include cottonwood *(Populus deltoids)*, Siberian elm *(Ulmus pumila)*, juniper *(Juniperous* sp.*)*, ponderosa pine *(Pinus ponderosa)*, and skunkbrush. Most of the shelterbelts on abandoned farmsteads contain decadent/senescent trees due to water loss and wind damage.

Playas occur near the Project area. They are also known as prairie potholes or eastern plains depressional wetlands. Playas are seasonally wet shallow depressions with a ring of riparian vegetation often dominated by sedge *(Carex* sp.*)* with other species including blue grama, common dandelion *(Taraxacum officinale)*, western wheatgrass, and salsify *(Tragopogon dubius)*. Three playas were identified near the Project area: 1) east of County Road 89, outside the Project area to the northeast; 2) two playas west of County Road 85, south of the Project area and west of the proposed interconnection transmission line.

The Project area consists of 1,643 hectares (4,061 acres). Of this area, 399 hectares (986 acres or 24 percent) are in CRP lands, 1,227 hectares (3,031 acres or 75 percent) are grasslands (native prairie and pasture land), and 18 hectares (44 acres or 2 percent) are shelterbelts scattered throughout the Project site (Figure 3.6). Agricultural lands occur along the transmission line, but not on the Project site.

3.5.2 Environmental Impacts and Mitigation Measures

3.5.2.1 Significance Criteria

Impacts to vegetation would be considered significant:

- Introduction or spread of invasive plant species to a pristine area (i.e., an area of native vegetation void of invasive species)
- Loss of agricultural land production jeopardizing a ranch or farms existence
- Loss of vegetation from playas or depressional wetlands

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3.5.2.2 Impacts of the Proposed Project

Direct impacts to vegetation would include 180 hectares (446 acres) of temporary surface disturbance during construction of and 19 hectares (47 acres) of permanent loss of habitat for roads, turbine foundations, and facilities for the life of the Project. Table 3.5 shows acreage impacted by vegetation type during construction and for the life of the Project. Since the permanent life-of-Project footprint (19 hectares [47 acres]) would be relatively small compared with the overall size of the Project area (over 1,619 hectares [4,000 acres]), amounting to one percent of the Project area, these direct, long term impacts would be minimal. Permanent impacts to agricultural lands would be less than 0.04 hectares (0.1 acre). The Project would not impact any riparian vegetation, including the vegetation of playas or depressional wetlands, because no riparian vegetation occurs within the Project footprint. Weed infestations could

constitute an adverse effect; however, CHW would take measures (e.g., prompt revegetation, washing construction vehicles before going onsite if necessary, avoiding weedy areas once onsite, washing trucks between sites if weedy areas are encountered, and controlling weeds by mechanical and herbicidal means if necessary). Given these measures, noxious weed invasion and impacts from weeds are anticipated to be minimal. No tree removal that would constitute impacts to shelterbelts is anticipated. However, if tree removal becomes necessary, it would be limited to those trees that impede safe and efficient Project operation. Any disturbed areas that are not required for operations would be revegetated as soon as possible after construction.

Because very minor or no impacts would occur to agricultural lands, wetlands or riparian areas and noxious weed invasion would be controlled through BMPs and mitigation, the impacts to vegetation due to the installed structures, buildings and access roads proposed for the Project would be direct, long term and minor. Other vegetation impacts would be direct, short term and minor.

Table 3.5 Project Impacts by Vegetation/Habitat Type

Vegetation Type	**Disturbance Type**	**Initial Disturbance (Acres)**	**Life-Of-Project Disturbances (Acres)**
Agricultural Land	Turbines	0	0
	Access roads	0	0
	Other facilities	0.9	0.1
subtotal		**0.9**	**0.1**
CRP Land	Turbines	90	1.13
	Access roads	14.7	6.7
	Other facilities	39.2	3.01
subtotal		**143.9**	**10.84**
Grassland	Turbines	210	2.94
	access roads	66	28.4
	Other facilities	22.36	3.01
subtotal		**298.36**	**34.35**
Shelterbelt	Turbines	0	0
	access roads	2.3	1.04
	Other facilities	0.25	0
subtotal		**2.55**	**1.04**

Table 3.5 Project Impacts by Vegetation/Habitat Type			
Vegetation Type	**Disturbance Type**	**Initial Disturbance (Acres)**	**Life-Of-Project Disturbances (Acres)**
Grand Total		**445.71**	**46.33**

3.5.2.3 Impacts of the No Action Alternative

No impacts to vegetation would occur under the No Action Alternative.

3.5.2.4 Mitigation Measures

Implementation of the BMPs relating to onsite vegetation and noxious weeds would reduce or eliminate potential impacts to vegetation. These BMPs would include:

- Prompt revegetation
- Avoiding weedy areas on site
- Washing trucks between sites if weedy areas are encountered, and
- Controlling weeds in accordance with landowner wishes or easement agreements, through mechanical means or the use of herbicides, if necessary.

Mitigation would include limiting erosion and colonization by noxious weeds after construction. A native seed mix would be applied to the cleared areas, as necessary, to minimize noxious weed invasion and to initiate immediate cover for the area.

3.6 Wildlife

3.6.1 Environmental Setting for the Proposed Project

Fieldwork was conducted May 6 and 7, June 2, and July 12, 17, and 18 , September 2 and October 30 and included 1) wildlife studies, 2) searching for TEP or C and special concern species including specific searches for swift fox (*Vulpes velox*) dens, 3) viewing the greater prairie-chicken (*Tympanuchus cupido*) lek, 4) searching for raptor nests onsite and one mile beyond the site boundaries, and 5) conducting habitat mapping. All potential raptor nesting habitat was searched by looking for nests using the naked eye, binoculars, or a spotting scope. All nest locations (regardless of species) were mapped. Habitats for TEP or C species were identified based on current habitat descriptions provided by the FWS. Lists of wildlife species known to occur or that may occur in Logan County were obtained from review of reference texts including Fitzgerald et al (1994), Hammerson (1999), and Kingery (1998).

The Project area provides habitat for a variety of wildlife species typical of native sandsage prairie and CRP grasslands in northeastern Colorado. Pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) occur in the area. The Project area contains

range for pronghorn. An estimated 20 pronghorn currently occupy Game Management Unit (GMU) 93 in the area (Wendy Figueroa, CDOW, personal communication, September 2008,). The entire Project area is mule deer range, and about 30 to 40 mule deer occupy the area. No crucial winter ranges for pronghorn or mule deer occur in the Project area.

Mammalian predator species that are likely to occur in the Project area include coyote (*Canis latrans*), red fox (*Vulpes vulpes*), swift fox, raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), American badger (*Taxidea taxus*), eastern spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), and possibly bobcat (*Lynx rufus*) and mountain lion (*Felis concolor*).

A number of small mammals may occur in the Project area. Lagomorphs (rabbits and hares) that occur in the Project area include desert cottontail (*Sylvilagus audubonii*), eastern cottontail (*Sylvilagus floridanus*), and black-tailed jackrabbit (*Lepus californicus*). The white-tailed jackrabbit (*Lepus townsendii*) is less likely to occur due to its preference for less disturbed native grasslands. Rodents that occur in the Project area likely include spotted ground squirrel (*Spermophilus spilosoma*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), black-tailed prairie dog (*Cynomys ludovicianus*), plains pocket gopher (*Geomys bursarius*), plains pocket mouse (*Perognathus flavescens*), silky pocket mouse (*Perognathus flavus*), hispid pocket mouse (*Chaetodipus hispidus*), Ord's kangaroo rat (*Dipodomys ordii*), western harvest mouse (*Reithrodontomys megalotis*), plains harvest mouse (*Reithrodontomys montanus*), deer mouse (*Peromyscus maniculatus*), northern grasshopper mouse (*Onychomys leucogaster*), bushy-tailed woodrat (*Neotoma cinerea*), prairie vole (*Microtus ochrogaster*), and house mouse (*Mus musculus*). Black-tailed prairie dogs were observed in the Project area, and skulls of Ord's kangaroo rat were found in great horned owl pellets during Project-related fieldwork. Other mammals that could occur in the Project area include Virginia opossum (*Didelphus virginianus*), least shrew (*Cryptotis parva*), eastern mole (*Scalopus aquaticus*), and bats.

Little brown bats (Myotis lucifugus) and big brown bats (Eptesicus fuscus) are likely resident onsite, roosting in human made structures such as attics and out-buildings. Hoary bats (*Lasiurus cinereus*) and red bats (*Lasiurus borealis*) may roost in shelter belts in the Project area; these two species and silver-haired bats (*Lasionycteris noctivagans*) likely migrate through the Project area between northern breeding and southern wintering areas. No bat roosts were identified in discussions with CDOW staff, or in searches of vacant buildings in the project area; however, this does not guaranty an absence of bat roosts in the area.

An estimated 266 species of birds occur in Logan County (U.S. Department of Energy 2005) and may occur in the Project area. Most of these species probably occur in the Project area only during migration and thus would be occasional visitors only. Many of the species (i.e., waterfowl, shorebirds, and waders) would not breed in the Project area because no breeding habitat exists, but they may occasionally visit the Project area if they are breeding and nesting in nearby habitat or feeding in pasture or CRP lands during migration.

The Project area contains breeding and nesting habitat for several species of raptors, including Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), prairie

falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), great-horned owl (*Bubo virginianus*), burrowing owl (*Athene cunicularia*), long-eared owl (*Asio otus*) and short-eared owl (*Asio flammeus*). Red-tailed hawk, Swainson's hawk, ferruginous hawk, northern harrier (*Circus cyaneus*), peregrine falcon, burrowing owl, and great horned owl were observed in the Project area. Surveys conducted during the Spring, Summer and Fall 2008 identified 3 active raptor nest locations, 3 inactive raptor nest locations and 9 Fall raptor nests (could not be determined whether these were active or inactive) either within the Project boundary or within 805 m (0.5 mile) outside the Project boundary.

Upland fowl include various species of grouse and pheasants. Greater prairie-chickens were observed displaying on a lek, and a ring-necked pheasant was observed. Many species of non-passerine and passerine (songbirds) were observed in the Project area. These include northern flicker (*Colaptes auratus*), mourning dove (*Zenaida macroura*), grasshopper sparrow (*Ammodramus savannarum*), horned lark (*Eremophila alpestris*), lark bunting (*Calamospiza melanocorys*), western meadowlark (*Sturnella neglecta*), lark sparrow (*Chondestes grammacus*), vesper sparrow (*Pooecetes gramineus*), and Cassin's sparrow (*Aimophila cassinii*), western kingbird (*Tyrannus verticalis*), American robin (*Turdus migratorius*), loggerhead shrike (*Lanius ludovicianus*), northern mockingbird (*Mimus polyglottos*), Bullock's oriole (*Icterus bullockii*), black-billed magpie (*Pica hudsonia*), and brown thrasher (*Toxostoma rufum*), house sparrow (*Passer domesticus*) and the Say's phoebe (*Sayornis saya*). Also likely present are brown-headed cowbirds (*Molothrus ater*), and barn swallows (*Hirundo rustica*).

A variety of reptiles and amphibians may occur in the Project area. Ornate box turtle (*Terrapene ornate*) and bull snake (*Pituophis catenifer*) were observed. Others that may occur include plains spadefoot (*Spea bombifrons*), Woodhouse's toad (*Bufo woodhousii*), Great Plains toad (*Bufo cognatus*), lesser earless lizard (*Holbrookia maculate*), prairie lizard (*Sceloporus undulates*), six-lined racerunner (*Aspidoscelis sexlineata*), many-lined skink (*Eumeces multivirgatus*), glossy snake (*Arizona elegans*), western hognose snake (*Heterodon nasicus*), bullsnake (*Pituophis catenifer*), milk snake (*Lampropeltis triangulum*), and western rattlesnake (*Crotalus viridis*).

There are no fisheries in the Project area due to lack of suitable streams or lakes/reservoirs to support fish populations.

3.6.2 Environmental Impacts and Mitigation Measures

3.6.2.1 Significance Criteria

Impacts to wildlife resources would be considered significant if:

- Construction activities occur on established greater prairie-chicken leks or breeding grounds during the nesting season;
- Critical big game winter range is affected by construction during critical winter periods, causing disturbance or displacement of wintering animals;
- Mortality of birds from collisions with wind turbines reduced local numbers of the affected species to the point where there are measurable population declines.

- Mortality of bats from collisions with wind turbines reduced populations to the point where a species needs protection under state or Federal law.

3.6.2.2 Impacts of the Proposed Project

Potential impacts to wildlife from the proposed wind farm may result from direct mortality, habitat loss, and effective habitat loss. Direct mortality is the result of collisions with turbines, meteorological towers, overhead power lines, and substation structures and, for bats, may be caused by rapid reduction in air pressure close to the turbine blades that may result in barotrauma-related lung injuries. Habitat loss is due to the footprint of turbine pads, other infrastructure, and roads. Effective habitat loss is the loss of the use of seemingly suitable habitat because of human activity in the vicinity; this can disturb many species to the extent that they would not use habitat and it is effectively lost.

Ground disturbance impacts would include temporary and permanent loss of habitats for wildlife in general. Habitat disturbance would include a corridor consisting of tower assembly areas and pads (up to 5 acres at each tower location during construction) and upgrading access roads. Upon completion of construction, turbine assembly areas would be reduced to a 5 m (15 foot) diameter foundation pad area and road width would be reduced from 10 m (35 ft) to approximately 5 m (16 ft).

Trenches for utilities and communications lines would be excavated along access roads or in cross-country utility line easement corridors. Where possible, these temporary and permanent ROWs would be re-vegetated and allowed to return to their previous use and condition. The timing of revegetation would be variable, depending on the time of year that construction in an area is completed and rainfall amounts during the years following the revegetation.

Long-term impacts include permanent loss of habitat and habitat fragmentation due to the presence of the new facility, as well as regular disturbance from humans during periodic maintenance. Specific impacts on wildlife are discussed below.

All turbine towers have been located greater than 805 m (0.5 mile) of greater prairie-chicken lek. Therefore, prairie-chicken leks will not be impacted by the Project.

Impacts to big game are expected to be minimal because the land is primarily pasture land and is subject to regular human activity from farming and ranching activities. Impacts to big game could include direct mortality due to collisions with vehicles, loss of foraging habitat, and displacement from portions of the Project area during construction due to human presence or noise. Mortality due to collisions with vehicles would be minimal. Because the total footprint of the Project (turbine pads, roads, and substation) would be small relative to the size of the Project area, loss of forage would be negligible. Forage distribution has already been substantially altered by past and current agricultural activities, and the footprint of the wind Project likely would be unnoticeable within this larger agricultural management system. Big game using the area likely would habituate to the turbines and operation activities in time, although they may avoid roads as occurs at oil and gas development Projects (BLM 2008). However, no detectable changes in pronghorn antelope abundance occurred at the Arlington, Wyoming, wind project

after construction (Johnson et al. 2000), so pronghorn may habituate to wind development. Mule deer also are fairly tolerant of human activities (Reed 1981; Irby et al. 1988), and there is already frequent human presence due to farming and ranching activities, so it is probable that any displacement would likely be temporary and displacement effects would be minimal. No crucial winter range or known birthing areas occur onsite, so big game critical habitats would not be affected.

Impacts to small mammals and carnivores include an increase in vehicle kills with increased roads and traffic, and some loss of habitat. The impacts are anticipated to be minimal overall.

Bats may be impacted due to collision-related mortality, and some wind Projects are known to cause substantial bat mortality (Arnett et al. 2008, FWS 2003, Kunz et al. 2007). New findings show that the reduced air pressure in the vicinity of the turbines causes internal trauma leading to death (Baerwald et al. 2008). Other sources of fatality are also being investigated (Energetics Inc. 2004). Because bats are not known to roost in the area and no Federal or state-listed TEP or C bat species are anticipated to occur, impacts to protected bat species are not expected. However, the three migratory tree-roosting bats (hoary bats, red bats, and silver-haired bats) likely migrate through the Project area and thus may be at risk (Cryan 2008). The Spring Canyon Wind Project located 34 km (21 miles) away in Logan County, identified 16 hoary bat fatalities during surveys, resulting in bat fatalities estimated at 2.88 bats/turbine per year when carcass residency and searcher efficiency are factored in (TRC 2008). Of nine wind sites with bat fatalities presented in that report, this was the fourth highest. Bat acoustical monitoring is being conducted in the fall and spring on the CHW Project site and would serve to determine whether this Project site is in a migratory pathway for the hoary bat, red bat, or silver-haired bat.

Impacts to other mammals, amphibians, and reptiles are expected to be minimal. Mammals are relatively mobile, amphibians and reptiles are a little less so, and, while mortality due to collisions with vehicles or during excavation is possible, these occurrences are anticipated to be infrequent. As with big game, the overall agricultural management system within the Project area already strongly influences forage/prey availability, therefore the short-term 180 hectares (446 acres) of loss of habitat (19 hectares [47 acres] over the life-of-Project) from the Project footprint would probably have a minimal effect on other mammals and reptiles.

Birds may be directly impacted due to collisions with turbines, meteorological towers, overhead power lines, and substation structures; and through both direct and effective habitat loss. Direct habitat loss is the footprint of habitat lost due to roads, turbine pads, etc. Effective habitat loss is the loss of use of the habitat as may occur due to disturbance such as human presence and noise. This occurs when animals avoid a buffer zone around a road or other man-made structure. The potential impacts of wind power development on birds is well-documented. Studies at the Spring Canyon Wind Farm found bird fatalities of 4.67 per turbine per year, when carcass residency and searcher efficiency were accounted for (TRC 2008). Of nine wind sites reported, Spring Canyon had the highest number of bird fatalities per turbine per year. Wind power-related mortality is low compared with other sources of bird mortality (National Wind Coordinating Committee [NWCC] 2001). As with bats, the issue is not what proportion of overall mortality is due to wind farms, but rather whether wind farms cause significant population declines or are a significant contributor to cumulative effects on populations. This

issue is difficult to address due to the lack of reliable abundance data from which to make these determinations (National Research Council 2007).

The FWS has developed a set of recommendations to avoid and minimize impacts to wildlife from wind turbines (FWS 2003). These recommendations and a discussion of Project adherence to these recommendations are presented in Table 3.6.

Table 3.6 Site Development and Turbine Design and Operation Recommendations

FWS Interim Guidance	Existing Conditions and Proposed Action
Site Development	
1. Avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected under the Federal Endangered Species Act (ESA).	No documented locations of any species of wildlife, fish, or plants protected under the ESA occur in the Project area. While both Federal and state-listed TEP or C species may occur in the Project area, impacts are expected to be minimal.
2. Avoid locating turbines in known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, State or Federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.	There are no known local bird migration pathways in the Project area. There are no known high concentration areas such as wetlands, etc. in the Project area. Daily movements may occur among the Project area's agricultural land, grassland, CRP land, shelterbelts, and playa habitats, but these are common features of the landscape, and thus the Project is not located in an area where daily movements would pose more risk than other sites. CHW has avoided placing turbines within 805 m (0.5 mile) of a known prairie-chicken lek and 402 m (0.25 mile) of known raptor nests found in 2008. The Project area does not have a high incidence of fog, mist, or other conditions of low visibility.
3. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.	There are no known bat colonies in the Project area. Migration corridors or flight paths may occur in the Project area. Bat acoustical monitoring would be conducted.
4. Configure turbine locations to avoid areas or features of the landscapes known to attract raptors (hawks, falcons, eagles, and owls). For example, golden eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge, or in or near prairie dog colonies.	Turbines have been located on relatively flat lands, away from shelterbelts (i.e., potential raptor nesting sites). No turbines or other Project facilities would be placed in prairie dog colonies.

Table 3.6 Site Development and Turbine Design and Operation Recommendations

FWS Interim Guidance	Existing Conditions and Proposed Action
5. Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species.	CHW has configured the Project to group turbines as closely as possible without losing energy-generating capacity due to wake effects among turbines. Widely spacing turbines increases overall Project costs because of the need for more power lines and roads, therefore, from a cost perspective, the Project is designed with the closest spacing possible. The Project would result in habitat fragmentation in grassland and for CRP land wildlife species.
6. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.	Approximately 19 hectares (47 acres) of grassland and CRP land would be lost. No active cultivation currently occurs in the Project area, with the exception of the transmission line ROW.
7. Avoid placing turbines in habitat known to be occupied by prairie-chickens or other species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation.	One greater prairie-chicken lek was discovered, and turbines were moved to allow an 805 m (0.5-mile) buffer. Surveys in spring 2009 would determine whether additional leks occur onsite.
8. Minimize roads, fences, and other infrastructure. All infrastructure should be capable of withstanding periodic burning of vegetation, as natural fires or controlled burns are necessary for maintaining most prairie habitats.	The only facility that would be fenced is the Project substation and O&M building, where fencing is required for public health and safety reasons and the protection of CHW's property. CHW is using existing roads for much of its access; it would construct about 30.5 km (19 miles) of new roads. The number of roads, fences, and other infrastructure is minimized to reduce Project development and operation costs.
9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.	All disturbed areas would be reclaimed with native, locally-adapted species. CHW would control weeds.

Table 3.6 Site Development and Turbine Design and Operation Recommendations

FWS Interim Guidance	Existing Conditions and Proposed Action
Turbine Design and Operation	
1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (APLIC 2006).	CHW would use tubular towers and perch-free nacelles. Turbines would not use guy wires, but they would be necessary for the meteorological tower support. Any guy wires would be marked for airplane warning and bird deterrent devices would be included if necessary.
2. Follow FWS lighting recommendations and the minimum amount of pilot warning and obstruction avoidance lighting specified by FAA should be used (FAA 2000).	CHW is preparing a plan to meet FAA requirements.
3. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.	The height of the rotor-swept area for the Colorado Highlands wind Project is not known to pose an undue high risk to wildlife.
4. Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the APLIC (2006) for any required above-ground lines, transformers, or conductors.	All in-field collection and communications lines would be installed underground. The only exception is the line from the onsite substation to the offsite substation. For this, approximately 10 km (6 miles) of overhead power collection lines would be constructed, and these would be constructed in accordance with APLIC (2006) recommendations.
5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of 3 years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.	No seasonal high concentrations of birds are known to occur in the Project area.

Coordination with FWS and CDOW resulted in letters outlining desirable approaches and mitigation for protection of wildlife resources (Appendix A). A subsequent meeting, June 25, 2008, with staff from both agencies, served to clarify desirable pre-construction and post-construction wildlife studies. As a result, additional surveys would be conducted in 2008 and

2009 (see Section 3.6.2.4). All work would be conducted in accordance with the letter submitted to the CDOW and the USFWS dated July 18, 2008.

The layout and Project schedule presented for the wind farm and associated turbines reflects this coordination with the agencies. Activities for surface occupation and timelines impacted by construction are consistent with agency requirements for timing restrictions and activity buffers. The resulting impacts to wildlife due to the proposed Project would result from both long and short term effects on their habitats including vegetation impacts, human disturbance and the construction, operation and maintenance of the project. Overall impacts are expected to be minor.

3.6.2.3 Impacts of the No Action Alternative

No impacts to wildlife would occur under the No Action Alternative.

3.6.2.4 Mitigation Measures

CHW has committed to the following measures as described in our July 18, 2008 letter to the CDOW and the USFWS. Following consideration of these measures, no impacts have been identified to wildlife.

- Turbines located greater than 402 m (0.25 mile) of known raptor nests.
- Turbines located greater than 805 m (0.5 mile) of greater prairie-chicken lek.
- Seven back-up locations for turbines have been selected in order to address potential new wildlife-sensitive locations that may be discovered in subsequent surveys.
- Construction schedules would avoid breeding season activities and buffers for nesting raptors and prairie-chicken.
- Fall, winter, and spring raptor surveys would be conducted prior to the start of construction.
- Fall and spring bat acoustical monitoring would be conducted prior to the start of construction.
- Fall avian survey would be conducted in 2008.
- Lek survey would be conducted in spring 2009.
- Spring avian survey would be conducted in 2009.
- Grassland nesting bird sweeps would be conducted in advance of construction vehicles during the nesting season to avoid impacts to nesting birds.

CHW would prepare a mitigation plan outlining these actions and would commit to implement them.

3.7 Special Status and Sensitive Species

3.7.1 Environmental Setting for the Proposed Project

A list of endangered, threatened, proposed, and candidate species was prepared with the use of the FWS and CDOW websites (Appendix C). A query was also made to the Colorado Natural Heritage Program (CNHP) concerning sensitive species in the Project area (Appendix D). The CNHP query included a two-mile buffer surrounding the project area. This database query resulted in records of natural plant communities (northern sandhill prairie, riparian woodland, etc.) and wildlife (greater prairie-chicken, ferruginous hawk, Cassin's sparrow, northern many-lined skink) in the project area and beyond. None of these records were unanticipated or different from general observations reported here.

No Federal TEP or C plant species are expected to occur in Logan County, and the State of Colorado has no listed plant species or communities. TEP or C plant species are not discussed further in this EA.

Fieldwork was conducted May 6 and 7; June 2; July 12, 17, and 18; and August 29 that included 1) wildlife studies, 2) searching for TEP or C and special concern species including specific searches for swift fox dens, 3) viewing the greater prairie-chicken lek, 4) searching for raptor nests onsite and one-half mile beyond the site boundaries, and 5) conduct habitat mapping. All potential raptor nesting habitat was searched by looking for nests using the naked eye, binoculars, or a spotting scope. All nest locations (regardless of species) were mapped. Habitats for TEP or C species were identified based on current habitat descriptions provided by the FWS. Lists of wildlife species known to occur or that may occur in Logan County were obtained from review of reference texts including Fitzgerald et al. (1994), Hammerson (1999), and Kingery (1998).

Federally Listed Species

No habitat for pallid sturgeon, interior least tern, piping plover, or whooping crane occurs in the Project area, but these species are of concern in Logan County because water depletions in the South Platte River may affect the species and/or critical habitat downstream. The pallid sturgeon and least tern do not occur in the Project area. Both the piping plover and the whooping crane are unlikely to occur in the Project area. There is no breeding habitat, nesting habitat, suitable habitat or critical habitat for these species in the Project area. The installed facilities would not affect these species. The Project will consult with the USFWS under section 7 of the Endangered Species Act for the use of water for construction and prepared a Biological Assessment for the pallid sturgeon, interior least tern, piping plover and whooping crane in compliance with the Platte River Recovery Implementation Program. Water use for the Project is discussed in section 3.7.2.2.

State-listed Species

The Project area's grassland, CRP land, and/or agricultural fields provide suitable habitat for plains sharp-tailed grouse, burrowing owl, ferruginous hawk, mountain plover, black-tailed

prairie dog, swift fox, and yellow mud turtle (Appendix C). Other state-listed species are ones that may be migrants, and include American peregrine falcon, bald eagle, greater sandhill crane, long-billed curlew, and western yellow-billed cuckoo.

The CDOW state-listed species were evaluated for their potential occurrence using appropriate local references, consultations with CDOW, and staff knowledge of the species and habitats of Logan County. These species are discussed below.

Plains Sharp-Tailed Grouse (*Tympanuchus phasianellus jamesii*) – This endangered species traditionally occurred across much of eastern Colorado, but has been nearly eliminated from the state. Individuals have wandered into nearby Tamarack Ranch (a State Wildlife Area located 1.6 to 3.2 km (1.0 to 2.0 miles) north of County Road 46 outside the Project area) from Nebraska, where they occupy sandsage prairie. These individuals have hybridized with greater prairie-chickens (Kingery 1998). Although suitable habitat occurs for this species in the Project area, no individuals were observed during the assessment.

American Peregrine Falcon (*Falco peregrinus anatum*) – This species has a broad area of migration, and will forage on birds in grassland habitat, especially during spring and fall. Adequate nesting habitat (cliffs) does not exist in the Project area. One individual was observed flying over the greater prairie-chicken lek, likely in migration.

Bald Eagle (*Haliaeetus leucocephalus*) – Bald eagles were recently de-listed from Federal listing, but are listed on the State list. Good foraging habitat for this species, especially black-tailed prairie dog colonies, does not exist in the Project area, however taller trees could occasionally host a bird in transition from breeding grounds to wintering areas.

Burrowing Owl (*Athene cunicularia*) – This species generally prefers shortgrass prairie associated with black-tailed prairie dog colonies, as they often nest in burrows within an active colony. Individuals could certainly use other mammal burrows, but taller grasses and shrubs usually preclude their occurrence. A small black-tailed prairie dog (*Cynomys ludovicianus*) colony (roughly 150 meters by 200 meters in size) was found east of the transmission line outside of the Project area. Associated with this colony, a family of burrowing owls (*Athene cunicularia*) comprising six or seven individuals was observed.

Ferruginous Hawk (*Buteo regalis*) – One individual of this state species of Special Concern was observed on the Project area near the intersections of County Road 42 and 89. A hawk of grasslands and shrublands, this species forages primarily upon prairie dogs, ground squirrels, and jackrabbits. Surveys failed to detect prairie dogs in the Project area; alternative prey species were present. No nests were located. Nesting occurs in Logan County and a possible nest site was reported north of the Project site during the Breeding Bird Atlas survey in the 1990s. These records are recorded in 4.3 km by 5.6 km (2.9 mile by 3.5 mile) blocks; the block's southern boundary is County Road 44. Conversion of native grassland habitats to agriculture, energy development, and urbanization as well as the eradication of the majority of black-tailed prairie dogs in eastern Colorado has led to the Special Concern status (non-statutory). Nests of this species are prone to abandonment if disturbed during the incubation period (Wheeler 2003).

Greater Sandhill Crane (*Grus canadensis tabida*) – Suitable nesting habitat for this species does not exist in the Project area. Birds on migration could make a stopover in agricultural fields.

Whooping Crane (*Grus Americana*) – Suitable habitat for this species does not exist in the Project area. There is no breeding habitat, nesting habitat or critical habitat at the Project site. Although whooping cranes have been sighted north of the Project area in the Nebraska panhandle it is unlikely that they would occur at the Project site. The installed Project facilities would not affect this species. The Whooping Crane is the subject of a Biological Assessment related to the water use for the Project and will be addressed with the USFWS.

Piping Plover (*Charadrius melodus*) – Suitable habitat for this species does not exist in the Project area. There is no breeding habitat, nesting habitat or critical habitat at the Project site. The installed Project facilities would not affect this species. The piping plover is the subject of a Biological Assessment related to the water use for the Project and will be addressed with the USFWS.

Snowy Plover (*Charadrius alexandrinus*) – Suitable habitat for this species does not exist in the Project area and this species is an unlikely migrant.

Mountain Plover (*Charadrius montanus*) – This species is intimately associated with heavily grazed shortgrass prairie, as occurs where cattle and/or prairie dogs are present. Fallow fields may also be used. Surveys failed to detect this species or suitable habitat for this species. This species is unlikely to be present, although listed as possible in Appendix C.

Long-Billed Curlew (*Numenius americanus*) – This species nests in shortgrass prairie and occasionally in wheat or fallow fields. However the lack of adequate standing water would preclude this species nesting in the Project area. Migrant birds could stopover in pastures and open grasslands.

Western Yellow-Billed Cuckoo (*Coccyzus americanus*) – Closed canopy riparian forests are the preferred nesting habitat of this species, and do not occur on the site. Although unlikely, shelterbelts in the Project area could host migrant cuckoos. The Project would not affect this species.

Black-Tailed Prairie Dog (*Cynomys ludovicianus*) – This species inhabits short and mixed-grass prairies. Suitable habitat occurs in the Project area, but it is likely that the species was extirpated from the Project area in years past. A small black-tailed prairie dog colony (approximately 150 meters by 200 meters in size) was found east of the transmission line within the powerline ROW.

Swift Fox (*Vulpes velox*) – This species inhabits short and mixed-grass prairies throughout eastern Colorado. Suitable habitat occurs in the Project area in the form of remnant short-grass prairie, and grazed areas. Habitat mapping can serve to elucidate the extent of suitable habitat present, which can serve to suggest likelihood of occurrence (Martin et al. 2007). Surveys for swift fox dens initially were conducted during the habitat mapping effort May 6 and 7, 2008. The CDOW joined in a subsequent search conducted in July 2008, using all-terrain-vehicles to access areas not visible from roads. No swift foxes or their dens were found.

Yellow Mud Turtle (*Kinosternon flavescens*) – Habitat for this reptile includes permanent and semi-permanent ponds, temporary rain pools near grasslands and sand sage prairie. Sand sage habitat is especially used in the summer time by nesting females. The CDOW website shows this species only as "likely to occur", not "known to occur", indicating perhaps a lower likelihood of its presence (CDOW undated, http://ndis.nrel.colostate.edu/plugins/co_maps/030998.jpg).

3.7.2 Environmental Impacts and Mitigation Measures

3.7.2.1 Significance Criteria

Impacts to special status and sensitive species would be considered significant if effects from the proposed Project such as loss of individuals or loss of critical habitat result in "jeopardy" Biological Opinion under Section 7 of the ESA or similar loss of State-listed species.

3.7.2.2 Impacts of the Proposed Project

Federally Listed Species

Platte River Species

The Platte River Species are the interior least tern, piping plover, whooping crane and pallid sturgeon. There is no suitable habitat, critical habitat, nesting habitat or breeding habitat for any of these species at the Project Site. The installed facilities would not affect these species. These species are of concern based on water use by the Project and the potential of cumulative uses of water in the South Platte River basin and other tributaries to the Platte River to affect the critical habitats of these species in the Platte River. In accordance with the Platte River Recovery Implementation Program, the Project is consulting with the USFWS based on Project water use. A Biological Assessment was prepared and submitted to the USFWS to address water use.

Indirect impacts could occur if the Project resulted in water depletions in the South Platte River. The Project estimates a one-time construction use of less than 25 acre-feet of water that would be addressed with certificate under the SPWRAP as described in Chapter 2. Recurring water use requirements during operations and maintenance would also be addressed under the annual membership option of the SPWRAP. The Project may investigate an option of obtaining water from on on-site well that would be covered by the Project's SPWRAP membership.

State-listed Species

Impacts to State-listed species could include direct mortality due to collisions with vehicles, power lines, and/or turbines; inadvertent nest destruction; and displacement from habitat due to noise and human activity. Although suitable habitat is potentially present onsite for plains sharp-tailed grouse and mountain plover, these species were not observed. Neither species is likely to be present. Migratory species that may be present include peregrine falcon, bald eagle, greater sandhill crane, long-billed curlew, and western yellow-billed cuckoo.

Bald eagles are unlikely in the Project area because of lack of prey and roosting sites. Occasional individuals would be rare visitors to the Project area. Both construction and operation impacts are expected to be minimal for these migrant species. Greater sandhill cranes may migrate through the Project area and may stop to feed in agricultural fields. Impacts during construction would include displacement from potential resting and feeding areas, but this impact is expected to be minimal because there are abundant agricultural fields throughout the region that provide this habitat. Impacts during operation could include sandhill crane mortality due to collisions with turbines and overhead lines. Sandhill cranes typically migrate at heights well above 122 m (400 ft) (Toepler and Crete 1978) and thus would only be affected if taking off or landing on or near the site during resting/feeding stopovers or if they are forced down during bad weather. With the use of modern turbines, the potential for mortality is expected to be low. The long-billed curlew could be an occasional migrant, with a stopover in pastures and open grasslands. Impacts to long-billed curlew during construction could include mortality of individuals due to collisions with vehicles. Because of the lack of suitable nesting habitat (lack of adequate standing water), the potential to impact long-billed curlew nests is low. Because long-billed curlews are mobile, potential for collisions with vehicles is also low. Operational impacts could include mortality due to collisions with turbines and overhead lines, but mortalities are expected to be rare events. Impacts to long-billed curlew are expected to be low. Western yellow-billed cuckoos could use shelterbelts during migration. They would not nest onsite. There is the potential for mortality due to collisions with turbines and overhead lines, but mortalities are expected to be rare events. Impacts to yellow-billed cuckoos are expected to be low.

Burrowing owl, ferruginous hawk, black-tailed prairie dog, swift fox, and yellow mud turtle have either been observed or are species for which suitable habitat is present. CHW would attempt to avoid the area's black-tailed prairie dog colony east of the transmission line, so burrowing owl nests would not be impacted. Nesting burrowing owls may be displaced from portions of this colony by construction noise and human activity in areas adjacent to the colony during construction. Prior to construction, the prairie dog colony along the power line ROW would be searched for burrowing owls. If owls occur in the colony, construction would avoid the colony and no construction would occur within 46 m (150 feet) of the burrowing owl nest area from March 1 to October 31 in accordance with CDOW raptor guidelines (Craig 2008). During operation, impacts to burrowing owls could include mortality due to collisions with vehicles or wind turbines. Because burrowing owls are mobile, collisions with vehicles are unlikely, and since CHW would use state-of-the-art turbines with tubular towers and slow-turning rotors, mortalities during and after construction are anticipated to be rare events. Project impacts to burrowing owls are expected to be low.

Construction-related impacts to ferruginous hawks could include nest abandonment and the resultant loss of eggs or chicks if an active nest occurs on or near the Project area. CHW would conduct a raptor nest survey prior to construction, and any active nests would be avoided by an appropriate buffer until the chicks have fledged or the nest fails (Craig, 2008). Ferruginous hawks may be displaced from the Project area because of construction noise and human activity but are expected to resume the use of Project area habitat after construction is complete. Operational impacts would include the potential for mortality due to collisions with turbines, but with the use of modern turbines, mortalities are expected to be rare events. Impacts to

ferruginous hawks are expected to be low. Post-construction monitoring would be conducted to determine if ferruginous hawk mortality is occurring. Additional mitigation may be required if unacceptable levels of mortality occur, as determined by the CDOW and USFWS.

CHW would avoid surface disturbance in black-tailed prairie dog colonies, therefore black-tailed prairie dogs would not be impacted by the Project with the exception of the potential for vehicle-related mortality.

Swift fox are probably rare visitors to the Project area, and thus potential for impacts to this species is low. The yellow mud turtle is unlikely onsite due to the lack of ponds. Potential impacts include vehicle collisions during construction and operation. However, because of the lack of suitable habitat and lack of records of the species in the area, this likelihood is low.

For these species discussed above, with impacts assessed as very low or unlikely, CHW would coordinate with CDOW and FWS. Should fatalities arise, CHW will cooperate with the agencies on a solution to the extent feasible.

3.7.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, no Federal or State-listed species would be impacted by the Project.

3.7.2.4 Mitigation Measures

As described in Chapter 2, CHW would use state-of-the-art turbine technology, including large un-guyed turbines with tubular towers, slow-moving rotors, and few perching surfaces, thus reducing the potential for bird collisions. The power lines would be designed per the *Suggested Practices for Raptor Protection on Power Lines--the State of the Art in 2006* (Avian Power Line Interaction Committee 2006) to avoid potential electrocution impacts. CHW anticipates the avoidance of the area's black-tailed prairie dog colony. Prior to construction, this colony would be searched for burrowing owls and their sign, and if they occur in the colony, construction may be delayed within 46 m (150 feet) of the colony until after the nesting season (October 31). CHW would conduct a raptor nest survey prior to construction, and any active nests would be avoided by an appropriate buffer until the chicks have fledged or the nest fails. CHW is conducting mountain plover surveys in all potential habitat prior to construction as part of the spring avian survey and also during the sweep surveys if they occur during the plover nesting season, and, if nests are found, CHW would avoid construction within 402 m (0.25 mi) of a nest until the chicks are mobile (about 35 days after the nest is discovered or 7 days post-hatching) unless otherwise approved by the CDOW and USFWS.

To mitigate potential impacts from the water depletions occurring during construction, CHW would participate in the South Platte River Water Related Activities Program (SPRWRAP) component of the Platte River Recovery Implementation Recovery Program (PRRIP), as directed and approved by the USFWS under the ESA.

No additional mitigation is proposed beyond these protection measures committed to by CHW in Chapter 2.

3.8 Cultural Resources

3.8.1 Environmental Setting for the Proposed Project

The South Platte River Basin of northeastern Colorado has been inhabited by humans for at least 12,000 years. Three stages of prehistoric occupation have been identified in the region: Paleoindian, Archaic, and Late Prehistoric. Subdivisions of shorter duration, referred to as periods, comprise these stages (Gilmore *et al.* 1999). The first well documented era of occupation, the Paleoindian stage, began at approximately 12,000 B.P. and endured until 7500 B.P. The Clovis period (12,000 - 11,000 B.P.) coincides with terminal Pleistocene climatic conditions and is associated with highly mobile bands most strongly identified with a distinctive fluted, lanceolate dart point that has been found in dramatic association with mammoth bones (Chenault 1999:57). The more current view of Clovis adaptive strategy emphasizes a varied tool assemblage and diverse economy that includes plants and smaller game (Zier 1999:81-82). The subsequent Folsom period (11,000 - 10,000 B.P.) is marked by the transition from terminal Pleistocene to early Holocene environmental conditions, and witnessed evolution of the fluted point tradition. The traditional view of Folsom economy as one emphasizing the procurement of now-extinct bison species is currently undergoing significant modification (Kuehn 1998). These re-examinations suggest a wider subsistence base that, in addition to bison, included vegetal processing and the exploitation of small and medium-size game animals. The Plano period (10,000 - 7500 B.P.) witnessed the transition to full Holocene conditions and the development of numerous regional tool complexes lacking fluted points. A perceived increase in population is suggested by the occurrence of larger bison kill sites and camps (Wheat 1979).

The Archaic stage dates from 7500 to 1800 B.P. The band-level hunting and gathering tradition initiated during the Paleoindian stage was maintained during the Archaic, although this stage is marked by an increasingly varied subsistence base, large and diverse feature assemblages, and a range of morphologically disparate, primarily non-lanceolate, side- and corner-notched dart point styles (Tate 1999). The Early Archaic period (7500 - 5000 B.P.) coincides generally with the Altithermal climatic episode during which conditions were extremely warm and dry. Early Archaic evidence is scarce not only in northeastern Colorado but also across a vast area of the western High Plains (Frison 1991). Stone tool assemblages typical of the period thus are not fully understood. The Middle Archaic period (5000 - 3000 B.P.) coincides with a sweeping reversion to more mesic climatic conditions following the close of the Altithermal. Middle Archaic evidence, unlike that of the preceding period, is widespread throughout Colorado and surrounding areas and suggests successful adaptations by mobile hunter-gatherers to plains, basin/valley, foothills, and montane environments (Tate 1999; Frison 1991). The Middle Archaic period is closely associated with the McKean technological complex, marked by a series of distinctive lanceolate and stemmed-indented base Projectile point forms (Mulloy 1954). The Late Archaic period (3000 - 1800 B.P.) is characterized by high site frequency throughout the area, with many Late Archaic components occurring at the same localities as Middle Archaic sites. This continuity of occupation is indicative of a long-standing, regional hunter-gatherer population. Increasing variation in Projectile point styles suggests a strong trend toward

regionalism, although the generalized, broad-spectrum foraging economy that evolved throughout the Archaic stage continued during this period (Tate 1999).

The Late Prehistoric stage dates to 1800 - 100 B.P. (A.D. 150 - 1860) (Gilmore 1999). The Early Ceramic period (A.D. 150 - 1150) witnessed the introduction of ceramics, adoption of bow-and-arrow technology utilizing small side- and corner-notched arrow points. Early Ceramic sites are widespread in northeastern Colorado and occur in a wide variety of settings. Characteristic elements of this period include permanent and semi-permanent architecture and minimal use of cultigens. There appear to be relatively few recorded sites of the Middle Ceramic period (A.D. 1150 - 1540) in the South Platte River Basin, in contrast to the Arkansas River Basin at this time (Zier and Kalasz 1999). Most occupations of this age do, however, tend to be associated with multi-component sites, indicating continuity in adaptive strategy and settlement pattern. The Protohistoric period (A.D. 1540 - 1860) bridges the traditional concepts of prehistory and history (Clark 1999). Some of the events that transpired during this period are known as a result of archaeological investigations while for others documentary evidence exists in the form of written records. Equestrian nomadism characterizes the period following the introduction by the Spaniards of the horse to North America. Tribal groups that occupied and/or traversed the region during the Protohistoric period include Athabascan (Apacheans), Comanche, Ute, Cheyenne, Arapaho, Pawnee, and Sioux.

Anglo emigration began by the early 1840s in the South Platte Basin. Movement westward up the Platte River and into adjacent areas became nearly constant, as thousands of wagons utilized the valley of the Platte as a conduit to Utah and the far West , creating "the funnel through which America literally spilled over into the West" (Olson 1966:54). Whether for profit (1848 California gold rush), religious conviction (1847 - 1860 Mormon migration), or simple homesteading (Oregon-bound settlers), people utilized the trails to cross the plains to points beyond and not to settle the plains. Denver was founded in 1858 and quickly became the regional economic hub, although it was not until the 1860s and 1870s that the area encompassing the greater portion of the present study area was actively settled by whites.

Several historic routes of varying antiquity traverse South Platte River Valley in the Project vicinity. In addition to the route used by Long's 1820 exploration party, these include the Overland Trail and Stage Route, established in the 1850s; the Platte River Trail (ca. 1840s to 1900); and the route of the Spanish Villasur Expedition, ca. 1720 (Mehls 1984). None of these trails exhibits extant physical remains in the Project area. The Overland Stage Line Company established a series of stage stations or ranches bordering the south bank of the South Platte River between Old Julesburg and Denver. The coming of the railroad to the Great Plains and Rocky Mountain West ultimately rendered the great emigrant and freight trails obsolete. The transcontinental railroad forged through southern Wyoming in 1868 and was completed the following year. In short order, lines were built into Denver and other communities in northeastern Colorado.

By 1860 the principal economic themes of the South Platte River Basin had shifted away from transportation and the Indian trade, to be replaced over the course of the subsequent decade by homesteading/agriculture and ranching (Gregg 1954). Agricultural settlement in the general study area began in the mid-to-late 1860s. Based on data from southeastern Colorado, Carrillo

(1990; Carrillo et al. 1989) has identified three phases of historic agricultural settlement that can be broadly applied to the eastern Colorado plains. Referred to as subperiods, they span the period from 1867 to 1930. The validity of these phases over a wide area owes to the fact that they were driven by U.S. homesteading laws rather than local economic forces.

During the Early Settlement phase (1867-1890) large numbers of settlers moved into the area, generally in response to the Homestead Act of 1862 under which 65 Hectare (160-acre) plots of land could be acquired, and kept (patented) if specified improvements were made within an allotted time. Settlers in the South Platte Basin were almost entirely Anglos from the eastern and southern U.S. as well as various European countries. The Middle Settlement phase (1891-1915) witnessed the failure of a great many of the homesteads from the preceding phase, and consolidation of land holdings by a limited number of individuals, primarily Anglos. Many of the large irrigation canals in the South Platte River Valley were built in the early years of the Middle Settlement phase. A great influx of settlers occurred during the Late Settlement phase (1916-1930) in response to the Enlarged Homestead Act of 1909 and the Stock Raising Homestead Act of 1916 which, among other things, permitted claims of parcels of up to 640 acres. Drought began to affect the area in the mid-1920s, and within a few years eastern Colorado and adjacent areas – especially to the southeast – became part of the dust bowl. The economic effects of the drought were compounded by the onset of the Great Depression around 1930. The vast majority of those who had homesteaded in the region during the Late Settlement phase failed by sometime in the early 1930s as a result of these conditions. Many of the homesteaded parcels of land reverted to government ownership, while others were bought out by more successful neighbors. Consolidation of land holdings ultimately resulted.

Dryland farming techniques became widespread during an extended dry period in the latter 1880s and 1890s and, even earlier, cattlemen exploited the vast grasslands, running herds sometimes exceeding 40,000 head prior to the end of the open range period about 1895 (Mehls 1984). Changes in the beef and sheep industries occurred rapidly beginning around 1900 (e.g., pasture fencing and rotation, development of feed lots, increased rail access for transport), but stock raisers generally continued to prosper, as did their urban neighbors. Agriculture remains the economic mainstay of the region, and is manifested as livestock enterprises (swine and cattle, including both range and feedlot operations), poultry farms, and crop-raising operations (corn, milo, wheat, sorghum, and onions, among other crops), as well as support industries such as grain storage and transport, meat processing, and fertilizer production and distribution.

Surveys for Cultural and Historic Properties

The Project conducted both Class I and Class III surveys of the Project area (Anderson, C. et. al. October 2008). The Class I file search was conducted through the Compass on-line database of the Colorado OAHP during the week of May 5 – 9, 2008. The search was conducted on complete sections within which proposed wind farm facilities are to be located, plus a one-mile-wide buffer surrounding those sections. The search revealed that two prior cultural resource inventories, both of transmission line routes, are on record for the general Project area. Both of these inventories cross the corridor of the proposed transmission line for the Colorado Highlands Wind Project. The Sterling-Holyoke 115-kV line was surveyed by Commonwealth Associates (1980), while the Sidney-North Yuma 230-kV line was surveyed by Centennial Archaeology,

Inc. (Jepson 1991). Neither survey produced sites or isolated finds within or near the current Project corridor. No previously recorded prehistoric or historic sites are on record for any portion of the Colorado Highlands Wind Project area. In addition to OAHP records, a historic trails map of the Project vicinity was consulted (Scott 1989). Several trails and historic routes of travel traverse the valley of the South Platte River in the general Project vicinity but none of the routes crosses or runs close to the current Project area. Site-specific research targeting historic properties was conducted of Logan County Courthouse records in Sterling, as well as General Land Office (GLO) records, which are on file at the Colorado State Office of the Bureau of Land Management in Lakewood.

A Class III inventory was conducted of all proposed Project facilities at various times during the period May 15 – November 2008. A 4 Hectare (10-acre) parcel was surveyed around each proposed wind turbine location, as was a 46 m (150-foot) wide corridor straddling each proposed access road/buried utilities route and a 91 m (300-foot) wide corridor centered on the proposed overhead transmission line. In addition, the Wildhorse Creek Switchyard was surveyed separately on October 31, 2008. Transect spacing between individual archaeological surveyors did not exceed 20 m (65 ft) and averaged 15 m (50 ft). In November 1.27 additional miles of transmission line corridor were surveyed. Approximately 60 acres were surveyed for the proposed Project transmission line.

The inventory resulted in the recording of 19 sites and 15 isolated finds. Of the 19 sites, two are prehistoric, 15 are historic, and two are multicomponent, exhibiting both prehistoric and historic materials. The isolated finds include both prehistoric and historic remains. Prehistoric isolates finds consist of a projectile point of Late Archaic age, a biface, a retouched flake, and five occurrences of individual unmodified flakes. Historic isolated finds consist of six trash scatters or concentrations and a portion of a windmill tower. The isolated finds were not eligible for inclusion on the National Register of Historic Places (NRHP).

Information about the recorded sites is summarized in Table 3.7. The two prehistoric sites consist of a lithic scatter of unknown age and a lithic scatter with ground stone and ceramics that dates to the Late Prehistoric stage. The 15 historic sites include seven homestead remnants, which date mainly to the late 19th century or early 20th century; a 20th century abandoned farmstead with two standing structures; an abandoned power line dating to the late 1940s; a segment of the Chicago Burlington & Quincy (now Burlington Northern Santa Fe) Railroad built in 1885; an artifact scatter with a single structural remnant of early-to-mid 20th century age; and four trash dumps that range in age from late 19th to mid-20th century. One of the multicomponent sites is an undated prehistoric lithic scatter in spatial association with a late 19th or early 20th century trash scatter. The remaining multicomponent site consists of a late 19th-early 20th century trash scatter and a single prehistoric scraper.

Table 3.7 Summary Data for Recorded Archaeological and Historical Sites NOTE: The Project has not completed consultation with the Colorado SHPO. The recommendations are under review by the SHPO and subject to consultation and concurrence by the State of Colorado.

Site No.	P or H*	Description	NRHP Evaluation**	Management Recommendation
5LO642.1	H	Abandoned power line	NE	No further work
5LO643.1	H	Segment of Chicago Burlington & Quincy Railroad (now Burlington Northern Santa Fe)	Entire site – E; recorded segment - NE	No further work
5LO645	P	Lithic scatter	E	Avoid, or conduct test and mitigative excavations
5LO646	H	Trash dump	NE	No further work
5LO647	P	Lithic scatter with ground stone and ceramics	E	Avoid, or conduct test and mitigative excavations; monitor construction
5LO648	H	Trash dump	NE	No further work
5LO652	H	Homestead remnant	NE	No further work
5LO653	P/H	P – Lithic scatter; H – trash scatter	P – E; H - NE	P – Avoid, or conduct test and mitigative excavations; H – No further work
5LO654	H	Homestead remnant	NE	No further work
5LO655	H	Homestead remnant	NE	No further work
5LO656	H	Homestead remnant	NE	No further work
5LO658	H	Homestead remnant	NE	No further work
5LO660	H	Artifact scatter with structure remnant	NE	No further work
5LO663	H	Trash dump	NE	No further work
5LO664	H	Homestead remnant	NE	No further work
5LO667	P/H	P – Scraper; H – Trash scatter	NE	No further work
5LO677	H	Abandoned farmstead	NE	Re evaluation
5LO680	H	Trash dump	NE	No further work
5L0687	H	Farm complex	NE	No further work

* P = Prehistoric; H = Historic ** E = Eligible; NE = Not eligible

3.8.2 Environmental Impacts and Mitigation Measures

3.8.2.1 Significance Criteria

Impacts to cultural resources would be considered significant if cultural resource sites eligible for the NRHP are adversely affected by construction or operation of the wind Project.

3.8.2.2 Impacts of the Proposed Project

Fifteen of the 19 recorded sites are assessed as not eligible for the NRHP. This group includes all of the historic homestead remnants and the abandoned farmstead, the historic trash scatters, and the abandoned historic powerline, as well as the multicomponent site consisting of a historic trash scatter and single prehistoric artifact. No further management actions were recommended for these sites.

The four remaining sites are 5LO643.1 (railroad segment), 5LO645 and 5LO647 (prehistoric artifact scatters), and 5LO653 (multicomponent site). Site 5LO643.1 is a segment of the Chicago Burlington & Quincy Railroad (CB&Q). This link in the CB&Q system was built in 1885 under the name Colorado and Wyoming Railroad Company (Wilkins 1974:58; Gillette 1997), and is now part of the Burlington Northern Santa Fe system. This line as a whole is evaluated as NRHP-eligible. However, the segment recorded for the current undertaking does not support the eligibility of the greater site. Improvements have been made to this segment in order to maintain the railroad, and as a result the segment does not retain the distinctive characteristics of its original construction. The railroad bed has been raised and the tracks and ties have been replaced, and thus the original construction components are totally obliterated. No further work is necessary.

Prehistoric subsurface cultural materials are likely to be present at sites 5LO645, 5LO647, and 5LO653, all of which occur in eolian (dune) settings. (The historic component of site 5LO653 is not NRHP-eligible, and no further management actions are recommended subject to concurrence by the SHPO.) The preferable management action for these three sites is avoidance. If avoidance is not possible, the sites should be subjected to test excavation as a means of defining the nature and extent of subsurface deposits, and mitigative excavation should be conducted within the context of site-specific research designs. Furthermore, construction activity on the surface of the dune in which site 5LO647 is located should be monitored by an archaeologist. Cultural materials eroding from the southwestern margin suggest that buried remains are present to the north and east in the central part of the dune.

3.8.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, cultural resources would not be impacted by the Project.

3.8.2.4 Mitigation Measures

Subject to concurrence and consultation with the SHPO, no additional mitigation is proposed other than what has been described above.

3.9 Land Use, Transportation and Recreation

3.9.1 Environmental Setting for the Proposed Project

Land use within the Project area is primarily undeveloped with uses such as agricultural, grazing, native prairies and CRP land. Other land uses include transportation (roads), power transmission, residential use and recreation. Several gravel surfaced County Roads either bound or cross the Project area including County Roads 40, 42, 44, 46, 85, 87 and 89 as identified on Figure 3.7. State Route 55 is located west of the Project area.

There are no state or National Parks, Wild and Scenic rivers or other areas of recreational, scenic or aesthetic importance in the Project area. The Tamarack Ranch State Wildlife Area is located north of the Project area. Since the Project area is entirely located on private land, recreation including hunting is generally limited to the landowners themselves or granted to others by the landowners, except for use of the county roads to access off-site recreational areas (which are limited because most of the region is privately owned).

According to the Logan County Chamber of Commerce, the closest recreational vehicle (RV) parks are located in the Sterling and Peetz areas: Buffalo Hill Camp Ground and North Sterling State Park in Sterling and the Windy View RV Park in Peetz (Logan County Chamber of Commerce 2008a). Other camping areas in the County include North Sterling Reservoir, Prewitt Reservoir, Tamarack Ranch Wildlife Area, Jumbo Reservoir and Crow Valley Recreation Area. Fleming City Park also reportedly offers camping.

Interstate 76 is located north of the Project area; US Highway 6 is located south of the Project area; County Road 81/State Route 55 is located west of the Project area. There is good, improved access to the Project area via the County Road system from the State Highways and Interstate Highways. Burlington Northern-Santa Fe (located to the south) and Union Pacific (located to the north) provide rail service to the region. Denver International Airport is located approximately two hours from the Project area. Conditional Use Permit applications have been submitted to Logan County for the Project site and transmission line and are expected to be issued in November 2008.

3.9.2 Environmental Impacts and Mitigation Measures

3.9.2.1 Significance Criteria

Impacts to land use, transportation and recreation would be significant if the proposed Project precluded continuation of current land uses within the area surrounding the Project.

3.9.2.2 Impacts of the Proposed Project

Land Use

The Project would result in the initial disturbance of approximately 180 hectares (446 acres) and life-of-Project disturbance of 19 hectares (47 acres). Land use within the Project area is primarily undeveloped with uses such as agricultural, grazing, native prairies and CRP land. There is limited residential development in the Project area. These existing land uses would continue, as they currently exist prior to development, with only minor long term impacts. There would be minor loss of land use under permanent structures and roads affecting grazing, agriculture activities would be more difficult around towers and transmission structures and minor loss of CRP land and prairie would occur.

Transportation

Traffic would increase on the roads leading to and within the Project area during the construction stage, as equipment and materials are transported into the area. Large pieces of equipment such as rotor blades that are oversized loads may temporarily slow traffic on U.S. Highway 6 and some county roads as they are moved into the Project area. This additional heavy traffic would also cause additional wear on existing roads, but transportation would be conducted in accordance with Colorado Department of Transportation regulations and therefore adverse impacts to roads are not anticipated. Project area roads are crowned, ditched and graveled and are capable of supporting heavy loads. Only minor rutting of roads may occur, but would be a short-term, direct impact during the construction phase. Large agricultural equipment and trucks are common in the Project area so the introduction of additional large equipment associated with the wind Project would have only short term minor impact on transportation. Large pieces of equipment may occasionally impact transportation during the O&M phase, but most O&M traffic would be pick-up trucks and medium-sized trucks similar to those presently used for agricultural activities. The increase in traffic would not cause a major change in the transportation network in the Project area. Impacts to land use, transportation and recreation due to the Proposed Project would be short term and minor. Some land use impacts would be long term but minor. Transportation impacts would be short term and are expected to be minor. Impacts to recreation, especially in the form of hunting may be long term but are expected to be minor.

Recreation

All recreational land uses would continue as they are prior to development, with the possible exception of hunting, which would be precluded in the vicinity of wind turbines due to the potential for damage of transformers and other facilities by ammunition fired during hunting. This may have a minor effect on a landowner's income, as well as the recreational use of the area by hunters, the income impacts would be more than offset by the rent paid by CHW. The reduction in hunting opportunity would be insignificant.

3.9.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, land use, transportation and recreation would remain the same.

3.9.2.4 Mitigation Measures

Effective implementation of BMPs, including revegetating temporary work areas, would be sufficient to minimize impacts to land use. No additional measures have been identified as necessary to further reduce impacts to land use.

Heavy loads would be prohibited on gravel county roads when conditions are too wet to support traffic without creating significant ruts.

3.10 Public Health and Safety

3.10.1 Environmental Setting for the Proposed Project

Public access to private lands is already restricted by landowners and would continue to be restricted in accordance with easement agreements. This would prohibit members of the general public from accessing the wind farm facility located on private property. Existing safety hazards would include traffic on county roads, potential for fires, possible accidents related to agricultural and recreational activities, and electric and magnetic (electromagnetic) fields.

According to Cameron Harms, Transportation Director for Fleming School (preschool through 12th grade), there is only one bus stop in the vicinity of the Project area near the intersection of County Roads 46 and 85 north of the Project area (email correspondence, September 5-8, 2008, with Cameron Harms, Transportation Director for Fleming School). The bus reportedly stays on County Road 46 to and from County Road 83 to the east.

As previously discussed, Interstate 76 is located north of the Project area; US Highway 6 is located south of the Project area; County Road 81/State Route 55 is located west of the Project area. There is good, improved access to the Project area via the County Road system from the State Highways and Interstate Highways. Traffic in the area of the Project site is generally limited to local residents and visitors as there is little reason for non-residents to be traveling in the Project area.

The potential for fire or explosion from the wind energy facility is minimal. At electrical substations there may be a variety of types and applications of power transformers. In order to reduce the likelihood of property damage and the extent of transformer fires, protection is provided in the form of electrical, fixed fire and passive protection systems, such as fire barrier walls or separation.

Electrical protection for power transformers is accomplished with surge arresters, grounding, bonding, instrumentation, and switchgear. Fuses, switches, vacuum fault interrupters, circuit breakers, relays, meters, control power systems, and instrument transformers are all commonly

used. Over-current protection would be provided on both the primary and the secondary side of each transformer.

Magnetic and electric fields are produced by all electrical equipment, devices and appliances, including high-voltage transmission lines. A magnetic field is created by movement of electrons in a conductor (wire). The electric field is produced by the force that moves the electrons through the wire. There are also naturally occurring magnetic and electric fields, including the earth itself and human bodies. This combination of electric and magnetic fields is often referred to as "electromagnetic fields (EMF). The fluctuating pattern of AC produces a wave-like pattern. The frequency of these patterns including EMF or other waves is expressed in Hertz (Hz), which is the number of cycles of the repetitive wave pattern per second (1 Hz means one cycle (or wave) per second).

Current and voltage are required to transmit electrical energy over a transmission line. Current is the flow of an electrical charge measured in amperes and is the source of a magnetic field. Voltage represents the potential for an electrical charge to do work expressed in units of volts (V) or kV and is the source of an electrical field. The proposed 115-kV transmission line would provide a maximum thermal capacity of approximately 500 amperes in each of the conductors or wires. The electrical effects of the proposed 115-kV transmission line can be characterized as current-induced magnetic fields and voltage-induced electrical fields. There are no Federal or Colorado State standards governing electric or magnetic fields.

Local aircraft or radar or television signals within the area can be impacted by EMF produced by electrical equipment and transmission lines. The Project area is not located in the vicinity of a local or regional airport or a military air base.

3.10.2 Environmental Impacts and Mitigation Measures

3.10.2.1 Significance Criteria

Impacts to public health and safety would be considered significant if the Proposed Action resulted in loss of life, limb or property.

3.10.2.2 Impacts of the Proposed Project

Potential public health and safety impacts could include the following:

- Traffic accidents;
- Traffic accidents involving railroad crossings north and south of the Project area;
- Unanticipated fires;
- Electrocution from high voltage equipment;
- Interference with school buses or emergency vehicles; and
- Electromagnetic interference (EMI) with local aircraft radar or television signals.

With the implementation of mitigation described below, these impacts should not occur or would be unlikely.

Traffic

Traffic accidents and interference with local school buses or emergency vehicles are not anticipated to be likely impacts due to the fact that the county roads in the Project area are not heavily used as a result of the sparse population in the general area. There is only one school bus that uses the area and the likelihood that emergency vehicles utilize the road is low.

Electromagnetic Fields

Impacts to human health would include increase risk of injuries or deaths resulting from potentially higher risk of adverse health symptoms resulting from increases in electric and magnetic fields in the area.

Magnetic field strength is expressed in terms of teslas or gauss. The are no established limits for magnetic field strength. The proposed 115-kV transmission line, operated at maximum current and thermal capacity, would induce an estimated 30-hertz (Hz) magnetic field maximum of approximately 115 milligauss (mG) (0.15 gauss) diminishing to 3 mG about 200 feet away. These magnetic field strengths compare with levels of magnetic field measured near common household appliances, and are much less than the direct current magnetic field of the earth (0.6 gauss). Since the proposed line design is in keeping with Western's field-reducing guidelines, any exposures with the ROW would be similar to those expected from typical Western designs. The edge of the ROW would mark the beginning of the long-term residential exposure levels which would be the present health concern. Since there would be no residences or occupied buildings with the ROW, no such long-term exposures would be expected.

Long-term Exposure to Electric and Magnetic Fields

Questions concerning effects of long-term exposure to electric fields from transmission lines on human health are a controversial subject that has been raised primarily in hearings related to 500-kV and 765-kV transmission lines. These high voltage lines induce electrical fields at ground levels more than four times the maximum electrical field estimated under the proposed 115-kV transmission line. Although available evidence has not established that induced electrical fields pose a health hazard to exposed humans, the same evidence does not prove there is no hazard. Therefore, in light of the present uncertainty, it is Western's policy to design and construct transmission lines that recue the EMF to the maximum extent feasible.

While considerable uncertainty remains about the EMF/health effects issue, the following facts have been established from evaluating the results and trends of EMF-related research:

- Any exposure-related health risks to an exposed individual would be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns have been related to magnetic fields
- The measures employed for field reduction can affect line safety, reliability, efficiency, and maintainability, depending upon the type and extent of such measures.

Below are brief summaries of some past and current EMF health studies:

Electric and Magnetic Fields from 60-Hz Powerlines: What do We Know about Possible Health Risks? Morgan (1989) concluded that 60-Hz EMF does not pose a significant risk to agriculture, animals or ecosystems.

The Electric Power Research Institute (along with the Veterans Affairs Medical Center and the Bonneville Power Administration) (Hefeneider et al. 2001) conducted a four-phase study that exposed sheep to fields from a 500-kV transmission line. The research was done to determine whether long-term EMF exposures impacted melatonin levels, immune function and animal health. Early phase studies of exposed groups of animals showed no impact on melatonin levels. In later studies, immune cells were monitored in two exposed groups of animals to find out if exposure to fields resulted in immune cells reduction in the exposed animals. Cell reduction would affect immune function and animal health. Final results showed that immune cells were not consistently or significantly reduced in exposed sheep.

A team of Canadian researchers led by McBride reported in the May 1999 issue of the American Journal of Epidemiology that if there is a risk (of childhood leukemia from EMF exposure) it is undetectable through epidemiological studies.

A study sponsored by the National Institute of Health (NIH), National Institute of Environmental Health Sciences (NIEHS) was published in June 1999, The *Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*, stated that all theories concerning biological effects of EMF "suffer from a lack of detailed, quantitative knowledge," and concluded that laboratory data using a variety of animals, such as non-human primates, pigeons and rodents are inadequate to conclude that EMF field exposure alters cancer pattern rate and has not been adequately demonstrated for non-cancer health issues (e.g. birth defects) (NIEHS), 1999). As a precaution regarding human health issues, the report recommends that the electrical field at the edge of a ROW measured one meter above ground not exceed 1-kV/m, and considered this recommendation conservative.

3.10.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, no impacts to public health and safety would occur.

3.10.2.4 Mitigation Measures

Truck drivers, construction workers, residents and any visitors to the Project area are expected to obey traffic laws. All drivers are expected to exercise caution when crossing at-grade railroad crossings that might have to be crossed to reach the Project area.

The Project team would consist of qualified contractors and subcontractors who employ trained and competent personnel. All contractors, subcontractors and their personnel are required to comply with all state and Federal worker safety requirements, specifically all of the applicable requirements of the Occupational Safety and Health Administration (OSHA). Each contractor would be required to provide a site specific health and safety plan as required by Part 1910 –

Occupational Safety and Health Standards. In addition, due to the multiple employers that would have employees on site, safety would be coordinated on a Project-wide basis through activity-specific hazard assessments and Job Safety Assessments (JSAs).

Fires caused by lightning or other natural causes or those caused by the wind facility or other man-made causes (camp fires, cigarettes, vehicles, etc.) would be extinguished immediately by CHW personnel as long as there is no danger to life or limb and the appropriate landowner and the Logan County's sheriff's department would be notified immediately. Some fire-fighting equipment would be located in vehicles and at the O&M facility. If the fire cannot be extinguished by CHW personnel, the landowner and sheriff would be so advised. Fire deterrents within the wind farm would include access roads, which may serve as fire breaks and regular clearing of vegetation from areas around transformers, riser poles and buildings.

The substation would be fenced as required for public safety, but no other fencing is required or proposed at this time.

Safety signing would be posted around all towers, where necessary, transformers and other high voltage facilities, and along roads, in conformance with applicable state and Federal regulations.

In the event that the Project results in impact to radar, microwave, television or radio transmissions, CHW would work with the owner of the impacted communication system to resolve the problem. Potential mitigation may include realigning the existing antennae or installing relays to transmit the signal around the Project (BLM 2005). Additional warning information may also need to be conveyed to aircraft with onboard radar systems so that echoes from wind turbines can be quickly recognized.

The FAA requires a notice of proposed construction for a Project so that it can determine whether it would adversely affect commercial, military or personal air navigation safety (BLM 2005). The proposed Project would meet all appropriate FAA criteria including lighting requirements, and avoiding potential safety issues associated with proximity to airports, military bases or training area or landing strips, so no adverse impacts to aviation would be expected.

3.11 Noise

3.11.1 Environmental Setting for the Proposed Project

The unit used to describe the intensity of sound is the decibel (dB). Audible sounds range from 0 dB ("threshold of hearing") to about 140 dB ("threshold of pain"). The normal audible frequency range is approximately 20 Hz to 20 kHz. The A-weighted scale, denoted as dBA approximates the range of human hearing by filtering out lower frequency noises, which are not as damaging as the higher frequencies. It is used in most noise ordinances and standards. To provide a frame of reference, rustling leaves have a decibel level of 10 dBA; conversational speech, 60 dBA; and aircraft takeoff, 120 dBA.

The Project area is rural farmland, grazing land and prairies with homesteads, agricultural activities, state and county roads and the wind as the major contributors to ambient noise levels.

For a typical rural environment, background noise is expected to be approximately 40 dBA during the day and 30 dBA at night (BLM 2005). Noise levels within the Project area are likely lowest during the morning and at night when wind speeds are lower, and highest in the afternoon when wind speeds are higher.

Wind plants are always located where the wind speed is higher than average and the "background" noise of the wind tends to "mask" sounds that might be produced by operating wind turbines – especially because the turbines only run when the wind is blowing. With current turbine technology, an operating wind farm at a distance of 229 to 305 meters (750 to 1000 feet) is no noisier than a kitchen refrigerator or a moderately quiet room (AWEA, 2004b).

Noise is sometimes defined as unwanted sound, and the terms noise and sound are used more or less synonymously in this analysis. The human ear responds to a very wide range of sound intensities. The decibel (dB) scale used to describe and quantify sound is a logarithmic scale that provides a convenient system for considering the large differences in audible sound intensities. On this scale, a 10-dB increase represents a perceived doubling of loudness to someone with normal hearing. Therefore, a 70-dB sound level will sound twice as loud as a 60-dB sound level.

People generally cannot detect sound level differences (increases or decreases) of 1 dB in a given noise environment. Although differences of 2 or 3 dB can be detected under ideal laboratory conditions, such changes are difficult to discern in an active outdoor noise environment. A 5-dB change in a given noise source would be likely to be perceived by most people under normal listening conditions. For the purposes of this analysis, a 3-dB change in a given noise source is assumed to be detectable by residents in the vicinity of the proposed wind farm due to likely low levels of ambient noise.

When addressing the effects of noise on people, it is necessary to consider the "frequency response" of the human ear, or those frequencies that people hear best. Sound-measuring instruments are therefore often programmed to "weight" sounds based on the way people hear. As previously discussed, the frequency-weighting most often used to evaluate environmental noise is A-weighting, and measurements using this system are reported in "A-weighted decibels" or dBA. All sound levels discussed in this evaluation are reported in A-weighted decibels.

As mentioned above, the decibel scale used to describe noise is logarithmic. On this scale, a doubling of sound-generating activity (i.e., a doubling of the sound energy) causes a 3-dBA increase in average sound produced by that source, not a doubling of the loudness of the sound (which requires a 10-dBA increase). For example, if a source causes a 60-dBA sound level at some nearby receiver, two of the same source at the same location would cause the sound level at the receiver to increase to 63 dBA.

Sound waves from discrete events or stationary "point" sources (such as a wind turbine) spread as a sphere, and sound levels from such sources decrease at about 6 dBA per doubling of the distance from the source. Conversely, moving half the distance closer to a point source increases sound levels by about 6 dBA.

The L_{eq} is a noise metric representing the level of a constant sound that contains the same sound energy as the actual fluctuating sound over the same time period. As such, the L_{eq} can be considered an energy-average sound level. Because the L_{eq} considers sound levels over time, this metric accounts for the number and levels of noise events during an interval (e.g., 1 hour) as well as the cumulative duration of these events.

In contrast, the L_{dn} is a useful measurement in locations where the potential for sleep disturbance is a concern. The L_{dn} is like a 24-hour L_{eq}, except that the calculation adds 10 dBA to the sound levels between 10 p.m. and 7 a.m. to account for possible sleep disturbance. The L_{dn} is used to describe the noise environment in areas where there is both nighttime and daytime use, such as residences.

Typical sound levels of some familiar noise sources and activities are presented in **Table X**.

Table 3.8 Sound Levels Produced by Common Noise Sources

Thresholds/ Noise Sources	**Sound Level (dBA)**	**Subjective Evaluations [(a)]**	**Possible Effects on Humans [(a)]**
Human Threshold of Pain Carrier jet takeoff at 50 ft	140	Deafening	Continuous exposure to levels above 70 can cause hearing loss in majority of population
Siren at 100 ft Loud rock band	130		
Jet takeoff at 200 ft Auto horn at 3 ft	120		
Chain saw Noisy snowmobile	110		
Lawn mower at 3 ft Noisy motorcycle at 50 ft	100	Very Loud	
Heavy truck at 50 ft	90		
Pneumatic drill at 50 ft Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner at 3 ft	70		Speech Interference
Air conditioning unit at 20 ft Conversation at 3 ft	60	Moderate	
Quiet residential area Light auto traffic at 100 ft	50		Sleep Interference
Library Quiet home	40	Faint	
Soft whisper at 15 ft	30		
Slight rustling of leaves	20	Very Faint	
Broadcasting Studio	10		
Threshold of Human Hearing	0		

Source: EPA 1974 and Others

[(a)] Note that both the subjective evaluations and the physiological responses are continuums without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receivers.

3.11.2 Environmental Impacts and Mitigation Measures

3.11.2.1 Significance Criteria

Impacts from noise would be considered significant if the Project's operation resulted in regular annoyance to the residents within 1,000 feet of a wind turbine.

3.11.2.2 Environmental Impacts

Construction related noise that is produced by machinery and vehicles would exceed ambient noise levels and may be heard for some distance within the Project area. Noise levels would be typical of diesel powered machinery and gasoline or diesel powered vehicles. Cement trucks, cranes and auguring equipment would produce noise during their operation; and increased noise would be noticeable to local residents and others in the vicinity of construction activities. These impacts would be moderate, likely disrupting residents and wildlife during construction hours. Overall noise levels would be similar in type and degree to noise currently produced by farm machinery, trucking, highway noise and other construction Projects.

Noise impacts associated with operations are expected to be minimal to humans. At the base of a wind turbine, it should be possible to have a conversation without raising one's voice (American Wind Energy Association [AWEA] 2004b). At the nacelle, the wind turbines proposed for this Project generate approximately 104 dBA, depending on wind speed. The closest active raptor nest is approximately 541 m (1,776 feet) to the closest turbine (Turbine 7) and the nearest residence is over 280 m (920 feet) to the closest turbine (Turbine 65, west).

Generally, the sound of the wind will mask turbine noise, especially since turbines only operate when wind speeds reach a certain threshold. CHW would use state-of-the-art turbines that have been designed to minimize noise levels (e.g., upwind rotors, thinner blade tips, streamlined towers and nacelles, etc.), so it is anticipated that wind turbine noise impacts to residents and wildlife would be minimal.

The Cadna/A noise model was used to predict wind farm noise at three potentially-affected residential receptors in the project vicinity. Cadna/A is a computer model that can calculate sound levels after considering the noise reductions or enhancements caused by distance, topography, ground surfaces (including water), atmospheric absorption, and meteorological conditions. For modeling purposes, the terrain was assumed to be relatively flat in the project vicinity. The model, therefore, did not account for minor variations in terrain that may act to enhance or reduce noise transmission from source to receiver.

For the modeling effort, the noise sources were characterized based on frequency-specific information provided by the manufacturer, General Electric, and a three-dimensional map of the study area was created to enable the model to evaluate effects of distance and elevation of each source, and assigned the noise source sound levels to the appropriate locations on the map. Cadna/A then constructed topographic cross sections to calculate sound levels in the project vicinity.

The height of each wind turbine source was 80 meters above ground level. Each receptor was placed 1.5 meters (about 5 feet) above ground to represent a typical listening height.

To determine the potential for audibility, the ambient day-night level (L_{dn}) that would be increased by 3 dBA with the proposed project (i.e., using the Canda/A noise model results) was back-calculated. As previously discussed, for the purposes of this study, a 3 dBA increase is considered an audible increase in noise levels in a quiet rural environment.

Calculations were based on the assumption that the entire wind farm would operate at maximum wind-speed capacity over a 24-hour period (i.e., at the cut-out speed of 9 m/s at hub height).

Noise levels were predicted at three receiver locations, each representing a suspected residence. Receivers are labeled R1, R2, and R3, representing receivers nearest the southwest, west, and east of the Project site, respectively.

The threshold ambient levels at which the proposed wind farm would be audible are 24-hour L_{dn}s. Because receivers are located in an area that is subject to relatively high wind speeds, existing sound levels will likely vary (i.e., higher wind speeds typically result in higher sound levels due to noise generated by wind and wind rustling shrubs, tress, etc.). Higher wind speeds typically occur during daylight hours, and therefore existing noise levels are likely typically higher during the day than at night. Because noise generated by wind turbines are also higher under windier conditions, noise from the proposed wind farm would be expected to be higher during daylight hours than at night. The following summary of noise modeling results assumes a wind speed of 9 meters per second, continuous over a 24-hour period, considered a worst-case scenario. Under slower wind conditions, the ambient levels at which the wind farm would be audible at each receiver would be less than is identified below.

At the nearest suspected residence to the proposed wind farm, R1 (located approximately 280 m [920 feet] from the nearest wind turbine) noise from continuous operation of the wind farm would be 43 dBA. The proposed project would likely not be audible at this receiver if existing day-night sound levels were greater than 49 dBA, L_{dn}.

At R2, located about 1,400 feet from the nearest turbine, noise from the wind farm operating at maximum capacity would be 40 dBA. The proposed wind farm would likely not be audible at this receiver if ambient sound levels were greater than 47 dBA, L_{dn}.

At R3, located about 2,435 feet from the nearest turbine, noise from the wind farm operating at maximum capacity would be 37 dBA. The proposed wind farm would likely not be audible at this receiver if ambient sound levels were at or greater than 44 dBA, L_{dn}.
The following table summarizes the noise modeling results.

Table 3.9 Noise Modeling Summary at Nearest Suspected Receivers

Receiver [(a)]	Distance to Nearest Wind Turbine (feet)	Predicted Wind Farm Noise Levels, dBA [(b)]	Ambient Sound Level Threshold for Audibility, dBA [(c)]
R1 *Southwest* *920 feet to nearest Turbine*	920	43	49 Ldn
R2 *West* *1,400 feet to nearest Turbine*	1,400	40	47 Ldn
R3 *East* *2,435 feet to nearest Turbine*	2,435	37	44 Ldn

Source: ENVIRON, 2008

(a) Receiver location based on suspected house locations

(b) Assumes continuous operation at cut-off speed operation (9 m/s at hub height).

(c) Represents threshold ambient day-night level at which turbine noise would be likely audible. Project likely *not* audible at *higher* ambient levels.

Therefore, the predicted noise levels at the closest residential receptors are comparable to noise levels anticipated at a quiet home or rural night-time ambient noise levels.

Substations emit both transformer noise and switchgear noise. Transformers emit a low-frequency humming noise (caused by vibrations within the transformer). Substation noise levels at the nearest residence and nearest known raptor nest would be below ambient levels.

Wind turbine and substation noise would be at or below ambient levels at the nearest residences. Due to the temporary and intermittent nature of noise effects and the presence of similar noise sources within the Project area, noise impacts to residents and wildlife would be minor.

3.11.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, the area's noise levels would not change due to the Project.

3.11.2.4 Mitigation Measures

CHW would minimize construction noise impacts by ensuring that construction equipment is maintained and properly muffled, limiting the amount of equipment on-site to that which is necessary for construction and limiting construction activities to daytime hours.

3.12 Visual Resources

3.12.1 Environmental Setting for the Proposed Project

Visual resources refer to all objects (man-made and natural, moving and stationary) and features (e.g., landforms and water bodies) that are visible on a landscape. These resources contribute to the scenic or visual quality of the landscape, that is, the visual appeal of the landscape. A visual impact is the creation of an intrusion or perceptible contrast that affects the scenic quality of a landscape. A visual impact can be perceived by an individual or group as either positive or negative, depending on a variety of factors or conditions (e.g., personal experience, time of day, weather/seasonal conditions). Landscapes and their visual qualities, like other public resources, exist in a dynamically changing physical, social and economic context, resulting in shifting and competing demands for their use.

The area exhibits a typical rural setting with both occupied and abandoned farmsteads scattered along gravel roads throughout the landscape, which is a mixture of tilled and CRP agricultural fields and native grassland used for grazing. The landscape is characteristically flat to rolling, with the green and brown colors of the agricultural fields, linear features such as roads and transmission lines. The proposed Project would not impact any national or state parks or designated scenic areas with recognized regionally important viewsheds. U.S. Highway 6 is located approximately 4 miles south of the Project wind site and runs just north of the proposed Wildhorse Creek Switchyard. Several county roads traverse the area generally on section lines. This area of eastern Colorado is home to numerous wind turbines and the site of wind farms in the area is common. There are reportedly 339 wind turbines in the county already (Logan County). The visual elements of the proposed Project area are common in northeastern Colorado.

U.S. State Highway 6 is a regionally significant highway that carries traffic between the rural towns of Holyoke to the east at the intersection with U.S. Highway 385, Fleming and Sterling to the west near the intersection with Interstate Highway 76. The county roads in the Project area are not used often due to the sparse population within the overall area. The county roads have a moderate to low viewer sensitivity due to the moderate user attitude, short duration of view, and low user volume.

User attitude is described as the anticipation of the user to expect above-average scenery to be seen from a particular viewpoint. In the case of U.S. Highway 6 within the Project area, travelers are moving from place to place and expect to arrive expeditiously upon a state or Federal highway. Travelers typically choose these highways for their ability to quickly move motorists throughout the region. Conversely, any route that carries the official designation of a scenic highway tends to attract motorists for the sole purpose of viewing scenery. U.S. Highway 6 is not designated as a scenic highway. The wind turbines on the Project site would be visible from U.S. Highway 6, which is located approximately 4 miles south of the closest turbine.

3.12.2 Environmental Impacts and Mitigation Measures

3.12.2.1 Significance Criteria

Impacts to visual resources would be considered significant if construction of the wind Project would result in high visual contrasts in highly sensitive or visually unique areas in proximity to high to medium numbers of high sensitivity viewers.

3.12.2.2 Environmental Impacts

The Project Site is visible from U.S. Hwy 6 and from County Roads. The Wildhorse Creek Switchyard would be visible in the foreground at the intersection of U.S. Hwy 6 and CR 87. The Project transmission line would be visible as it crosses U.S. Hwy 6 to interconnect with the Wildhorse Creek Switchyard. The Project would primarily result in long term visual effects, resulting from the visibility of the proposed facilities for the life-of-the-Project. The changes would primarily affect representative landscapes of northeastern Colorado and residential and county highway viewer groups in the Project area. The wind turbines would change the aesthetics of the landscape with the addition of more tall towers and rotating blades. This effect may be deemed a beneficial or adverse effect depending on the viewer perspective and sensitivity.

U.S. Highway 6 is a regionally significant highway that carries commercial and private traffic into and through the area. This section of U.S. Hwy 6 is not a designated scenic highway. This Highway has a moderate to low viewer sensitivity due to the moderate user attitude and short duration of view. The turbines themselves would be located at least 4 miles north of the highway, which generally runs east and west, so the Project is not expected to dominate the views of travelers. Public outreach opportunities for the Project did not result in adverse comments on the potential visual impacts of the project. Generally attitudes of those participating in public meetings and comment opportunities are supportive of the project.

Visual impacts would also include short term direct effects from ground disturbances and the visibility of construction crews, equipment and vehicles working in the Project area and access roads. Short term visual impacts during Project construction would be adverse, but less than significant since these visual changes would be temporary and CHW would implement standard practices to reclaim disturbed landscapes to pre-disturbance conditions.

The substation, access roads, overhead power lines, vehicles and dust during construction would impact visual resources. The substation would be viewed most frequently by local landowners and travelers on U.S. Highway 6, and it would represent an industrial-type facility in a rural landscape. The Project area already contains several County roads that bisect the Project area and a number of private roads; construction of approximately 30.5 more kilometers (19 miles) would constitute a minor increase in the number of roads in the Project area. During construction, vehicles and dust would be a fairly constant presence in the Project area; during O&M, vehicle traffic would be only slightly more than current traffic levels.

Overall visual impacts would be long term and moderate.

3.12.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, the area's visual resources would not change due to the Project.

3.12.2.4 Mitigation Measures

No additional mitigation is proposed.

3.13 Socioeconomics and Environmental Justice

3.13.1 Environmental Setting for the Proposed Project

For the purposes of this EA, the area of potential effect for socioeconomic impacts includes the towns of Fleming, Sterling and Haxtun, Colorado and Logan County Colorado.

The Project area is located in a rural, agricultural area northeast of Fleming, in Logan County, Colorado. As of the census of 2000, the population of Fleming was 426 with 198 housing units and 169 households (US Census Bureau, 2008a). The racial makeup of the town was 96.7 White, 2.3% African American, 0.2% Native American, and 0.7% from two or more races. Hispanic or Latino of any race was 2.3% of the population. Median age is 39.1 years. Median household income was $26,484 and median family income was $31,818 and per capita income is $12,113. About 6.4% of families and 12.4% of the individual population were below the poverty line.

Sterling, Colorado is located approximately 40 km (25 miles) southwest of the Project area. In 2000, Sterling's population was 11,360 (US Census Bureau, 2008b). Sterling has 5,171 housing units with 4,604 households. The racial makeup of the city was 90.7% White, 0.7% African American, 0.8% Native American, 0.4% Asian, 0.1% Pacific Islander, 5.6% from other races, and 1.6% from two or more races. Hispanic or Latino of any race was 14.2% of the population. Median age is 35 years. Median household income is $27,337; median family income is $39,103, and per capita income is $15,287. About 11.5% of the families and 15.2% of the individual population are below poverty level.

Haxtun, Colorado is located approximately 32 km (20 miles) southeast of the Project area. In 2000, Haxtun's population was 982 (US Census Bureau, 2008c). Haxtun has 490 housing units with 418 households. The racial makeup of the town was 97.1% White, 0.1% African American, 0.5% Native American, 0.4% Asian, 0.1% Pacific Islander, 0.4% from other races and 1.3% from two or more races. Hispanic or Latino of any race was 2.0% of the population. Median age is 44.3 years. Median household income is $30,265; median family income was $38,906, and per capita income is $16,370. About 6.3% of the families and 12.4% of the individual population and are below the poverty level.

Logan County's population is an estimated 21,055 (U.S. Census Bureau 2008d), and Sterling is the main population center. Population density in the county is about 11 persons per square mile.

In 2006, there were 8,737 total housing units (U.S. Census Bureau 2008e) and ownership rate in 2000 was 69.9%. In 2000, there was an estimated 7,551 households with a median household income of $34,691 (U.S. Census Bureau 2008f); the median family income in 1999 was $42,241. The racial makeup of the county in 2006 was 95.4% White, 2.3% Black or African American, 0.8% Native American, 0.50% Asian, 0.1% Pacific Islander, 3.77% from other races, and 1.0% from two or more races. 13.1% of the population was Hispanic or Latino of any race. An estimated 13.0% of the population was below the poverty line in 2004.

According to the Logan County Economic Development Corporation, Logan County is a rapidly growing agriculture and industry-based community. While the economy is still largely reliant on agriculture, manufacturing, renewable energy, and business services has emerged as dominant forces. These sectors, combined with the City of Sterling's "retail hub" status, have diversified Logan County's economy and work force. The recent trend in energy prices has caused the energy industry to refocus efforts in northeastern Colorado, resulting in many new oil and natural gas wells and product pipelines being developed, including the State of Colorado's first commercial ethanol plant being located in Sterling. In addition, as a result of the state-of-the-art telecommunications infrastructure in Logan County, the City of Sterling is home to two call centers, one being located in Sterling for over 10 years and the second recently beginning operations in 2005. Goods manufactured in Logan County also include farming tools, oil and gas well drilling equipment, equipment for feeding livestock, scales and weighing machines, truck beds, flatbed trailers and trailers for hauling cars.

Each Federal agency is to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low income populations” (Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 1994, 59 Federal Register [FR] 7629).

The Presidential Memorandum accompanying the Executive Order directs Federal agencies to “analyze the environmental effects, including human health, economic and social effects of Federal actions, including effects on minority communities and low-income communities when such analysis is required by the National Environmental Policy Act.”

EPA defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including racial, ethnic or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of Federal, state, local and tribal programs and policies.

In addition, the Council on Environmental Quality provides input on NEPA compliance with Executive Order 12898 in its Environmental Justice Guidance under NEPA, December 1997.

Low income communities are defined by EPA as communities where the percentage of the population below poverty level is greater than the state average. Currently, 8.4% of Colorado's families and 12.0% of individuals are below poverty level. In Fleming, about 6.4% of families and 12.4% of the population were below the poverty line; consequently, Fleming is not a low-income community for families, but is marginally considered one for individuals. In Sterling, an estimated 11.5% of the families and 15.2% of the population and are below poverty level, so Sterling would be considered a low-income community. In Haxtun, an estimated 6.3% of the families and 12.4% of the population and are below the poverty level; consequently, Haxtun is not a low-income community for families, but is marginally considered one for individuals.

Minority communities are defined by EPA as communities where the percent of minorities is larger than the state average. Colorado's minorities make up 25.5% of the state's population and 15.6% of Logan Counties populations; therefore, Logan County is not considered a minority county. Minorities make up 5.6% of Fleming's population; therefore, Fleming is not a minority community. The minority population of Sterling is 16.7%, therefore, Sterling is not a minority community. The minority population of Haxtun is 4.7%, therefore, Haxtun is not a minority community (Colorado Department of Local Affairs, State Demography Office, email correspondence Sept 2008).

3.13.2 Environmental Impacts and Mitigation Measures

3.13.2.1 Significance Criteria

- Impacts to socioeconomics would be considered significant if Project-related population increases result in housing or public service demands that could not be met by existing or currently planned communities.
- Impacts related to environmental justice would be considered significant if the Project caused disproportionately high impacts on low-income or minority communities.

3.13.2.2 Impacts of Proposed Project

Approximately 150 construction jobs would be required to construct the Project over approximately 6 months. O&M would require 8 to 10 full time personnel during operation of the system for the planned life-of-Project. Most construction workers are expected to commute from Sterling, Fleming, Haxtun, Holyoke or Julesburg, Colorado and surrounding areas. Specialty construction workers, with specified wind power construction experience, would come from out-of-state, and the out-of-state work force is expected to be about 50% or about 75 workers, who would likely commute from Sterling during the construction period. Sterling has 567 vacant housing units and over 500 hotel rooms (Logan County Chamber of Commerce 2008b). There is adequate housing and associated infrastructure to support the 75 additional workers during the construction period. No new infrastructure would be required.

Because additional workers would be in the area and because there would be an increase in traffic, the Project would result in a small increase in the need for additional law enforcement; however, no public safety issues were noted during construction of the other wind Projects in the county (personal communication, September 4, 2008, with Allan Pierce, Logan County Under

Sheriff) and the Project assumes that a similar situation would be realized for this proposal. There would be no expected population increase resulting from the Project that would result in housing demands and public service demands that could not be met by existing resources in the area.

Western and the Project received no information during the scoping process, public meetings or agency meetings that indicated a potential environmental justice issue. The Project is located entirely on land with willing landowners and the community response in letters and e-mails and during public meetings has been uniformly supportive. The Project has not identified any disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes.

The Project would generate sales and use taxes for goods and services purchased during construction and operation (Table 3.10). It would also provide property taxes to the town of Fleming and to Logan County. The Project would employ 150 workers during construction and would create 8-10 permanent O&M jobs. All of these impacts would be beneficial to the affected towns/cities, to Logan County and to the State of Colorado. Logan County and the City of Fleming are low-income communities in the area of potential effect, but the Project is expected to generate revenue needed by the county and the city, so no adverse effects to low-income communities would occur. Furthermore, the Project would generate revenue for the private landowners on whose land the Project is located, further benefiting the area's economy.

Table 3.10 Expected Revenues to Local Landowners and Governments from the Proposed Project

Source of Revenue/Benefit	Estimated Amount of Revenue/Benefit (Life-of-Project)
Sales, Use and Property Taxes	$8,200,000
Landowner Income	$30,000,000
Construction Employment	150 temporary full-time jobs
O&M Employment	8-10 permanent full-time jobs

The following discussion of wind development impacts on property values was excerpted from the U.S. Bureau of Land Management's Final Programmatic Environmental Impact Statement on Wind Energy Development of BLM-Administered Lands in the Western United States (BLM 2005).

> The potential impact of wind development Projects on residential property values has often been a concern in the vicinity of locations selected for wind power. Although this PEIS does not directly assess the potential impacts of wind power on property values, a review of two studies that examined potential property value impacts of wind power facilities suggests that there would not be measureable negative impacts.
>
> ENONorthwest (2002) interviewed county tax assessors in 13 locations that had recently experienced multiple-turbine wind energy developments. While not all the locations

chosen had wind turbines that were visible from residential areas, and some development projects had been constructed too recently for their full impact to be properly assessed, the study found no evidence that wind turbines decreased property values. In one area examined, it was found that designation of land parcels for wind development actually increased property values.

Sterzinger et al. (2003) analyzed the effects of 10 wind energy development Project built during the period 1998 to 2001 on housing sale prices. The study used a hedonic statistical framework that attempted to account for all influences on changes in property value; its data came from sales of 25,000 properties, both within view of recent wind energy developments and in a comparable region with no wind energy Projects, before and after Project construction. The results of the study indicate that there were no negative impacts on property values. For the majority of the wind energy Projects considered, property values actually increased within the viewshed of each Project, with property values also tending to increased faster in areas with a view of the wind turbines than in areas with no wind Projects.

3.13.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, the affected towns/cities, Logan County, and the State of Colorado would not realize the sales and use or property taxes potentially generated by the wind Project, and private landowners would not realize the additional income from easements on their property.

3.13.2.4 Mitigation Measures

No mitigation is proposed.

3.14 Cumulative Impacts

Cumulative impacts are the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor to collectively significant actions taking place over a period of time (C.F.R. 1508.7).

The natural, human, and cultural environment within the project area and in the general region has been substantially altered by long-practiced agricultural activities, particularly grazing and, along the transmission line, crop production. Both of these activities are widespread in the project area. Major agricultural activities have resulted in widespread conversion of shortgrass prairie to farmland and rural residential development. Other developments that have affected the project area and the region include additional wind energy facilities; transportation (roads, highways, railroads, pipelines, and transmission lines); small towns with businesses to provide goods and services to the rural communities; and water development (e.g., irrigation ditches, wind mills, and stock ponds).

One of the main developments in Logan County is wind facilities with the associated infrastructure of utility lines, roads, turbines, substations, and transmission lines; and the increase in population, housing, and services to maintain the facilities. In addition to the 267 permitted towers for FPL Energy there are currently an additional thirty-two (32) towers built by EnXco, and forty (40) towers built and in operation by Invenergy bringing the current total of existing towers to 339 operating turbines. There is the potential for an additional 133 towers permitted for phase 3 of FPL Energy and an additional 88 towers for Ridge Crest (EnXco) which could bring the total build-out at 607 towers that would span the width of Logan County along the Nebraska border (Jim Neblett, Director of Logan County Department of Planning and Zoning, personal communication, September 2008).

In addition to the wind farm development in Logan County, there are numerous wind facilities developed or being developed in the region. There are two such facilities in Washington County near Akron, two facilities in Yuma County (one on the north and one on the south side of the Arikaree River), one north of Wray in Yuma County, and one in Sedgwick County (Wendy Figueroa, CDOW, personal communication, September 2008).

Wind projects in the foreseeable future are difficult to assess. The wind resource appears good, and it seems very likely that additional wind farms are being planned.

3.14.1 Climate and Air Quality

Because of the nature of the proposed Project, potential air quality impacts would be minor, localized, temporary and short term. Air quality would be slightly impacted during construction and operation. Therefore, there is little likelihood of cumulative impacts occurring with other sources of air pollution. Should cumulative impacts occur, neither the proposed Project nor the alternatives would cause or contribute to a violation of applicable standards. Cumulative effects of the wind Project would produce electric power from a non-polluting source, resulting in a small incremental improvement in air quality when compared to burning coal for electric power. Because the proposed Project would not affect local climatic conditions, there would be no cumulative impacts on climate.

3.14.2 Geology, Paleontology and Soils

Cumulative impacts to geology are not anticipated.

While not likely, excavation in the Ogallala formation has the potential to impact paleontological resources and the Project would contribute minimally to cumulative impacts to paleontology. As it is unlikely to uncover important fossils during the Project, impacts would be minor.

The proposed Project would entail surface soil disturbances that would increase erosion potentials and reduce soil productivity for various periods of time. Soils have already been highly impacted by farming and other agricultural activities. The proposed Project would disturb up to 180 hectares (446 acres) of soils during construction, much of which are already disturbed. The erosion control best management practices and revegetation and mitigation activities required would serve to stabilize the surface soils and return the majority of affected soils to a

productive condition across a comparatively short timeframe. Therefore, cumulative impacts to soils would be negligible.

3.14.3 Water Resources

The proposed Project would not directly impact surface water and thus no direct cumulative impacts would occur. Cumulative impacts to surface water quality are already largely affected by agricultural activities, including wind and water erosion from plowed fields and irrigation return water. The Project would have the potential to contribute to indirect effects to water quality, resulting from incremental increases in sedimentation caused by surface soil disturbances at tower sites and interior roads. Similar impacts would be expected from residential and industrial construction. CHW would use best management practices to avoid surface water pollution and minimize indirect cumulative impacts to surface waters, and would therefore not contribute to any significant cumulative impacts. Operations would not impact surface waters and thus would not cause additional cumulative impacts.

As groundwater is reported to be 46 to 49 m (150 to 160 feet) deep, the proposed Project is not expected to impact groundwater and would not contribute to cumulative impacts to groundwater resources. The Project would consume water (surface and/or groundwater) from existing permitted sources likely from Fleming or Sterling, Colorado. The Project would contribute only slightly to groundwater consumption. Groundwater quality in the Project area would not be impacted and cumulative groundwater quantity and quality impacts are anticipated to be minimal.

3.14.4 Floodplains and Wetlands

Waters of the U.S. are protected under the *Clean Water Act* and many floodplains are defined as waters of the U.S. The Project would comply with the *Clean Water Act* regulations to protect the Project area. The Project would not impact floodplains or wetlands. Three small playas were identified during the wetland survey, but all three wetlands are located outside of the footprint of the Project area. Cumulative impacts to floodplains and wetlands would be minor and of short duration. Operations would not impact floodplains or wetlands and thus would not cause additional cumulative impacts.

3.14.5 Vegetation

Vegetation within the project area comprises grassland (1,227 hectares [3,031 acres]), CRP lands (399 hectares [986 acres]) and shelterbelts (18 hectares [44 acres]), for a total of 1,643 hectares (4,061 acres) for the Project area, exclusive of the transmission line. The proposed project would create 19 hectares (47 acres) of permanent disturbance and 180 hectares (446 acres) of temporary disturbance for turbine pads and string corridors, access roads, collection line trenches, overhead collector lines, operations and management building, and two substations. This incremental increase in vegetation disturbance represents a temporary disturbance on 11 percent and permanent disturbance on 1 percent of the existing Project area. These footprints present minor impacts. Cumulative impacts to vegetation would be minor.

3.14.6 Wildlife

Cumulative impacts to wildlife would be similar to those described for the Proposed Project because land use within and adjacent to the project area is subject to the same regular human activity from farming and ranching activities as has been occurring for some time. Large tracts of native habitat have been replaced with pasture land which provides non-native habitat for some species while displacing other species. The CRP land, grasslands, and shelterbelts in the region provide habitat for a wide number of species; however, existing human disturbance and activity adversely impact some species. Black-tailed prairie dog, burrowing owl, mountain plover, ferruginous hawk, and swift fox are shortgrass prairie species that are now state-listed species because of widespread loss of shortgrass prairie habitat. The project boundary encompasses 1,821 hectares (4,500 acres) and would cause temporary disturbance to 180 hectares (446 acres) and a permanent loss of 19 hectares (47 acres). With revegetation plans and the use of native species for reseeding/replanting, the long term disturbance is reduced to 19 hectares (47 acres) or 1 percent of the project area. Therefore, the proposed project would contribute minimally to habitat loss and would have minor impacts on terrestrial wildlife.

Direct cumulative impacts to bats and birds (i.e., collision-related mortality) would result from the presence of above-ground features such as communications towers, grain elevators, transmission lines, vehicles on highways, windows, and the wind project, as well as mortality caused by other factors (e.g., house cats) (NWCC 2001). However, bat and bird mortalities at wind projects have been documented to be low compared with other sources of mortality (Table 3.2) (NWCC 2001). While the project would cause some mortality, collisions are anticipated to be low for the proposed project. When combined with other proposed development and wind projects in the county, however, these fatalities become a potentially larger issue. The current project would add 60 towers to the existing 339 towers in Logan County, for a total of 396.

At the nearby Spring Canyon wind facility, 4.67 bird and 2.88 bat fatalities were estimated to occur per turbine per year based on the sampling conducted (TRC 2008). If these numbers are reflective of regional trends, and therefore predictive of estimated fatalities at all 396 turbines, this would result in 1,849 bird and 1,140 bat fatalities per year. Typically there are differences between sites, such that this type of extrapolation likely is not accurate. The bird fatalities at Spring Canyon included eight species, some of which are very common, such as the horned lark (*Eremophila alpestris*) and western meadowlark (*Sturnella neglecta*). The bat fatalities, on the other hand, were all hoary bats. Unfortunately, the size of hoary bat populations in North America is not known, and would be very difficult to assess. It is therefore difficult to put the loss of 1,140 hoary bats per year in a population level context. Furthermore, it is likely that other bat species would be included in fatality studies at the 396 turbines employed in this discussion. The biology of bat species in general is a factor to consider. Bats generally have low reproductive rates, having only one young per year; and they are very long-lived, up to 29 or so years (Adams 1997). Although these estimated fatality numbers seem large, the estimated cumulative impacts of the current project on bats are not large. Based on a fatality rate of 2.88 bats per turbine per year, one can predict 173 bat fatalities per year for the Project. However, it is important to reiterate that the size of the hoary bat population in North America is not known and the impact of the proposed project on the population level context cannot be determined.

3.14.7 Special Status and Sensitive Species

Cumulative impacts to special status species would be similar to those described for the Proposed Project. All development activities must comply with the ESA, which requires avoidance or mitigation for impacts to TEP or C species, therefore no significant cumulative impacts to T&E species would occur. By avoiding black-tailed prairie dog colonies, the project would have minimal to no impacts on state-listed species. Cumulatively, the region's agricultural activities have had greater impact on habitat than other developments. Most of the project's disturbance would occur on previously disturbed land; therefore the project would not result in an additional species listing under the ESA. Cumulative impacts to special status and sensitive species would be low

3.14.8 Cultural Resources

Prehistoric subsurface cultural materials are likely to be present at sites 5LO645, 5LO647, and 5LO653, all of which occur in eolian (dune) settings. The historic component of site 5LO653 is not NRHP-eligible, and no further management actions are warranted; consequently, only two sites were identified where prehistoric subsurface cultural materials are present. The preferable management action for these three sites is avoidance. If avoidance is not possible, the sites would be subjected to test excavation to define the nature and extent of subsurface deposits, and mitigative excavation should be conducted within the context of site-specific research designs. Cumulative impacts to cultural resources in general are expected to be low since impacts on properties eligible for the NRHP are typically mitigated either through avoidance or through data recovery. The Project proposes to avoid impacting eligible sites so cumulative impacts are not expected.

3.14.9 Land Use, Transportation and Recreation

The proposed Project would make a minor contribution to cumulative land use effects resulting from the Project. Wind power generation already occurs in the county and surrounding areas, so the proposed Project would add incrementally to the amount of electric generation in the area. Other land uses would be impacted slightly (e.g., a loss of about 19 hectares [47 acres] of cropland, CRP land and native prairie for the life-of-the-Project) and cumulatively would be minor. Because of the vast amount of private agricultural land in Logan County, land use activities and characteristics are likely to remain in spite of the proposed cumulative development.

During construction, the proposed Project would result in short term and minor impacts to local transportation systems. Impacts to transportation systems would result from the intermittent presence of construction crews and vehicles and associated increased traffic. Traffic would increase, but the overall transportation system should be able to handle Project-related traffic along with the other uses.

Recreational opportunities area presently controlled and would continue to be controlled by the private landowners; therefore, the Project would not cause cumulative impacts to recreation.

3.14.10 Noise

Noise impacts are anticipated to be negligible, such that at distances of approximately 305 m (1,000 feet) or more from the turbines, the area would not experience an increase in noise relative to current conditions. Cumulative impacts due to noise would be minor.

3.14.11 Visual Resources

The proposed Project would contribute to regional changes in land use character and related visual quality. The area exhibits a typical rural setting with both occupied and abandoned farmsteads scattered along gravel roads throughout the landscape, which is a mixture of tilled and CRP agricultural fields and native grassland used for grazing. The landscape is characteristically flat to rolling, with the green and brown colors of the agricultural fields, linear features such as roads and transmission lines. The proposed Project would not impact any National or state parks or designated scenic areas with recognized regionally important viewsheds. U.S. Highway 6 is located approximately 4 miles south of the Project wind site and runs just north of the proposed Wildhorse Creek Switchyard. Several county roads traverse the area generally on section lines. This area of eastern Colorado is home to numerous wind turbines and the site of wind farms in the area is common. There are reportedly 339 wind turbines in the county already (Logan County). The visual elements of the proposed Project area are quite common in northeastern Colorado. U.S. Highway 6 is a regionally significant highway that carries commercial and private traffic into and through the area. This section of U.S. Hwy 6 is not a designated scenic highway. This Highway has a moderate to low viewer sensitivity due to the moderate user attitude and short duration of view. Due to the distance of the turbines from the highway, the Project is not expected to dominate the views of travelers. Public outreach opportunities for the Project did not result in adverse comments on the potential visual impacts of the project. Generally attitudes of those participating in public meetings and comment opportunities are supportive of the project. Cumulative visual impacts would be moderate, but there would be no cumulative impacts in highly sensitive or visually unique areas in proximity to high sensitivity viewers.

3.14.12 Socioeconomics and Environmental Justice

The proposed Project would make a minor and short term contribution to the cumulative socioeconomic impacts that would result from construction and operation of the Project. The Projects impacts would be beneficial to the local landowners, the town of Fleming, neighboring cities, Logan County and the State of Colorado. Cumulative impacts would also be beneficial. Cumulative development in the general area would not disproportionately impact low income or minority communities because no minority communities, as defined by EPA, occur in the region. Logan County and Fleming may be classified as low income depending on the individual community as compared to the state average, but economic/infrastructure development would have beneficial impacts to both entities. There are no identified secondary and induced growth effects from commercial, industrial and residential activity within the Project area to which the Project would contribute.

3.15 Unavoidable Adverse Effects

Mitigation measures would be used on the proposed Project to avoid or minimize many of the potential adverse effects from the Project. However, unavoidable adverse effects, residual impacts that would likely remain after mitigation, would include the following:

- The consumption of fossil fuels and water and labor and materials would be expended during construction and to a much lesser extent, during operation (e.g., fuel for O&M vehicles, energy to heat O&M building). This would be offset by renewable energy produced through wind rather than consumption of fossil fuel.
- Some damage to, or illegal collection of, paleontological or cultural resources may occur.
- Up to 180 hectares (446 acres) of soil and vegetation disturbance would occur during construction, resulting in some soil loss and some stream sedimentation, until surface disturbed areas are successfully reclaimed. Up to 19 hectares (47 acres) of vegetation would be lost for the life-of-Project.
- Some additional emissions of fugitive dust, sulfur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide and volatile organic compounds would occur, mostly during construction of the Project.
- Some wildlife mortality could occur.

3.16 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations.

Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. An irreversible commitment of resources represents a loss of future options. It applies primarily to non-renewable resources, such as minerals or cultural resources, and to those factors that are renewable only over long time spans, such as soil productivity.

Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site). Irretrievable commitments represent the loss of production, harvest, or use of renewable resources. These opportunities are foregone for the period of the proposed action, during which other resource utilization cannot be realized. These commitments may be reversible, but the foregone utilization opportunities are irretrievable

Resource	**Commitment Description**	**Irreversible**	**Irretrievable**
Land Use	Exclusion of future land uses in project area	Yes for life of Project. Some would be reversible after decommissioning. Loss of soil fertility would not be reversible.	Project Life

Resource	Commitment Description	Irreversible	Irretrievable
Visual Resources	Impacts to local scenic quality during construction and operations	No	Project Life
Biological Resources	Habitat fragmentation, disturbance or loss of vegetation and impacts to habitats during construction and operations	Yes. Can be minimized through mitigation.	Yes or No, depending on the habitat and species
Water Resources	Water consumptive Use during construction	Yes	Yes
Wetlands	None expected, no wetlands on Project site	No	No
Geology and Geohazards	Possible slope failure	Yes	Yes
Soils	Soil loss and erosion during construction and operations. BMPs and mitigation would reduce.	Yes	Yes
Paleontology	None Identified	No	No
Cultural Resources	Disturbance of eligible properties during construction and operations	None expected due to avoidance and mitigation.	No, if mitigated
Air Quality	None, if BMPs implemented during construction and operations	No	No
Construction Materials and Fuels	Use of materials and fuels during construction and operations	Most uses would be; recycling could mitigate some resources impacts.	Yes

3.17 Intentional Destructive Acts

Transmission line projects and other installed infrastructure such as the wind project may be the subject of intentional destructive acts ranging from vandalism and theft to sabotage and acts of terrorism intended to disable a line or project. The former, more minor, type of act is far more likely for such types of projects in general and particularly for those like the proposed Project, which are in relatively remote areas and serve relatively small populations. Intentional sabotage or terrorist acts would be expected to target much larger electrical facilities, where a loss of service would have substantial regional impacts.

Theft is most likely to involve substation and switchyard equipment that contains salvageable metal (e.g., copper and aluminum) when metal prices are high. Vandalism, on the other hand, is more likely to take place in relatively remote areas and perhaps more likely to involve acts of

opportunity (e.g., shooting out transmission line insulators, shooting at the blades on a wind generator, etc.) than premeditated acts.

Protections against theft include fencing around substations and the use of locks and alarm systems where expensive or dangerous equipment is housed. The presence of high voltage would also discourage theft and vandalism. Vigorous prosecution of thieves and monitoring of metal recycling operations might also deter the theft of equipment. Similarly, the prosecution of vandals who have damaged or destroyed project equipment might discourage vandalism if it has become a problem.

With respect to the proposed action, certain project facilities, such as the substations, would be protected from theft and vandalism by fencing and alarm systems. The presence of high voltage would also serve as a deterrent to casual attacks. The relatively remote location of the proposed project would tend to reduce vandalism on the whole, because of the small number of people who would be expected to encounter the facilities. However, this same remoteness might encourage a rare act of opportunistic vandalism. Such occurrences are expected to be infrequent and would be vigorously investigated and prosecuted to discourage further acts.

The effects of intentional destructive acts could be wide ranging or more localized, depending on the nature and location of the acts and the size of the project, and would be similar to outages caused by natural phenomena such as storms and ice buildup. While a transmission line is out of service, residences may lose electrical service. Electrical appliances would be nonfunctional until electrical service was restored. In such cases, perishable food could spoil, and residents would be inconvenienced and could experience discomfort during cold or hot weather. However, some residents may already have backup generators and alternate means of cooking and heating. Also, if the residences are supplied with electricity from two or more sources, there may be no noticeable interruption or only minor, temporary interruptions if the alternate sources were not impacted.

Effects on commercial and industrial electricity users would similarly include loss of lighting and ventilation but could also include the shut down of office equipment, computers, cash registers, elevators, heavy machinery, food preparation equipment, and refrigeration. Some commercial operations might be forced to shut down temporarily as a result of a loss of power or concerns about safety. Municipalities could be affected by loss of traffic signals, while city offices might have to close temporarily. Police and fire services could be affected if communication systems shut down. City services, such as sewer and water systems, might be affected by extended outages. Loss of electrical service at hospitals would be of special concern as it could be life threatening. Such effects might be mitigated at hospitals and for other critical uses through the use of temporary backup power (e.g., from a diesel or gas-powered generator).
In addition to the effects from loss of service, destructive acts could cause environmental effects as a result of damage to the facilities. Two such possible effects are fire, should conductors be brought down, and oil spills from equipment (e.g., mineral oil in transformers) in the substations, should some of that equipment be damaged or breached. Fires would be fought in the same manner at those caused by, for example, an electrical storm. Any spills would be treated by removing and properly disposing of contaminated soil and replacing it with clean soil.

4.0 CONSULTATION AND COORDINATION

Table 4.1 presents a list of individuals and organizations that were contacted during preparation of this EA

Table 4.1 Consultation and Coordination

Contact	Affiliation, Location	Date	Purpose of Contact
Federal			
	USFWS, Denver	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Susan C. Linner	USFWS, Denver	May 7, 2008	Response to April 11, 2008 Notice of Decision to Prepare an Environmental Assessment
Sandy Vana-Miller	USFWS, Denver	June 25, 2008	Meeting at CDOW, Brush to discuss wildlife issues, buffer zones and planned surveys
Sandy Vana-Miller	USFWS, Lakewood	June 2008	Email correspondence regarding wildlife issues
Sandy Vana-Miller	USFWS, Lakewood	July 18, 2008	Letter regarding Meeting of June 25, 2008 and proposed plans for additional studies.
BLM Office	BLM Colorado State Office	July-September 2008	GLO master title plats research
Susan C. Linner	USFWS, Denver	November 25, 2008	Endangered Species Act consultation letter and copy of EA
State			
	CDOW, Brush	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
	State Historic Preservation Officer	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Robert Mailander	Regional Representative, The Governor's Energy Office	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Georgianna Contiguglia	State Historic Preservation Officer	April 17, 2008	Response to April 11, 2008 Notice of Decision to Prepare an Environmental Assessment
Edward Nichols	State Historic Preservation Officer	November 19, 2008	Section 106 Consultation
Larry Budde	CDOW, Brush	May 9, 2008	Response to April 11, 2008 Notice of Decision to Prepare an Environmental Assessment
Dan Cacho and Wendy Figueroa	CDOW, Brush	May 11, 2007	On-site visit to discuss wildlife issues and view prairie-chicken lek
Wendy Figueroa	CDOW, Brush	June 25, 2008	Meeting at CDOW, Brush to discuss wildlife issues, buffer zones and planned surveys
Dan Cacho	CDOW, Brush	June 25, 2008	Meeting at CDOW, Brush to discuss wildlife issues, buffer zones and

Table 4.1 Consultation and Coordination

Contact	Affiliation, Location	Date	Purpose of Contact
			planned surveys
Dan Cacho	CDOW, Brush	July 2, 2008	On-site visit to discuss wildlife issues
Wendy Figueroa & Dan Cacho	CDOW, Brush	July 18, 2008	Letter regarding Meeting of June 25, 2008 and proposed plans for additional studies.
Dan Cacho and Wendy Figueroa	CDOW, Brush	July 18, 2008	Search for swift fox dens
Wendy Figueroa	CDOW, Brush	September 17, 2008	Discuss cumulative impacts
Richard Lin	CO Dept. of Local Affairs, State Demography Office, Denver	September 2008	Email correspondence regarding percentage of minorities in Fleming, Sterling and Haxtun
Website	CO Historical Society/Office of Archaeology and Historic Preservation, Denver	August-September 2008	Research of cultural resources information
Larry Budde	CDOW, Brush	November 25, 2008	Copy of EA
Celia Greenman	CDOW, Denver	November 25, 2008	Copy of EA
Robert Mailander	Regional Representative, The Governor's Energy Office	November 25, 2008	Copy of EA
County			
	Board of County Commissioners, County Planning Department	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Jim Neblett	County Planner, Logan County Planning and Zoning Department	April 11, 2008, September and October 2008	Notice of Decision to Prepare an Environmental Assessment. Telephone conversations regarding other wind projects in Logan County
Debra Zwin	Chair, Logan County Commissioners	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Allan Pierce	Logan County Under Sheriff, Sterling	September 2008	Public health and safety and traffic issues related to existing wind Projects in Logan County
Chad Wright	Logan County Road and Bridge Department, Sterling	September 2008	Impacts to the County roads from the construction of the existing wind Project west of Peetz
Logan County Clerk and Recorder of Deeds	Logan County Clerk and Recorder of Deeds, Sterling	July – August 2008	Deed book review
Jim Neblett	County Planner, Logan County Planning and Zoning Department	November 25, 2008	Copy of EA
Gene Meisner	Logan County	November 25,	Copy of EA

Table 4.1 Consultation and Coordination

Contact	Affiliation, Location	Date	Purpose of Contact
	Commissioner	2008	
Debra Zwirn	Logan County Commissioner	November 25, 2008	Copy of EA
Jack McLavey	Logan County Commissioner	November 25, 2008	Copy of EA
Native American Tribes			
Rodney Bordeaux	Rosebud Sioux	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Ivan Posey	Shoshone Business Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Richard Brannan	Arapaho Business Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Maxine Natchees	Ute Tribal Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Eugene Littlecoyote	Northern Cheyenne Tribal Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
John Yellow Bird Steele	Oglala Sioux Tribal Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Ron His-Horse-is-Thunder	Standing Rock Sioux Tribal Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Alonzo A. Coby	Shoshone-Bannock Tribes of Fort Hall	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Carl Venne	Crow Tribal Council	April 22, 2008	Notice of Decision to Prepare an Environmental Assessment
Other			
	Town of Fleming	April 11, 2008	Notice of Decision to Prepare an Environmental Assessment
Cameron Harms	Fleming School Transportation Director, Fleming	September 2008	Number and routes of busses in the Project area transporting students.
Jarod Kuntz	Kuntz Pump, Atwood	September 2008	Depth to groundwater in Project area
Kevin Urie	Denver Water	October and November 2008	Phone conversations regarding the South Platte Water Related Activities Program, Inc. (SPWRAP)
	Town of Fleming	November 25, 2008	Copy of EA
Mark Farnsworth	Highline Electric Association	November 25, 2008	Copy of EA
Byron Larson	Toltec Energy	November 25, 2008	Copy of EA

5.0 REFERENCES

Adams, R. 1997. Bats of the Rocky Mountains. University of Colorado Press, Niwot, Colorado.

American Wind Energy Association. 2004a. Wind Energy Fact Sheet: Wind Turbine Lighting.

American Wind Energy Association. 2004b. Wind Energy Fact Sheet: Facts About Wind Energy and Noise.

American Wind Energy Association. 2008c. U.S. Wind Energy Projects in Colorado as of 6/30/08. Accessed via the Internet: http://www.awea.org/Projects/Projects.aspx?s=Colorado accessed 2008.

American Wind Energy Association. Undated. Wind Energy Fact Sheet: Comparative Air Emissions of Wind and Other Fuels.

American Wind Energy Association. Undated. Wind Energy FAQ: How Much Water Do Wind Turbines Use Compared with Conventional Power Plants?

Anderson, Cody, Gibson, Bonnie, Zier, Christian. October 2008. A Class III Cultural Resource Inventory of the Proposed Colorado Highlands Wind Project, Logan County, Colorado. Centennial Archaeology, Inc.

Arnett, E.B., et al. 2008. Patterns of bat fatalities at wind energy facilities in North America. Journal of Wildlife Management 72(1):61-78.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection 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. http://www.aplic.org/SuggestedPractices2006(LR-2watermark).

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. August, 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18 (16):R695-R696.

Bureau of Land Management. 2008. Draft Fortification Creek Resource Management Plan Amendment/Environmental Assessment. U.S. Department of the Interior. August.

Carrillo, Richard F. 1990. *Historical Archaeology Research Design. In, An Introduction to the Archaeology of Pinon Canyon, Southeastern Colorado* (6 volumes), edited by W. Andrefsky, Jr. Report submitted to National Park Service-Rocky Mountain Regional Office, by Larson-Tibesar Associates, Inc., Laramie, Wyoming, and Centennial Archaeology, Inc., Fort Collins, Colorado.

Carrillo, Richard F., Diane Adams, and Dorothy Larson. 1989. Relative Dating of Historic Homesteads: A Test Employing Cartridges and Bottle Glass. In, Temporal Assessment

of Diagnostic Materials from the Pinon Canyon Maneuver Site: Towards the Development of a Cultural Chronology for Southeastern Colorado, edited by C. Lintz and J. L. Anderson. *Memoirs of the Colorado Archaeological Society* No. 4.

Centennial Archaeology, Inc. 2008. A Class III Cultural Resource Inventory of the Proposed Colorado Highlands Wind Project; Logan County Colorado.

Chenault, Mark L. 1999. Chapter 4 - Paleoindian Stage. In *Colorado Prehistory: A Context for the Platte River Basin*, by Kevin P. Gilmore, Marcia Tate, Mark L. Chenault, Bonnie Clark, Terri McBride, and Margaret Wood. Colorado Council of Professional Archaeologists, Denver.

Clark, Bonnie. 1999. Chapter 7 - Protohistoric Period. In *Colorado Prehistory: A Context for the Platte River Basin*, by Kevin P. Gilmore, Marcia Tate, Mark L. Chenault, Bonnie Clark, Terri McBride, and Margaret Wood. Colorado Council of Professional Archaeologists, Denver.

Colorado Department of Public Health and the Environment. May 2008. Water Quality Control Commission. 5 CCR 1002-31. Regulation #31. The Basic Standards and Methodologies for Surface Water.

Colorado Department of Public Health and the Environment. March 2008a. Water Quality Control Commission. 5 CCR 1002-38. Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin. Regulation 38. Accessed via the Internet: http://www.cdphe.state.co.us/regulations/wqccregs/wqccreg38southplatte.pdf

Colorado Department of Public Health and the Environment. March 2008b. Water Quality Control Commission. 5 CCR 1002-38. Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin, Stream Classifications and Water Quality Standards Tables. Regulation 38. Accessed via the Internet: http://www.cdphe.state.co.us/regulations/wqccregs/wqccreg38southplattetable.pdf

Colorado Department of Public Health and the Environment. April 30, 2008v. Water Quality Control Commission. 5 CCR 1002-93. Regulation #93. Section 303(d) List Water-Quality-Limited Segments Requiring TMDLs.

Colorado Department of Public Health and the Environment. April 2008d. Water Quality Control Commission. 5 CCR 1002-94. Regulation #94. Colorado's Monitoring and Evaluation List.

Colorado Division of Wildlife. May 9, 2008. Letter to Mr. Jim Hartman of the Western Area Power Administration regarding recommendations from local biologists and wildlife managers.

Colorado Division of Wildlife. Undated. Map showing Yellow Mud Turtle County occurrence. Accessed via the internet at: http://ndis.nrel.colostate.edu/plugins/co_maps/030998.jpg

Colorado Water Conservation Board. 2002. South Platte/Republican River Basin Facts Fact Sheet. Accessed via the internet: http://cwcbweblink.state.co.us/DocView.aspx?id=118983&searchhandle=20615

Colorado Water Conservation Board. 2006. Statewide Water Supply Initiative Fact Sheet: South Platte Basin. Access via the internet: http://cwcbweblink.state.co.us/DocView.aspx?id=119002&searchhandle=12637

Commonwealth Associates. 1980. *Cultural Resource Assessment of the Sterling-Holyoke 115 kV Transmission Line*. Prepared for Western Area Power Administration by Commonwealth Associates, Inc., Jackson, Michigan.

Craig, G. February, 2008. Recommended buffer zones and seasonal restrictions for Colorado raptors. Colorado Division of Wildlife. 7 pp.

Cryan, P. 2008. http://www.fort.usgs.gov/BatsWindmills/. Website accessed September 17, 2008.

CTL Thompson, Inc. August 1, 2008. Preliminary Report, Geotechnical Investigation, Colorado Highlands Wind Project, Logan County, Colorado.

Energetics, Inc. 2004. Proceedings: Bat and wind power generation technical workshop. Sponsored by Bat Conservation International, U.S. Fish and Wildlife Service, National Renewable Energy Laboratory, and the American Wind Energy Association. February 19 and 20, 2004.

Electric Power Research Institute (EPRI). 1982. Transmission Line Reference Book: 345-kV and Above. Second Edition.

Electric Power Research Institute (EPRI). 1998. Long Term Effects of 60-Hz Electric vs. Magnetic Fields on IL-1 and Other Immune Parameters in Sheep: Phase 4 Study. October 1998.

Electric Power Research Institute (EPRI). 1999. EPRI Comments on the NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. July 26.

Electric Power Research Institute (EPRI). 2000. EPRI Comments on a Pooled Analysis of Magnetic Fields, Wire Codes, and Childhood Leukemia. October 2000.

ENVIRON International Corporation. 2008. Phase I Environmental Site Assessment, Colorado Highlands Wind LLC, Wind Farm Project, Logan County Colorado – Privileged and Confidential Prepared at the Request of Counsel.

ENVIRON International Corporation. 2008. Cadna/A noise model used to predict wind farm noise at three potentially-affected residential receptors in the project vicinity.

Federal Emergency Management Agency. 1989. Flood Insurance Rate Map, Logan County Colorado (Unincorporated Areas). Panel 300 or 500, Community Panel Number 080110 0300B and Panel 190 of 500, Community Panel Number 080110 0190B.

Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. University Press of Colorado and Denver Museum of Natural History. 467 pp.

Frison, George C. 1991. *Prehistoric Hunters of the High Plains,* 2nd Edition. Academic Press, New York.

Gillette, Jack H. 1997. *The Cheyenne Line: The Prairie Railroad from Sterling, Colorado to Cheyenne, Wyoming.* The County Printer, Dix, Nebraska.

Gilmore, Kevin P. 1999. Chapter 6 - Late Prehistoric Stage. In *Colorado Prehistory: A Context for the Platte River Basin,* by Kevin P. Gilmore, Marcia Tate, Mark L. Chenault, Bonnie Clark, Terri McBride, and Margaret Wood. Colorado Council of Professional Archaeologists, Denver.

Gilmore, Kevin. P., Marcia Tate, Mark L. Chenault, Bonnie Clark, Terri McBride, and Margaret Wood. 1999. *Colorado Prehistory: A Context for the Platte River Basin.* Colorado Council of Professional Archaeologists, Denver.

Gregg, Josiah. 1954. *Commerce of the Prairies,* edited by M. L. Moorhead. University of Oklahoma Press, Norman.

Hammerson, G.A. 1999. Amphibians and reptiles in Colorado. Second Edition. University Press of Colorado and Colorado Division of Wildlife. Niwot, Colorado.

Harmes. 2008. Email Correspondence with Cameron Harmes, Transportation Director for Fleming School. Regarding the number of busses and routes for transporting students near the Project area.

Irby, L.R., R.J. Mackie, H.I. Pac, and W.F. Kasworm. 1988. Management of mule deer in relation to oil and gas development in Montana's overthrust belt. Pages 113-121 *In* J. Emerick, S.Q. Foster, L. Hayden-Wing, J. Hodgson, J.W. Monarch, A. Smith, O. Thorne, II, and J. Todd (eds). Proceedings III: Issues and technology in the management of impacted wildlife. Thorne Ecological Institute, Boulder, Colorado. 177 pp.

Jepson, Daniel A. 1991. *Class III Cultural Resource Inventory of the Sidney-North Yuma 230-Kilovolt Transmission Line, Northeastern Colorado and Southwestern Nebraska.* Prepared for ENSR Consulting and Engineering by Centennial Archaeology, Inc., Fort Collins, Colorado.

Johnson, G.D., D.P. Young, Jr., W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000. Wildlife monitoring studies, SeaWest Windpower Project, Carbon County, Wyoming, 1995-1000. Final Report. Prepared for SeaWest Energy Corporation, San Diego, California and the U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Rawlins, Wyoming. 195 pp.

Keith, D.W., J.F. DeCarolis, C.C. Denkenberger, D.H. Lenschow, S.L. Malyshev, S. Pacala, and P.J. Rasch. 2004. The influence of large-scale wind power on global climate. Publication of the National Academy of Sciences 101(46):16115-16120.

Kingery, H.E. 1998. Colorado breeding bird atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife.

Koenig, N. V. 2002, Evaluation of Mineral and Mineral Fuel Potential of Logan County State Mineral Lands Administered by the Colorado State Land Board, Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resources, Denver, CO, CD-ROM.

Kuehn, Steven R. 1998. New Evidence for Late Paleoindian-Early Archaic Subsistence Behavior in the Western Great Lakes. *American Antiquity* 63(3):457-476.

Kuntz, 2008. Personal communication with Mr. Jarod Kuntz, Operations Manager for Kuntz Pump located in Atwood, Colorado regarding depth to groundwater in Project area.

Kunz, T.H., E.B. Arnett, W. P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007. Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses. Frontiers in Ecology and the Environment 5(6):315-324.

Martin, J.D., G.C. White, and F.M. Pusateri. 2007. Occupancy rates by swift foxes (*Vulpes velox*) in eastern Colorado. Southwestern Naturalist 52:541-551.

Mehls, Steven F. 1984. *Colorado Plains Historic Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Morgan, M.G. 1989. Electrical and Magnetic Fields from 60 Hertz Electric Power: What do we know about possible health risks? Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA.

Mulloy, William T. 1954. The McKean Site in Northeastern Wyoming. *Southwestern Journal of Anthropology* 10:432-460.

National Institute of Environmental Health Sciences (NIEHS) 1999. NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. NIH Publication No. 99-4493.

NIEHS. 1998. Assessment of Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Field. National Institute of Environmental Health Sciences (NIEHS). Working Group Report, 1998. Web site: www.niehs.nih.gov/emfrapid.

Lin, Richard. September 18, 2008. Email Correspondence with Richard Lin, PhD of the Colorado Department of Local Affairs, State Demography Office regarding minority percentages in the cities of Fleming, Sterling and Haxtun.

Logan County Chamber of Commerce. 2008a. Tourism Information: Frequently Asked Questions about Enjoying the Great Outdoors in Sterling and Logan County: Access via the internet at: http://www.logancountychamber.com/toursimoutdoors.html.

Logan County Chamber of Commerce. 2008b. Tourism Information: Lodging Information for Sterling and Logan County. Accessed via the internet at: http://www.logancountychamber.com/tourismlodging.html.

Logan County Chamber of Commerce. 2008. Tourism Information: Community Parks in Sterling and Logan County Colorado. Accessed via the internet at: http://www.logancountychamber.com/tourismparks.html.

National Energy Policy Development Group. 2001. National Energy Policy: Reliable, Affordable, and Environmentally Sound Energy for America's Future. Prepared by National Energy Policy Development Group for the President of the United States of America.

National Renewable Energy Laboratory, Renewable Resource Data Center. 1986. Wind Energy Resource Atlas of the Unite States. Chapter 3: Regional Summaries. Accessed via the Internet: http://rredc.nrel.gov/wind/pubs/atlas/chp3.html.

National Renewable Energy Laboratory. 2004. Colorado Wind Resource Map: 50M Wind Power.

National Renewable Energy Laboratory, a Department of Energy National Laboratory. April 2006a. Wind Powering America Fact Sheet Series: The Wind/Water Nexus.

National Renewable Energy Laboratory. 2006b. Comparing Statewide Economic Impacts of New Generation from Wind, Coal, and Natural Gas in Arizona, Colorado and Michigan. Technical Report: NREL/TP-500-37720.

National Research Council. 2007. Environmental Impacts of Wind Energy Projects. Committee on Environmental Impacts of Wind Energy Projects, Board on Environmental Studies and Toxicology, Division on Earth and Life Studies. The National Academy Press, Washington, D.C.

National Wind Coordinating Committee. 2001. Avian collisions with wind turbines: a summary of existing studies and comparisons to other sources of avian mortality in the United States.

National Wind Coordinating Committee. 2002. Permitting of Wind Energy Facilities, A Handbook Revised 2002.

Olson, James C. 1966. *History of Nebraska*. University of Nebraska Press, Lincoln.

Pierce. 2008. Personal communication with Mr. Allan Pierce, Under Sheriff of Logan County regarding potential public safety issues or traffic problems with previous wind farm Projects in the County.

Reed, D.F. 1981. Conflicts with civilization. Pages 509-535 *In* O.C. Wallmo (ed.), mule deer and black-tailed deer of North America, Wildlife Management Institute, University of Nebraska Press, Lincoln. 605 pp.

Scott, G.R., 1978, Map showing geology, structure, and oil and gas fields in the Sterling 1 degree x 2 degrees quadrangle, Colorado, Nebraska, and Kansas: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1092, scale1:250000.

Scott, G.R., 1982, Paleovalley and geologic map of northeastern Colorado: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1378, scale 1:250000.

Scott, Glenn R. 1989. Historic Trail Maps of the Sterling 1º x 2º Quadrangle, Northeastern Colorado. *U.S. Geological Survey Miscellaneous Investigations Series,* Map I-1894. Denver, Colorado.

Sterzinger, George, Fredric Beck, and Damian Kostium. 2003. Renewable Energy Policy Project: The Effect of Wind Development on Local Property Values.

SVP (Society of Vertebrate Paleontology) 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources–standard guidelines: Society of Vertebrate Paleontology News Bulletin, vol. 163, pages 22-27.

SVP 1991. Standard measures for assessment and mitigation of adverse impacts to nonrenewable paleontological resources: Society of Vertebrate Paleontology News Bulletin, vol. 152, p. 2-5.

Tate, Marcia J. 1999. Chapter 5 - Archaic Stage. In *Colorado Prehistory: A Context for the Platte River Basin,* by Kevin P. Gilmore, Marcia Tate, Mark L. Chenault, Bonnie Clark, Terri McBride, and Margaret Wood. Colorado Council of Professional Archaeologists, Denver.

Toepler, J.E. and R.A. Crete. 1978. Migration of radio-tagged great sandhill cranes for Minnesota and Wisconsin. Pages 159-173 *In* J.C. Lewis, (ed.) Proceedings: 1978 Crane Workshop. National Audubon Society, Colorado State University Printing Service. April 1979.

TRC Environmental Corporation. 2008. Post-construction avian and bat fatality monitoring at the Spring Canyon Wind Project, Logan County, Colorado. TRC Environmental Corporation, Laramie, Wyoming.

United States Census Bureau. 2008a. Census information for Fleming, Colorado, Accessed via the Internet: http://censtats.census.gov/data/CO/1600826875.pdf accessed 2008.

United States Census Bureau. 2008b. Census information for Sterling, Colorado, Accessed via the Internet: http://censtats.census.gov/data/CO/1600873935.pdf accessed 2008.

United States Census Bureau. 2008c. Census information for Haxtun, Colorado, Accessed via the Internet: http://censtats.census.gov/data/CO/1600834960.pdf accessed 2008.

United States Census Bureau. 2008d. Census information for Logan County, Colorado, Accessed via the Internet: http://factfinder.census.gov/servlet/SAFFPopulation?_event=Search&geo_id=01000US&_geoContext=01000US&_street=&_county=Logan+County&_cityTown=Logan+County&_state=04000US08&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=010&_submenuId=population_0&ds_name=null&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry= accessed 2008.

United States Census Bureau. 2008e. Census information for Logan County, Colorado, Accessed via the internet: http://quickfacts.census.gov/qfd/states/08/08075.html accessed 2008.

United States Census Bureau. 2008f. Census information for Logan County, Colorado, Accessed via the internet: http://factfinder.census.gov/servlet/SAFFFacts?_event=&geo_id=05000US08075&_geoContext=01000US%7C04000US08%7C05000US08075&_street=&_county=logan+county&_cityTown=logan+county&_state=&_zip=&_lang=en&_sse=on&ActiveGeoDiv=&_useEV=&pctxt=fph&pgsl=040&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry= accessed 2008.

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Colorado Agricultural Experiment Station. July 1977. Soil Survey of Logan County, Colorado.

U.S. Department of Energy, Western Area Power Administration. 2005. Environmental Assessment, Spring Canyon Wind Project, Logan County Colorado, formerly known as The Peetz Table Wind Project. DOE/EA-1521.

U.S. Department of Energy, Western Area Power Administration, Rocky Mountain Customer Service Region. July 19, 2007. Letter Agreement No. 07-RMR-1732. Letter to Mr. Ty Remington of GE Energy requesting Environmental Review for Fleming Wind Project.

U.S. Department of Energy, Western Area Power Administration, Rocky Mountain Customer Service Region. April 22, 2008. Letter to Mr. Rodney Bordeaux/Rosebud Sioux Tribal Council requesting comments from the Rosebud Sioux Tribal Council and other consulted Tribes.

U.S. Department of Energy, Western Area Power Administration. May 21, 2008. Memorandum regarding Interim Action Determination – Geological Investigations.

U.S. Department of the Interior, Bureau of Land Management. June 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States.

U.S. Department of the Interior, Fish and Wildlife Service. May 7, 2008. Letter to Mr. James Hartman with comments regarding the Endangered Species Act of 1973, the Bald and Golden Eagle Protection Act of 1940, the Migratory Bird Treaty Act of 1918 and the National Environmental Policy Act of 1969.

U.S. Department of the Interior, Fish and Wildlife Service. May 13, 2003. Memorandum from the Deputy Director to the Regional Directors, Regions 1-7: Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines.

U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2002. Revised intra-service Section 7 consultation for the federal agency actions resulting in minor water depletions to Platte River System. Memorandum to Assistant Regional Director, Ecological Service, Region 6, from Regional Director. 77 pp. + append.

U.S. Department of the Interior, Fish and Wildlife Service. 1975. National Wetland Inventory Maps: Fleming, Haxtun West, Crook and Tamarack Ranch, Colorado.

U.S. Environmental Protection Agency (EPA). Undated. Ecoregions of Colorado. ftp://ftp.epa.gov/wed/ecoregions/co/co_front.pdf

U.S. Environmental Protection Agency. 1992. EMF in Your Environment: Magnetic field measurements of everyday electrical devices. Environmental Protection Agency. December 1992.

U.S. Environmental Protection Agency. 2008. Air Quality Nonattainment Areas Map – Criteria Air Pollutants. Accessed via the internet: http://www.epa.gov/air/data/nonat.html?st~CO~Colorado

USGS. 1995**.** Ground Water Atlas of the United States: Arizona, Colorado, New Mexico, Utah. HA 730-C. by S. G. Robson and E. R. Banta.

Walsh Environmental Scientists and Engineers, LLC. September 2008. Habitat and wildlife assessment: Fleming wind energy Project, Logan County, Colorado.

Western Area Power Administration. 2006. 2006 Annual Report: Discovering Solutions.

Western Area Power Administration, Rocky Mountain Region. General Statement of Work for the Preparation of an Environmental Assessment and Related Studies and Documents for Applications Related to Transmission and Interconnection Requests Including: Appendix A: Biological Assessment, Appendix B: Cultural Resources Surveys, Appendix C: Paleontology.

Wheat, Joe Ben. 1979. The Jurgens Site. *Plains Anthropologist Memoir* 15(84, Pt. 2). Lincoln, Nebraska.

Wheeler, B.K. 2003. Raptors of western North America. Princeton University Press. Princeton, New Jersey.

Wilkins, Tivis E. 1974. *Colorado Railroads: Chronological Development.* Pruett Publishing Company, Boulder, Colorado.

Wright. 2008. Personal communication with Mr. Chad Wright, Road and Bridge Operations Manager for Logan County, regarding traffic and condition of roads associated with wind Project west of Peetz.

WRCC. 2005. Western Regional Climate Center, Web Site, http://www.wrcc.dri.edu

Zier Christian J. 1999. Chapter 5 - Paleoindian Stage. In *Colorado Prehistory: A Context for the Arkansas River Basin*, by Christian J. Zier and Stephen M. Kalasz (with contributions by Mary W. Painter, Mark Mitchell, Amy Holmes, and Michael McFaul). Colorado Council of Professional Archaeologists, Denver.

Zier, Christian J., and Stephen M. Kalasz. 1999. *Colorado Prehistory: A Context for the Arkansas River Basin* (with contributions by Mary W. Painter, Mark Mitchell, Amy Holmes, and Michael McFaul). Colorado Council of Professional Archaeologists, Denver.

6.0 LIST OF PREPARERS

Western Area Power Administration

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Education: B.S. (Biology) University of Wisconsin, Madison; M.S. (Zoology) Michigan State University
Project Responsibility: NEPA Document Manager, Review and Regulatory Compliance
Experience: 32 years professional experience

Environ International Corp.

John Imse, RG
Education: BA, Geology, Lawrence University; MS, Geology, Idaho State University
Project Responsibility: Project Management, Principal Technical Review
Experience: 28 years professional experience

David Heinze, P.E.
Education: BS, Civil Engineering, University of Missouri-Columbia; MS Civil/Environmental Engineering University of Missouri-Columbia
Project Responsibility: Project Management, EA Report Preparation
Experience: 16 years professional experience

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Education: BA, Environmental, Population, and Organismic Biology, University of Colorado; MS, Biological Sciences, Bowling Green State University
Project Responsibility: Technical Support
Experience: 26 years professional experience

Walsh Environmental Scientists and Engineers, Inc.

Carron Meaney
Education: B.S. (Biology), M.A. (Biology), Ph.D. (Biology) University of Colorado, Boulder
Project Responsibility: Preparation of Wildlife and Special Status Species sections of Environmental Assessment
Experience: 30 years professional experience

Danielle Cassidy
Education: B.S. (Environmental Science and Ecology) Sierra Nevada College, Incline Village, Nevada; M.S. (Restoration Ecology and Ecosystem Conservation) University of Wisconsin, Madison
Project Responsibility: Habitat assessment of Project site, preparation of maps and figures in GIS, and preparation of vegetation and habitat sections of Environmental Assessment
Experience: 4 years of professional experience

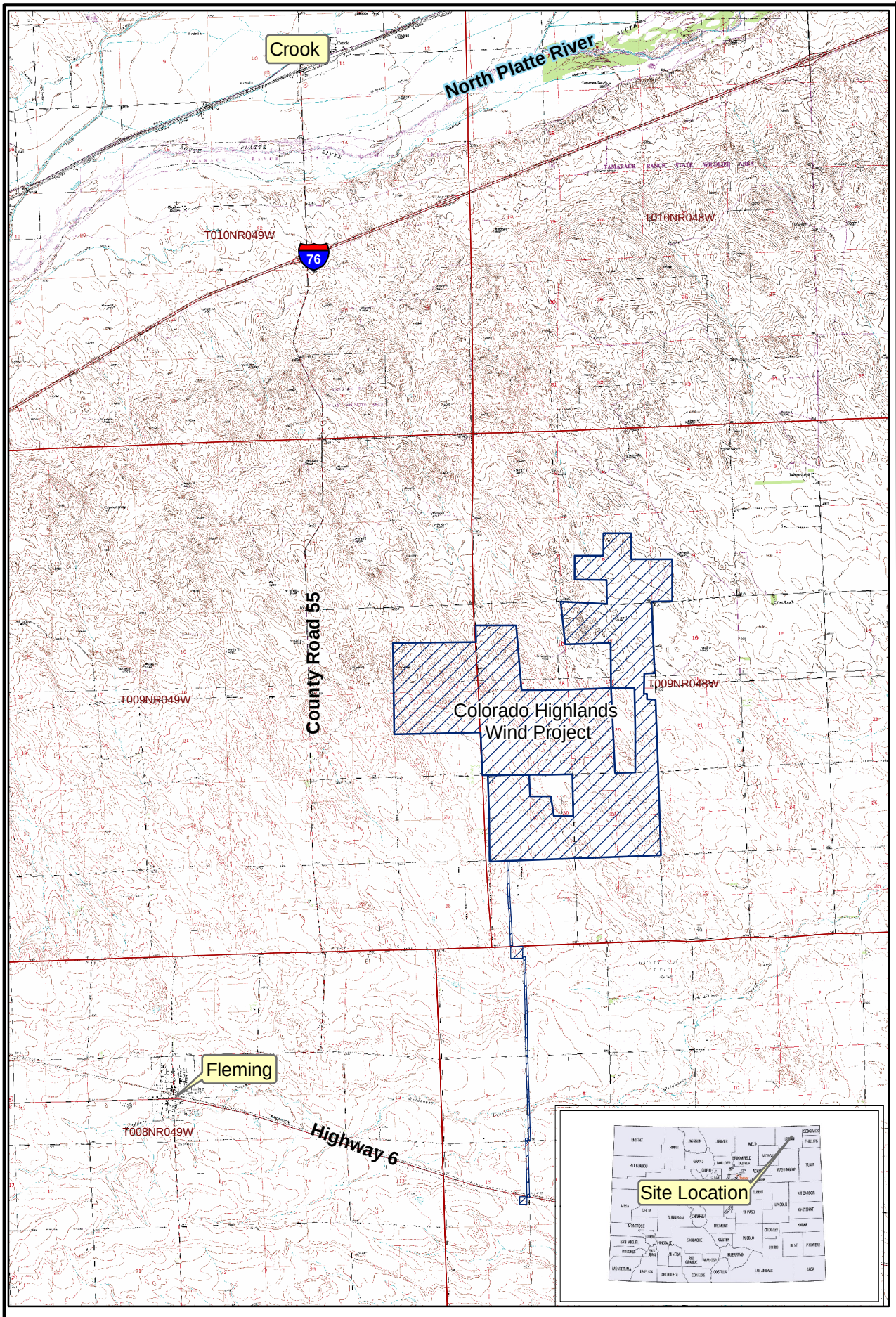
Scott Severs
Education: B.S. (Wildlife Biology) Colorado State University, Fort Collins
Project Responsibility: Biological surveys of Project site including: special status species assessment, bat activity assessment, raptor nesting assessment, and prairie chicken surveys. Preparation of Wildlife and Special Status Species sections of Environmental Assessment
Experience: 16 years of professional experience

Jenny Gerson
Education: B.S. (Ecological and Evolutionary Biology) University of Colorado, Boulder
Project Responsibility: Biological surveys of Project site including: special status species assessment, bat activity assessment, raptor nesting assessment, winter raptor surveys, and prairie chicken surveys. Preparation of Wildlife and Special Status Species sections of Environmental Assessment
Experience: 3 years of professional experience

Centennial Archaeology, Inc.

Christian J. Zier
Education: Ph.D. (Anthropology/Archaeology), University of Colorado, Boulder.
Project Responsibility: Cultural Resources (Class III inventory, technical reports, EA)
Experience: 35 years professional experience, primarily CRM studies, western U.S

FIGURES

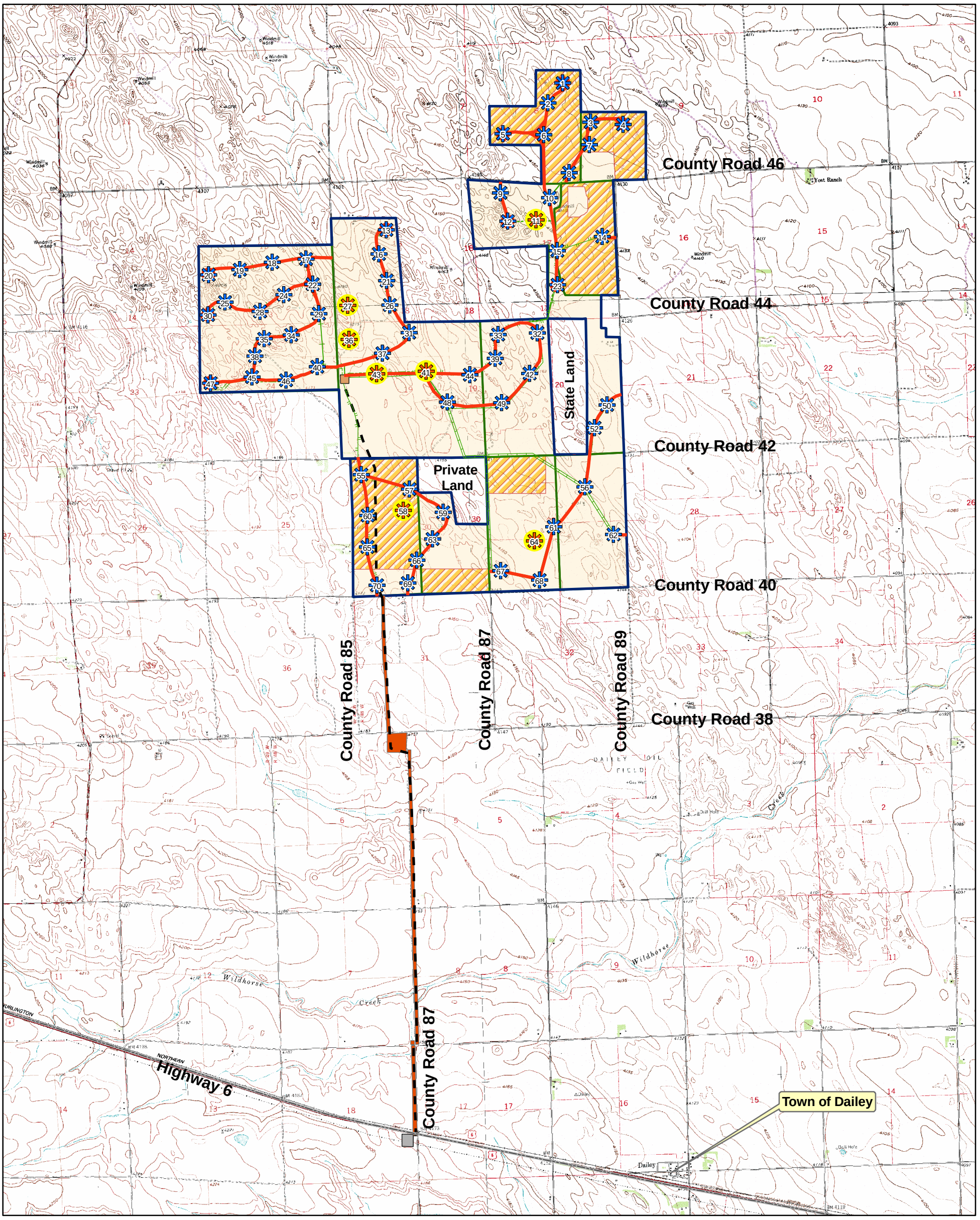


SITE LOCATION
COLORADO HIGHLANDS WIND PROJECT
LOGAN COUNTY, COLORADO

Wednesday, September 10, 2008 7:56:14 AM

Figure

1.1



Legend

Proposed Turbine Locations

- optional
- required
- Access Road Locations
- Transmission Line

Project Support Facilities

- Western's Proposed Wildhorse Creek Substation
- Collector Substation
- CRP Land
- Fleming Wind Property Owner Parcel Boundary
- Project Boundary
- Transmission Line Easement

Circuits

- Circuit 1
- Circuit 2
- Circuit 3
- Circuit 4
- Circuit 5
- Sterling Frenchman 115Kv Transmission Line

N

0 0.25 0.5 1 1.5
Miles

Source: U.S.G.S 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984).
Haxtun West, Colorado Quadrangle, 1962 (Photorevised 1980).
Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

Figure 2.1

PROPOSED TURBINE, POWERLINES, SUBSTATIONS, ROADS, ANDTRANSMISSION EASEMENT COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, COLORADO

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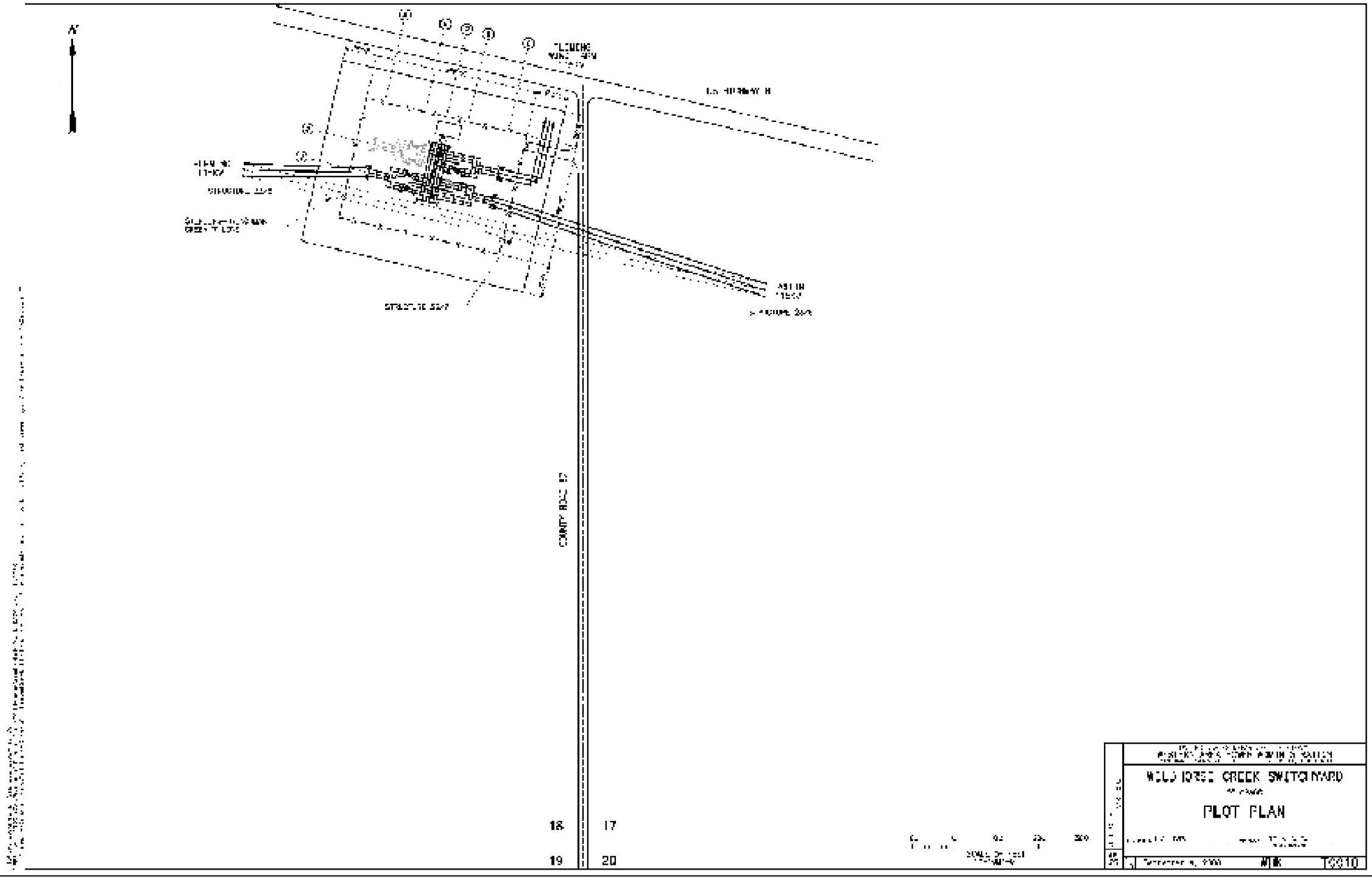

DETAIL OF WILDHORSE CREEK STATION SWITCHYARD
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, COLORADO

Drafter: J. Gilbert
Friday, January 9, 2009
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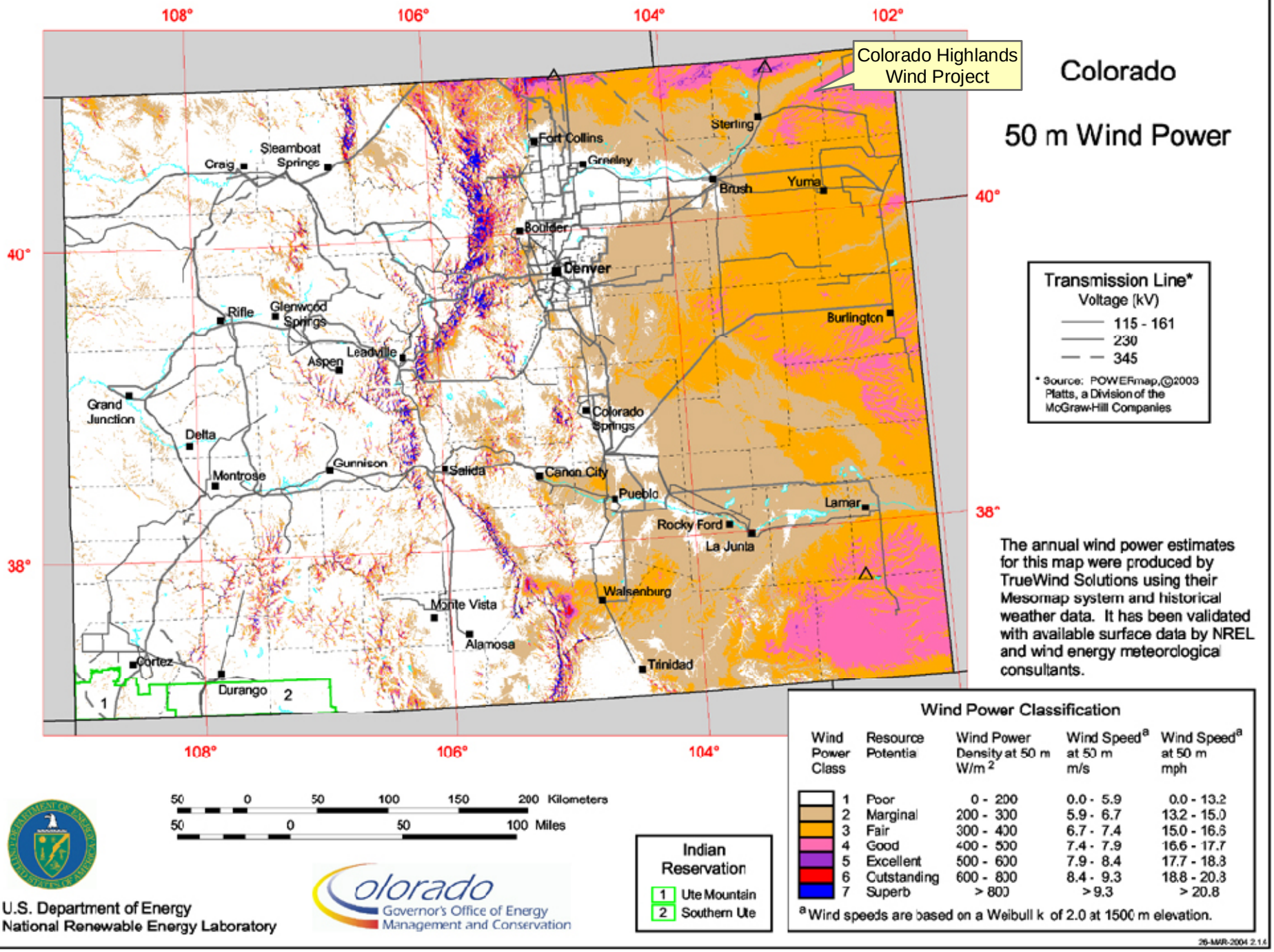
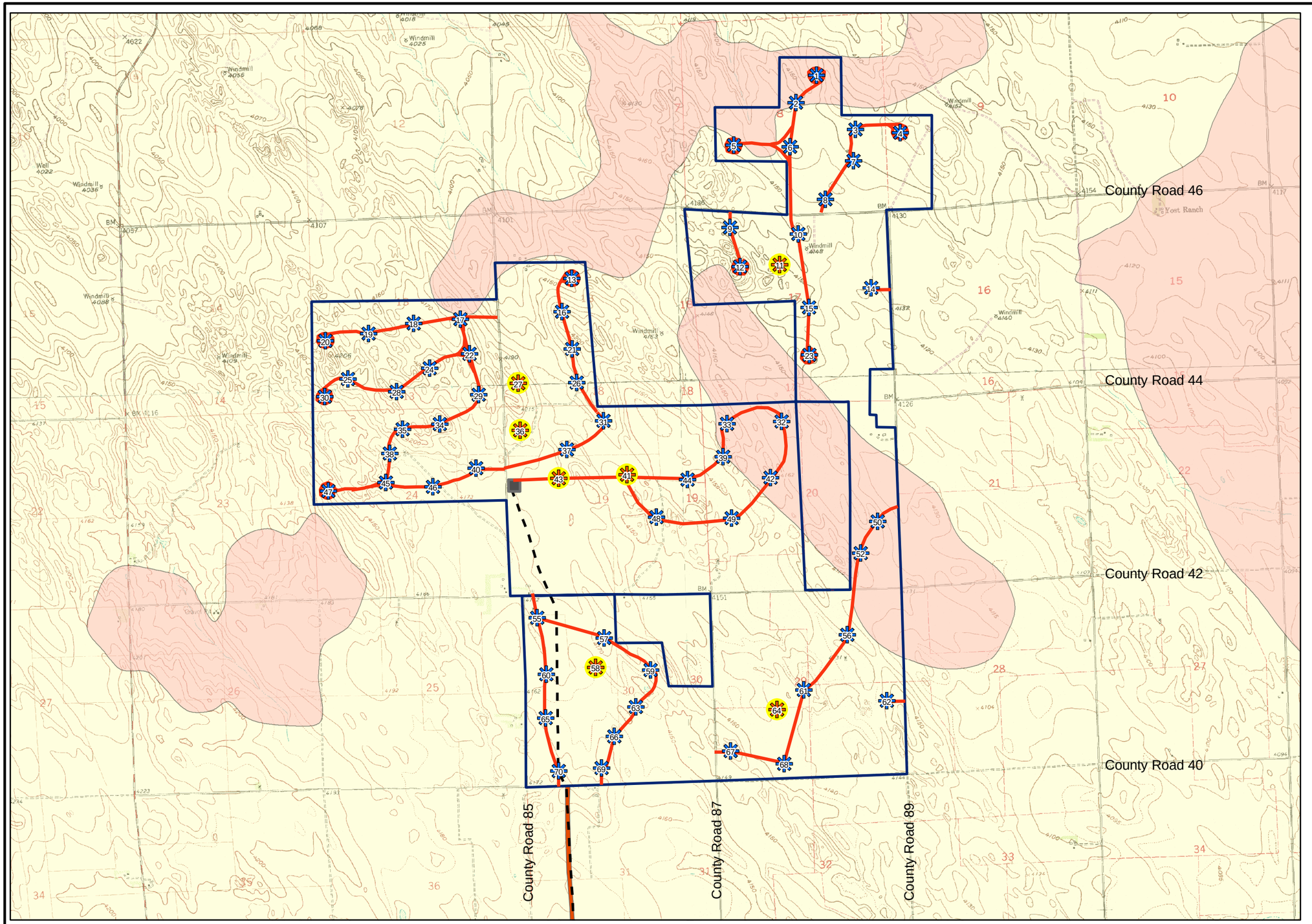
Figure

2.2



NREL - 50 m WIND MAP
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, CO

Figure 3.1



Legend

Proposed Turbine Locations

optional

required

Access Road Locations

Project Boundary

Transmission Line Easement

Collector Substation

Eolian Sand

Ogallala Formation

N

0 0.2 0.4 0.8

Miles

Contour Interval = 20 ft.

Source: U.S.G.S 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984).
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Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

GEOLOGIC MAP OF SURFICIAL DEPOSITS MODIFIED FROM SCOTT (1978)
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, COLORADO

Figure

3.2

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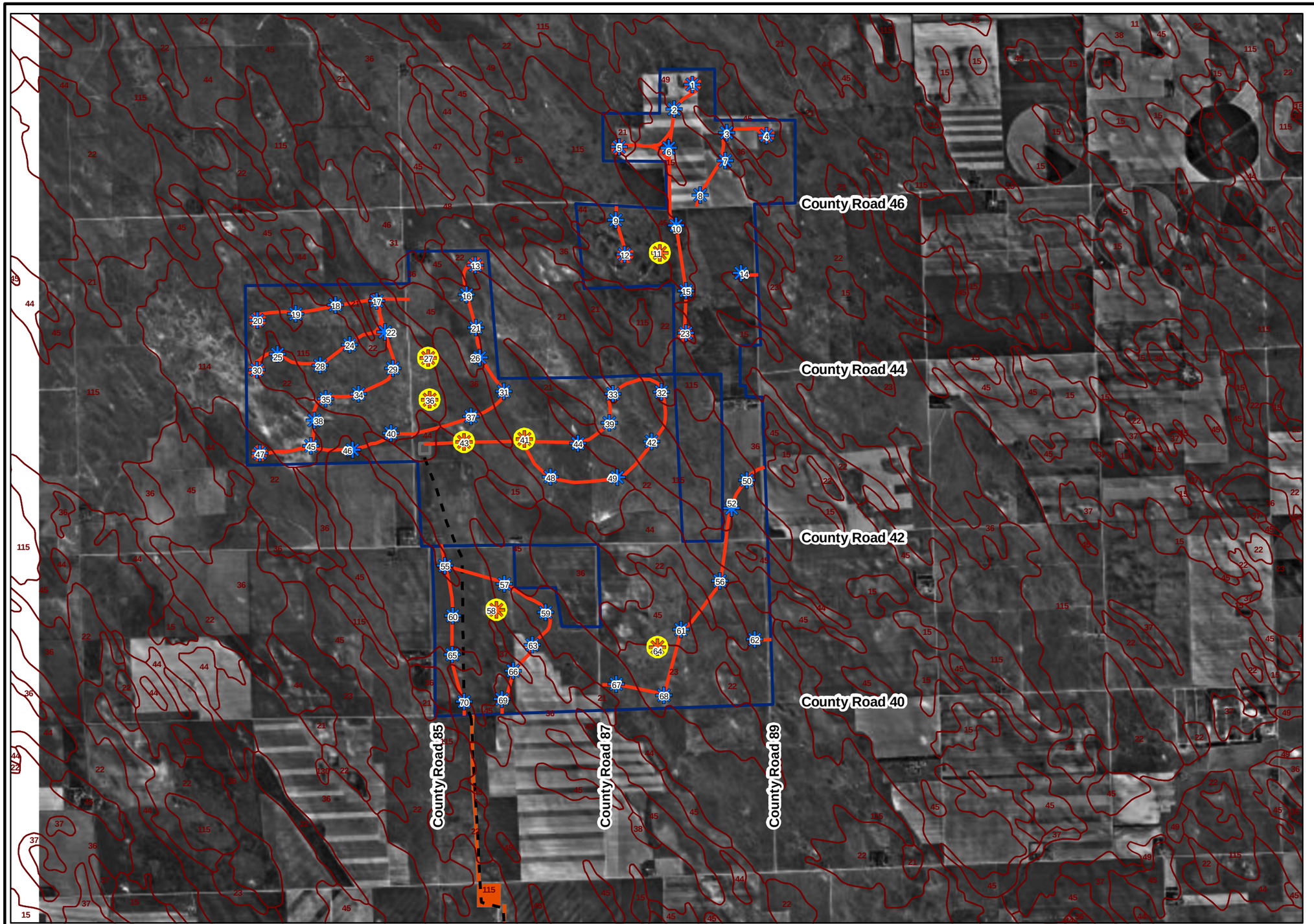

Legend

Proposed Turbine Locations

optional

required

Logan County - Soil Survey

- 115 - Valent loamy sand, 3-15% slope
- 15 - Bayard-Canyon complex
- 21 - Dailey loamy sand, 0-3% slope
- 22 - Dailey loamy sand, 3-9% slope
- 23 - Dailey loamy sand, thick surface
- 36 - Haxtun loamy sand, 0-3% slope
- 37 - Haxtun loamy sand, 3-5% slope
- 44 - Julesburg loamy sand, 0-3% slope
- 45 - Julesburg loamy sand, 3-9% slope
- Access Road Locations
- Collector Substation
- Transmission Line
- Transmission Line Easement
- Project Boundary

N

0 0.25 0.5 1

Miles

Soil Data: SSURGO NRCS 2008

SOIL SURVEY
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, CO

Wednesday, September 10, 2008 2:50:02 PM
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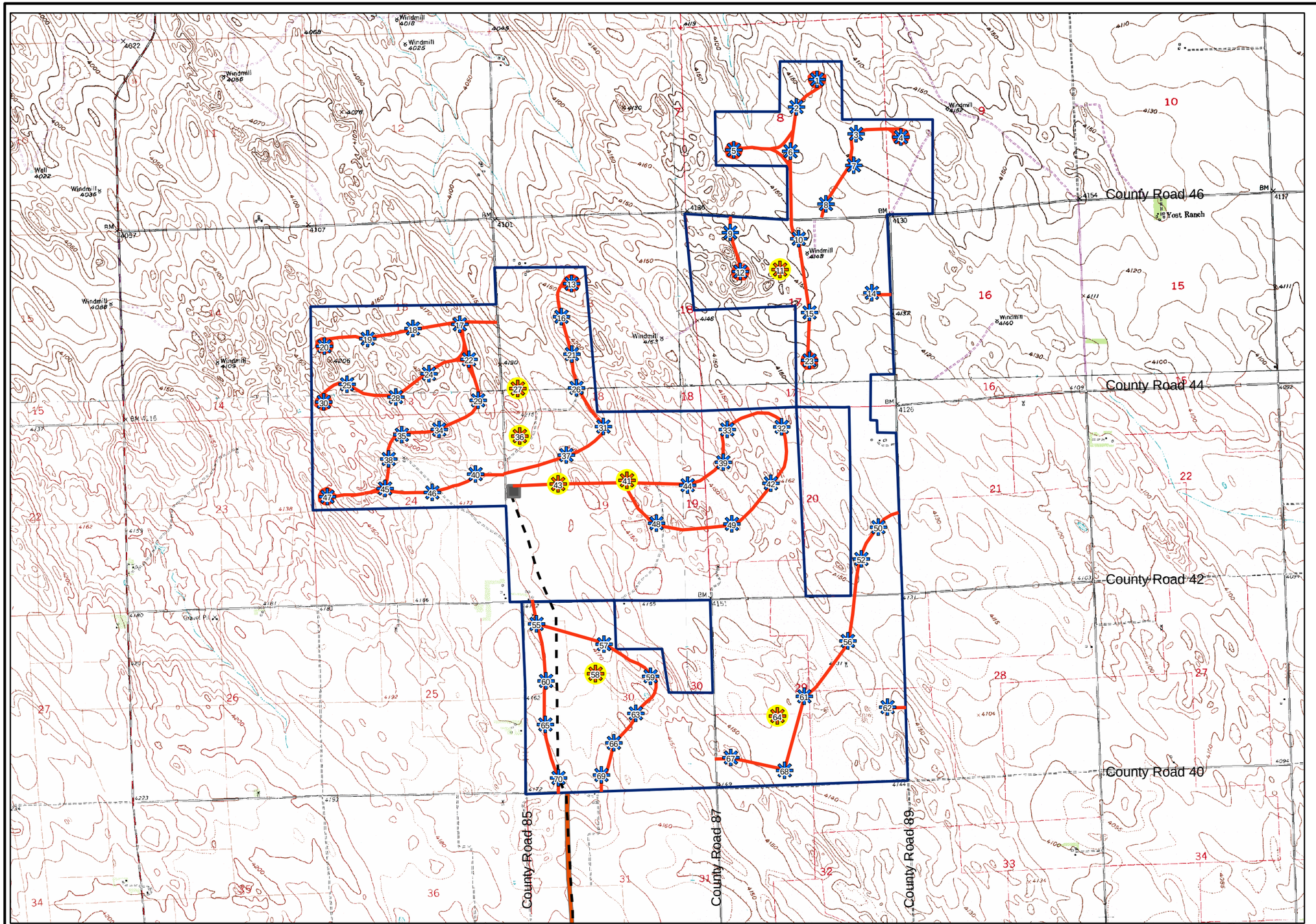
Figure

3.3



Legend

Proposed Turbine Locations

optional

required

Access Road Locations

Transmission Line

Project Boundary

Collector Substation

Transmission Line Easement

N

0 0.2 0.4 0.8

Miles

Contour Interval = 20 ft.

Source: U.S.G.S 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984).
Haxtun West, Colorado Quadrangle, 1962 (Photorevised 1980).
Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

SITE TOPOGRAPHY
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, CO

Figure

3.4

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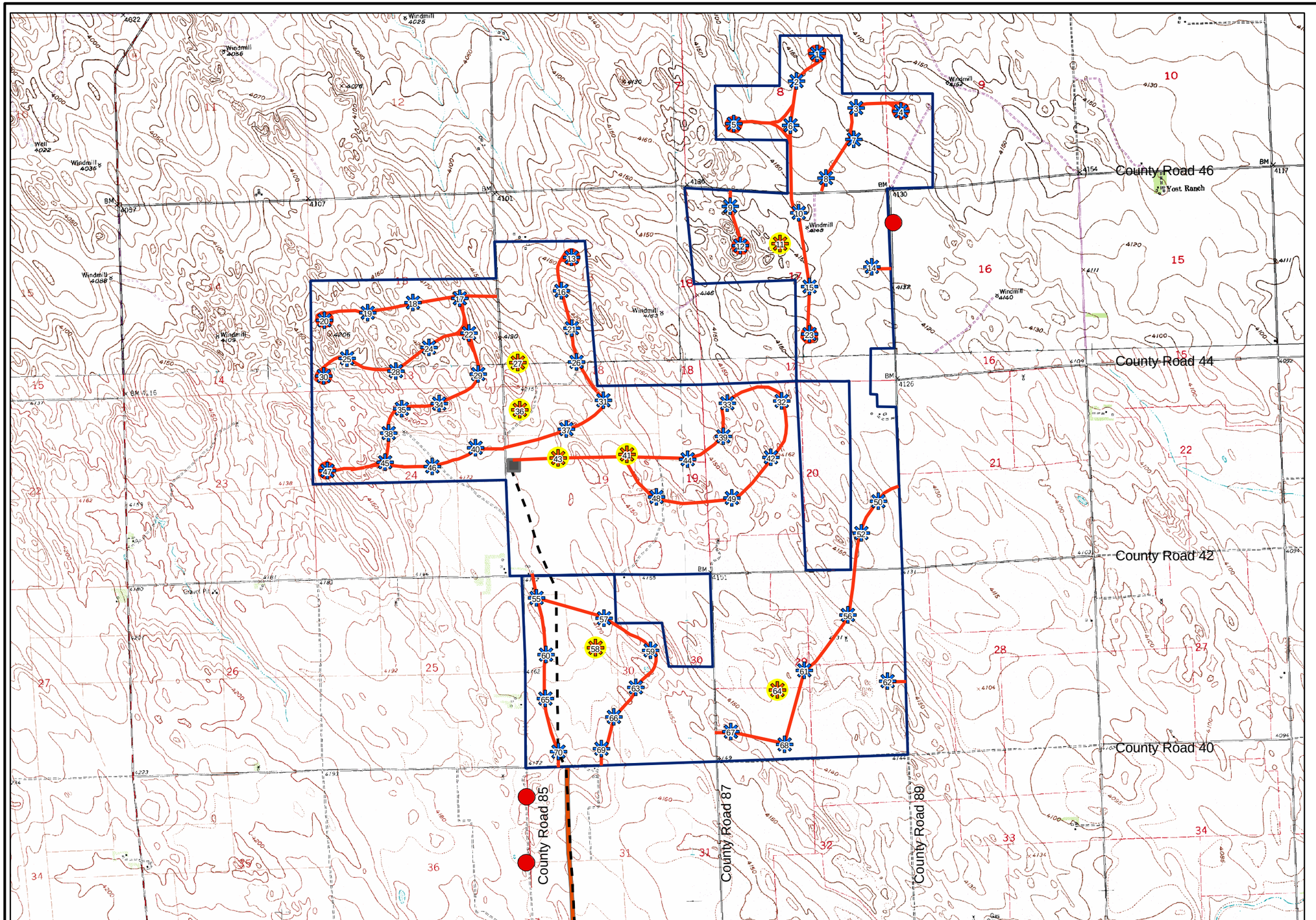

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Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

PLAYA LOCATIONS
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, CO

Figure

3.5

Wednesday, September 10, 2008 1:53:25 PM
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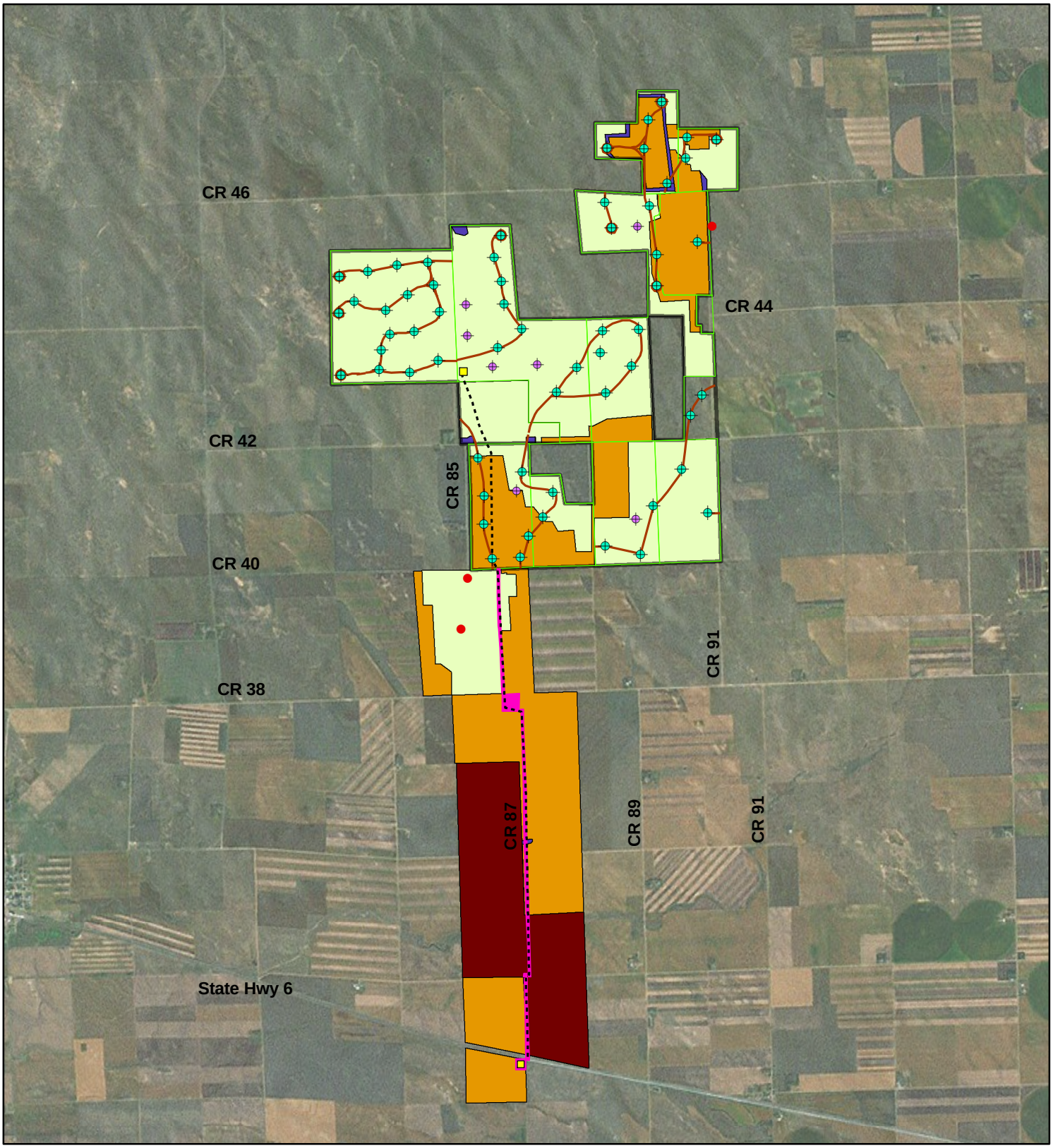
Figure 3.6. Habitat Mapping
Colorado Highlands Wind Project



Wind Turbine

Optional Wind Turbine

Transmission Line

Roads

Project Boundary

Land Ownership

Substation

Transmission Line Easement

Habitat Types

Playa

Agricultural

CRP Lands

Grassland

Shelterbelt

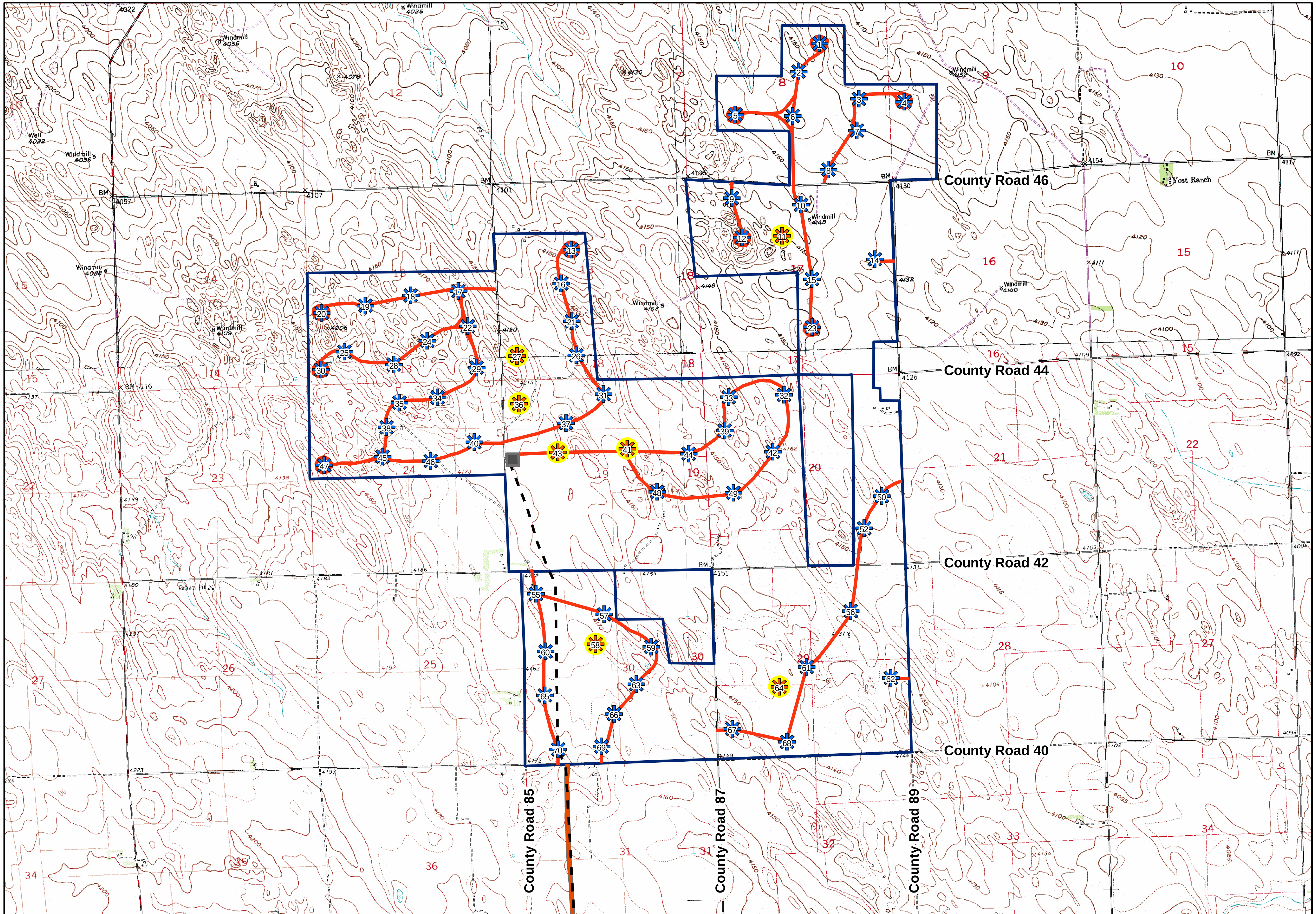
N

W E

S

0 0.5 1 2 Miles

Datum: WGS 1984
Projection: UTM Zone 13N



Legend

Proposed Turbine Locations

- optional
- required
- Transmission Line
- Access Road Locations
- Collector Substation
- Project Boundary
- Transmission Line Easement

N

0 0.2 0.4 0.8

Miles

Contour Interval = 20 ft.

Source: U.S.G.S 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984).
Haxtun West, Colorado Quadrangle, 1962 (Photorevised 1980).
Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

HIGHWAYS
COLORADO HIGHLANDS WIND SITE, LOGAN COUNTY, CO

Figure

3.7

Wednesday, September 10, 2008 2:50:02 PM
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APPENDIX A
AGENCY LETTERS

RECEIVED
BY JGH DATE 24APR08

April 17, 2008

Jim Hartman
Environmental Manager
Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

Re: Proposal to Approve an Interconnection Request for Fleming Wind Project, Logan County, CO (CHS #52211)

Dear Mr. Hartman:

Thank you for your correspondence dated April 11, 2008 and received by our office on April 14, 2008 regarding the review of the above-mentioned project. We recommend that the Department of Energy initiate review of the project by our office and other consulting parties under Section 106 of the National Historic Preservation Act (Section 106). The Advisory Council on Historic Preservation recommends that lead Federal agencies coordinate their NEPA and Section 106 studies for projects (please see attached flow chart).

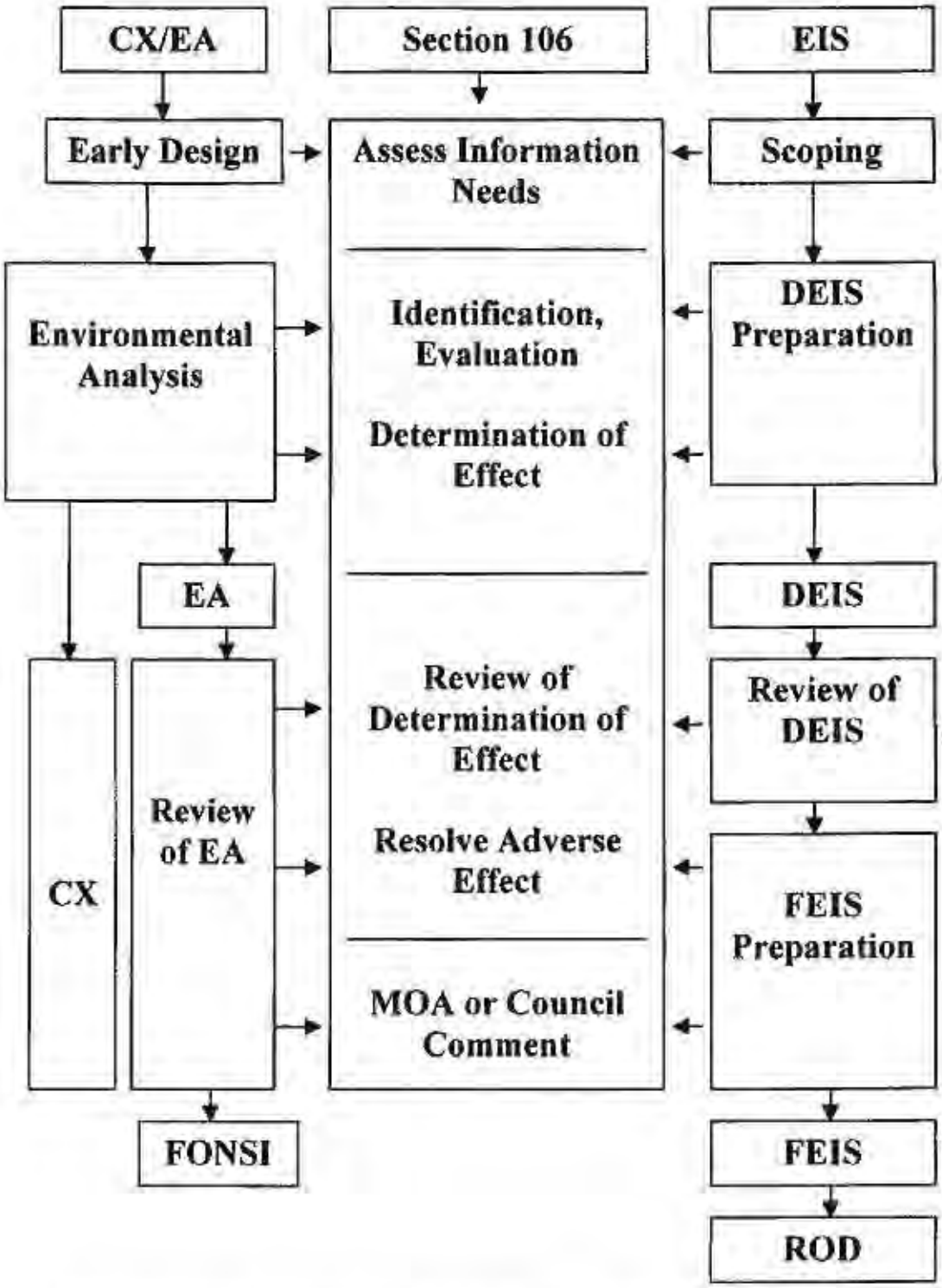
If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Coordinator, at (303) 866-4678.

Sincerely,

Mark Wolfe

For Georgianna Contiguglia
State Historic Preservation Officer

COORDINATION BETWEEN NEPA AND SECTION 106



The Public and Consulting Parties must be notified and given the opportunity to comment during each step of the Section 106 review process.

Received 8 MAY 2008

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (65412)
Denver, Colorado 80225-0486

IN REPLY REFER TO
ES/CO: T&E/Species list
TAILS: 65412-2008-SL-0363

MAY - 7 2008

Mr. James Hartman
Department of Energy
Western Area Power Administration
Rocky Mountain Region
P.O. Box 3700
Loveland, Colorado 80539-3003

Dear Mr. Hartman:

The U.S. Fish and Wildlife Service (Service) received your letters dated April 11, 2008, and April 28, 2008, regarding your proposal to approve an interconnection agreement with Wind Energy Prototypes, LLC (WEP) for the Fleming Wind Energy Project in Logan County, Colorado. These comments have been prepared under the provisions of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et. seq.), the Bald and Golden Eagle Protection Act of 1940 (BGEPA), as amended (16 U.S.C. 668 et. seq.), the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 et. seq.), and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321-4327).

For your convenience, we have enclosed a list of Colorado's threatened and endangered species, as well as the counties in which they are known to occur. We do not have site specific information available to us. If questions regarding the presence of an endangered species, the extent of its habitat, or the effects of a particular action need to be resolved, the Service recommends that a knowledgeable consultant conduct habitat assessments, trapping studies, or provide recommendations regarding options under the ESA. Due to staffing constraints, the Colorado Field Office cannot provide you with these services.

The Service supports the development of wind power as an alternative energy source. However, if not appropriately designed and sited, turbines and wind farms can have negative impacts on wildlife and their habitats. On July 10, 2003, we released *Interim Guidance on Avoiding and Minimizing Impacts to Wildlife from Wind Turbines* (Guidance) (http://www.fws.gov/r9dhcbfa/wind.pdf). These voluntary siting guidelines are intended to assist developers in avoiding and minimizing impacts from wind turbines to wildlife and their habitats. They are based on the best information available and were developed by a team of Federal, State, university, and wind energy industry biologists.

Post-construction monitoring to identify any wildlife impacts is highly recommended at all developed sites. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist without regard to his/her affiliation or interest in the site.

Please also be aware of the potential application of the MBTA and the BGEPA. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and

nests, except when specifically authorized by the Department of the Interior. Unlike the ESA, neither the MBTA nor its implementing regulations (50 CFR Part 21) provide for permitting "incidental take" of migratory birds.

The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed at structures such as wind turbines even if all reasonable measures to protect them 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 minimize their impacts on migratory birds, and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without implementing all reasonable measures to avoid take.

Protective measures to help reduce possible impacts to migratory birds and other raptors should be installed whenever possible. For example, 7 CFR § 1724.52 allows for deviations from construction standards for raptor protection, provided that structures are designed and constructed in accordance with the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, by the Edison Electric Institute, APLIC, and the California Energy Commission. The regulation requires that such structures be in accordance with the National Electrical Safety Code and applicable State and local regulations.

Any future mitigation recommended by the Service for the proposed wind project would be voluntary on the part of the developer unless made a condition of a Federal license, permit or other authorization. However, mitigation does not apply to "take" of species under the MBTA, BGEPA, or ESA. The goal of the Service under these laws is the elimination of loss of migratory birds and endangered and threatened species due to wind energy development. The Service will actively expand partnerships with regional, national, and international organizations, States, tribes, industry, and environmental groups to meet this goal.

If the Service can be of further assistance, please contact Sandy Vana-Miller in this office at (303) 236-4773.

Sincerely,

Susan C. Linner
Colorado Field Supervisor

Enclosure: Species List

cc: FWSR6/ES/LK, Sandy Vana-Miller

Colorado Field Office County List
Updated February 2008

Update 2-19-08

Symbols:
* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.
▲ Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other states.
© There is designated critical habitat for the species within the county.
T Threatened
E Endangered
P Proposed
X Experimental
C Candidate

For additional information contact: U.S. Fish and Wildlife Service, Colorado Field Office, PO Box 25486 DFC (MS 65412), Denver, Colorado 80225-0486, telephone 303-236-4773
U.S. Fish and Wildlife Service, Western Colorado Field Office, 764 Horizon Drive, Building B, Grand Junction, Colorado 81506, telephone 970-243-2778

Species	Scientific Name	Status
ADAMS		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ALAMOSA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
ARAPAHOE		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T

Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ARCHULETA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Mexican spotted owl	Strix occidentalis lucida	T
Pagosa skyrocket	Ipomopsis polyantha	C
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
BACA		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
BENT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
BOULDER		
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
BROOMFIELD		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E

Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
CHAFFEE		
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
CHEYENNE		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
CLEAR CREEK		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
CONEJOS		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
COSTILLA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
CROWLEY		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E

Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
CUSTER		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
DELTA		
Black-footed ferret	Mustela nigripes	E
Bonytail	Gila elegans	E
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow©	Ptychocheilus lucius	E
Humpback chub	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
DENVER		
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
DOLORES		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
DOUGLAS		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E

Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
EAGLE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
ELBERT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Whooping crane ▲	Grus americana	E
EL PASO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
FREMONT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E

Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
GARFIELD		
Bonytail	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Humpback chub	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Parachute beardtongue	Penstemon debilis	C
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
GILPIN		
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
GRAND		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Osterhout milkvetch	Astragalus osterhoutii	E
Penland beardtongue	Penstemon penlandii	E
Razorback sucker*	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
GUNNISON		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C

HINSDALE		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
HUERFANO		
Arkansas darter	Etheostoma cragini	C
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
JACKSON		
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sternula antillarum	E
North Park phacelia	Phacelia formosula	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
JEFFERSON		
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
KIOWA		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T

KIT CARSON		
Black-footed ferret	Mustela nigripes	E
LAKE		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Penland alpine fen mustard	Eutrema penlandii	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
LA PLATA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Knowlton cactus	Pediocactus knowltonii	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
LARIMER		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
North Park phacelia	Phacelia formosula	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
LAS ANIMAS		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
New Mexico meadow jumping mouse	Zapus hudsonius luteus	C
LINCOLN		

Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
LOGAN		
Least tern (interior population)▲	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane▲	Grus americana	E
MESA		
Bonytail©	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Humpback chub©	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MINERAL		
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
MOFFAT		
Black-footed ferret	Mustela nigripes	E
Bonytail©	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Humpback chub©	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker©	Xyrauchen texanus	E
Ute ladies'-tresses orchid (Yampa River floodplain)	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C

MONTEZUMA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Mancos milkvetch	Astragalus humillimus	E
Mesa Verde cactus	Sclerocactus mesae-verdae	T
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Sleeping Ute milkvetch	Astragalus tortipes	C
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
MONTROSE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MORGAN		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
OTERO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Piping plover	Charadrius melodus	T
OURAY		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E

Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
PARK		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Penland alpine fen mustard	Eutrema penlandii	T
Piping plover▲	Charadrius melodus	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Whooping crane▲	Grus americana	E
PHILLIPS		
None		
PITKIN		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
PROWERS		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
PUEBLO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Mexican spotted owl	Strix occidentalis lucida	T

RIO BLANCO		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Dudley Bluffs bladderpod	Lesquerella congesta	T
Dudley Bluffs twinpod	Physaria obcordata	T
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
White River beardtongue	Penstemon scariosus var. albifluvis	C
Yellow-billed cuckoo	Coccyzus americanus	C
RIO GRANDE		
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
ROUTT		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAGUACHE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN JUAN		

Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN MIGUEL		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SEDGWICK		
Least tern (interior population)	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane▲	Grus americana	E
SUMMIT		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Penland alpine fen mustard	Eutrema penlandii	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
TELLER		
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Whooping crane▲	Grus americana	E

WASHINGTON		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
WELD		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
YUMA		
None		T

STATE OF COLORADO

Bill Ritter, Jr., Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

Thomas E. Remington, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192
wildlife.state.co.us

For Wildlife-
For People

May 9, 2008

Mr. Jim Hartman
Environmental Manager
Western Area Power Administration
P.O. Box 3700
Loveland, CO. 80539

Re: Fleming Wind Energy Project

Dear Mr. Hartman,

The Colorado Division of Wildlife (CDOW) would like to thank Western Area Power Administration for the opportunity to provide recommendations on the proposed Fleming wind energy development in Logan County. Division staff has reviewed the information provided, and has consulted with local biologists and wildlife managers.

The Fleming wind project area overlays with greater prairie chicken (GPC) range, which is limited in Logan County. The DOW has worked with private landowners to bolster GPC populations throughout the eastern plains of Colorado. While the population is healthy and they are now hunted on a limited basis, they are not found in large numbers in Logan County and are vulnerable to direct habitat loss. Several leks (breeding areas) have been identified close to the proposed project area, and at least one lek has been identified by DOW staff within the site boundaries.

These birds rely heavily upon Conservation Reserve Program lands (CRP), cultivated crop stubble, and grassy sand-hill habitat areas of the proposed project during the majority of the year. These grassy sand-hills are of particular importance in the project area, as the birds are dependent on large blocks of mid-grass systems for year round habitat. The prairie chickens tend to be widely distributed through available sand-hill habitat throughout the summer and autumn months, but concentrate in winter (around food sources) and in spring, when the breeding season approaches. Greater prairie chicken leks are generally used from March through May. They prefer low sites with wide-viewing horizons covered by low or sparse vegetation, or ridge tops with wide-viewing horizons.

Greater prairie chickens show strong attachment to leks not only during spring mating but throughout the year. While performing mating rituals on their leks, they depend on sounds they generate to attract potential mates. Human impacts related to site development and construction could negatively impact the small numbers of prairie chickens in Logan County. Impacts resulting from increased human presence could include abandonment of leks due to increased noise levels, disturbance or destruction of nesting areas, possible mortality from direct strikes on the towers and vehicles (construction and maintenance), and increased use by predating raptors with more perches available. In order to prevent or minimize these impacts we recommend that activity related to the project be avoided from March 15th to June 15th annually to avoid disturbing Greater prairie chickens on their leks and during subsequent nesting periods.

USFWS's Interim Guidelines recommends avoiding turbine placement in habitats known to be occupied by species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation. We recommend a lek buffer of ½ mile from turbine sites and transmission lines. The DOW recommends that a survey be performed during the optimal survey period, from late March to mid to late April 2009, in order to ensure that all leks being used by prairie chickens in the project area are identified and subsequently protected by the appropriate buffers and protections mentioned above.

Transmission Line – Introduction of a transmission line for this project can have negative impacts on many species of wildlife that inhabit the area, especially birds and bats. Construction of new transmission lines in northeastern Colorado is increasing. Each of these lines poses a direct strike threat both birds and bats. The lines also provide new perching sites for raptors that may not have been present in the past with potential increased predation on species like prairie chickens. DOW staff also suggests that future expansion be considered when planning the capacity and location of these lines so that new transmission lines will not be needed. Minimizing the number of transmission lines will certainly reduce the potential for these wildlife impacts. During construction of the transmission lines and associated structures, devices such as swan diverters are recommended to minimize bird – power line collisions in accordance with Avian Power Line Interaction Committee (APLIC) guidelines.

The following eight recommendations address general but significant issues to be resolved from the CDOW perspective. The recommendations are not listed in order of importance.

1. **Avoiding/Minimizing Impacts.** *In selecting sites for construction, focus on options that avoid critical wildlife habitats, over the use of mitigation strategies.* Areas that exhibit high levels of wildlife use like the sand-hills and playas found within or along this project area would benefit greatly by not placing facility infrastructure adjacent to or over such areas. If there is no option to avoid placement of infrastructure on or adjacent to areas of high wildlife value, options should be evaluated on buffering placement, altering structure design, and sequencing construction in a manner that minimizes losses to habitat and wildlife. As a last resort, if all options for avoiding impacts are taken and prove insufficient, then mitigation strategies should be identified and implemented. CDOW encourages mitigation options, such as land acquisition and/or conservation easements, as well as potential options such as developer support directed to entities that are actively involved in research, education, management, preservation and recovery efforts for the benefit of wildlife.

2. **Study Protocols.** *Consult with CDOW for review and comment on wildlife and habitat survey protocol, including monitoring locations, before the protocol is finalized.* It is important that pre-construction and construction/ post-construction monitoring be conducted using similar methods, so that valid comparisons can be made. The length of time for pre-construction monitoring should be a minimum of 2 yrs, and the length of time for construction and post-construction monitoring should be a minimum of 2 more yrs. Less monitoring might be acceptable, based on consultation with CDOW. Because of the unique habitat and wildlife diversity, as well as the proposed wind energy infrastructure and project's size and potential for negative impacts, CDOW recommends that all wildlife and habitat surveys make use of protocols that are best suited to assess population level impacts, and assess direct and indirect impacts based on current peer-reviewed biological methodologies. CDOW requests the opportunity to comment on future issues derived from baseline or impact surveys, as well as amendments made to infrastructure/facility placement, county permit requirements or recommendations. CDOW strongly encourages current and future developers to be proactive in bringing plans for additional phases or developments to our attention prior to establishing infrastructure placement and routing, as well as working with landowners on lease negotiations. This is requested in the hope that proactive, cooperative efforts will identify concerns early on so that they may be addressed for the best possible solution for people as well as wildlife.

3. **Research/Access / Monitoring.** Provide on-going support for research on wind energy development impacts on wildlife and habitat, as well as provide CDOW with all forms of raw data collected at onset, during,

and post construction surveys. *All research data (observed, written, recorded, GPS files, etc.) collected should be accessible and provided to CDOW's District Wildlife Managers and Biologists in a timely manner. Annual reports summarizing the data should be submitted to CDOW.*

Agreements between the developer/operator and the landowner should include a clause recognizing the access provision for CDOW personnel for monitoring purposes. It is conceivable that wind turbines will increase scavenging opportunity for and concentration of predators in areas where ground nesting species are found. CDOW recommends that on-going monitoring efforts be made to detect, document and remove carcasses caused by blade strikes to minimize the potential of concentrated increases of predator occupation.

4. **Operational Considerations**. *Limit on-site visit frequency and duration by service personnel, especially during critical nesting time, to minimize impacts to wildlife. It is also recommended that facility maintenance staff keep service vehicle speeds to a minimum to avoid vehicle collisions with wildlife.* During the operational phase, staff should be properly trained in documenting wildlife mortalities and notifying local wildlife officials in a timely manner. During the period of time from March 1 through June 30, all wind turbine maintenance should begin after 10 am and stop by 5 pm to prevent disturbance of greater prairie chickens while on their leks.

Long-term decommissioning plans should also be developed in the event that it is decided to decommission any infrastructure of the facility. Decommissioning plans should include (but not limited to) timing of decommissioning individual or project wide infrastructure and plans to reclaim areas back to pre-construction conditions.

5. **Weed Management**. Noxious weeds reduce or destroy wildlife habitat. *Noxious weeds should be actively eradicated, and a noxious weed and re-vegetation management plan should be developed and implemented in areas where there will be disturbance due to construction or maintenance activities.* Equipment should be cleaned when moved from site to site to remove weed seeds even if no weeds are recognized. Noxious weed management should continue throughout the useful life of the wind facility, and for 5 years after operation ceases. In the post-construction period, the area should be promptly re-contoured to its original state (based on pre-construction photographs) and re-vegetated to pre-construction conditions using native species to prevent erosion and invasion by weeds. Re-vegetation of disturbed areas after site construction as well as a re-vegetation effort after the useful life of the wind facility should follow the standards used by the USFS, which requires 80% coverage of native vegetation as a measure of successful reclamation. The applicant may wish to contact the Logan County Weed Inspector to facilitate development of reclamation and weed management plans for the facility

6. **Hunting**. *At the landowner's discretion, allow hunting to continue within and adjacent to the project area.* As this area develops in wind energy, it is important to maintain the legacy of traditional agricultural land uses. Hunting is one such activity that is essential in managing big game wildlife populations, and in providing recreation and income opportunities for landowners as well as the local community. Deer, pronghorn, pheasants, dove, coyote, and rabbit are a few of the wildlife species that are hunted in this area. Hunting is not only an important management tool used by the Colorado Division of Wildlife to balance wildlife populations with available habitat, but is also a recreational activity and economic asset. Colorado statutes require landowners to allow hunting on their properties in order to be eligible for compensation due to agricultural losses caused by big game. Landowners often allow friends and family to hunt coyotes as a method of reducing depredation on their livestock. For the above reasons, CDOW recommends that hunting and depredating animal control should be allowed to continue on areas developed for wind energy at the landowner/lessee's discretion.

7. **Livestock Fencing.** Use of fences designed to prevent harm or fatalities to wildlife is recommended. *Fencing that would be used within or around development sites, either during or after the project, should allow free passage of wildlife, incorporating three or four strand fencing with a bottom strand height of 17 inches and a*

maximum top strand height of 42 inches, along with installation of double stays between posts. Chain link and mesh fencing should be kept to a minimum and used only to protect facilities where security is required. Substation fencing should be built according to and meet applicable standards.

8. **Wildlife Protection.** The proposed wind energy project will be in an area that is very rich in wildlife diversity and will span a variety of regionally unique habitat types. We recommend that sensitive wildlife species and critical habitat features be identified and buffered when considering infrastructure placement and operation, especially during critical nesting periods. We have the following recommendations:

Raptors.
Raptor nests should be identified within the project area and given a ¼ mile buffer from wind turbine placement, except for prairie falcon and golden eagle nests which should be given a ½ mile buffer from turbine placement. Construction activities within ½ mile from nest sites should occur outside of critical nesting periods. As noted in the USFWS interim guidance, as well as the developers permit application, impacts from collisions can be minimized by avoiding migratory pathways and habitats where birds concentrate when siting wind energy facilities. Prairie dog towns located near the proposed site provide excellent shelter, feeding, and nesting habitat for numerous resident and migratory raptors including; golden eagles, falcons, hawks and owls. Although each Raptor species nests at different times, the general nesting period for raptors in this area occurs between mid February through mid July, with the exception of golden eagles, which start nesting in mid December. The USFWS uses a 500 meter disturbance buffer from raptor nests and is listed as a standard in their current forest wide management plan. Although there are exceptions, these buffer distances and seasonal restrictions suggested here reflect an informed opinion that if implemented should assure the majority of individuals within a species will continue to occupy the area.

Burrowing owl nest sites—no development activity within 150 ft of active burrowing owl nest sites between March 15 and October 31. Although burrowing owls may not be actively nesting during this entire time, they may be present at burrows up to a month before egg laying and up to several months after young have fledged. Because nesting burrowing owls may not be easily visible, it is recommended that targeted surveys be implemented to determine if burrows are occupied.

*(An active nest is any nest that is frequented or occupied by a raptor during the breeding season, or which has been active in any of the five previous breeding seasons. Many raptors use alternate nests in various years. Thus, a nest may be active even if it is not occupied in a given year.)

Mountain Plover. *Identify habitat within the project area, and construction activity should be sequenced outside of critical nesting periods, April 1st through August 15.* The mountain plover is a rare species that was recently proposed for Federal Endangered species listing. Colorado continues conservation efforts on mountain plover given that 60-80% of the continental population is believed to breed in the state. Suitable habitat exists along the route of the proposed facility. Mountain plovers are found primarily in the arid grasslands of the Great Plains. Nesting plovers choose short-grass prairie grazed by prairie dogs, bison, or cattle, and fallow fields on fragmented prairie (Knopf, 1996). Since nest site specific fidelity has not been documented in breeding mountain plovers in Colorado, construction of the proposed facility will likely have fewer negative effects on this bird species if disturbance to the ground surface takes place outside of the breeding season. If construction processes can't be completed outside of critical nesting periods, construction areas should be pre surveyed for mountain plover nests prior to breaking ground (Knopf, 1996), and the developer should employ nest clearance surveys before site specific infrastructure construction begins. In a cooperative program, the CDOW and Rocky Mountain Bird Observatory (RMBO) provide the free services of biologists trained to detect plover activity on farm lands.

Songbirds. Species found in this area (including all SLB parcels) include the lark bunting, McCowan's longspur, chestnut collared longspur, horned lark, meadow lark, swallows, Cassin's sparrow, lark sparrows, loggerhead shrike, brown thrasher and swifts, which either breed, migrate through, or winter here, based on the Bird Species Occurrence Status Checklist. For breeding birds, most species of small birds are ground nesting, although some species nest in trees or bushes. Many of these small birds are experiencing drastic population declines and the CDOW is concerned about any activities that could negatively impact them. All of these birds could be subject to habitat loss, displacement and disturbance from construction of the facility or mortalities caused by strikes from turbine blades. It is possible that human activities around these nests can have significant negative impacts. *In regards to ground-nesting small birds in the area, it is recommended that any construction that takes place on the proposed area occur before April 1 and after August 15 to minimize any impacts that human activity may have on these ground nesting birds.* USFWS staff recommends this as well as a way of avoiding violation of the Migratory Bird Treaty Act. Turbine types, construction timing, and consideration of how construction is completed could do much to reduce impacts on these species.

Depending on the year (mainly, based on available moisture) there are many more birds that reside in the proposed area then those listed: bobolinks, although they prefer hayfields, also utilize the irrigated corn and alfalfa fields; long-billed curlews and Wilson's phalarope can be found around the playas when they have water in them; prairie falcons are very numerous throughout NE Colorado during the winter months. There are several bird species that must migrate through the area since their summer range is north of Colorado and they winter in the south: American golden, piping, mountain and western snowy plovers, Bell's vireo, buff-breasted sandpiper, greater and lesser sandhill crane, solitary sandpiper, Sprague's pipit, veery and the western yellow-billed cuckoo.

Bats. *If migrating bats are found to pass through the area, employ seasonal shutdowns on turbines that cause significant bat mortality due to collisions with turbine blades.* This measure could minimize impacts to bats during peak migration periods (August and September).

Swift Fox. Swift fox is a species of state and federal concern that lives in and around the proposed area. Swift fox live here year-round, breed, during December and raise their young into the next fall. Any disturbance or destruction of dens from December 15th through August 15th would be detrimental to this species. *All maternal swift fox den sites should be identified and avoided during pre and post construction processes.* It is recommended that Swift Fox surveys include daylight searches for den areas and nighttime spotlight searches during August and September.

Prairie dogs. *All prairie dog towns within and adjacent to the proposed project should be located prior to construction. If a prairie dog town falls within an unavoidable construction site and needs to be removed, the town should be surveyed for other species, such as burrowing owls and mountain plover, prior to eradication efforts. After burrowing holes are surveyed, necessary eradication efforts should occur from October 31 to March 15.*

Efforts to remove the animals from a parcel may be met with strong resistance from individuals and/or organized groups. From a biological standpoint, prairie dogs may be considered a key species in shortgrass-midgrass prairie ecosystems. The heavily browsed grasses typical of prairie dog towns provide the type of habitat that is preferred by nesting bird species such as the mountain plover. Prairie dogs are also a prey base for a variety of raptors and terrestrial predators. Studies indicate that the burrow system created by prairie dogs provide essential habitat for literally dozens of other vertebrate groups. The relationship between prairie dogs and native grass stands is well documented. Prairie dog eradication needed for development purposes on this site should be performed before development or construction work begins, and should be kept to the minimum number of burrows possible. Eradication of prairie dogs and their burrows necessitated by construction activity should be performed using only approved methods and approved toxicants. If it is unavoidable, eradication efforts during the potential season of use by burrowing owls should be performed only after the site is surveyed by a biologist certified for such efforts,

and holes used by burrowing owls are adequately protected. Trapping/transplant efforts or euthanasia are legal options for prairie dog removal. Trapping/transplant efforts require a permit from CDOW and county commissioner approval if moved to a different county.

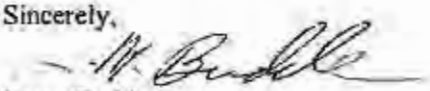
Reptiles and Amphibians. Identify critical reptile and amphibian habitat, including escarpments, ephemeral ponds and wetlands and avoid during construction and when siting infrastructure.

Deer. The proposed project area encompasses mule deer habitat. The area provides year long food and cover. The topography, sandhill and crop fields make this area extremely attractive to mule deer. It is unknown what effects the placement of wind turbines will have on mule deer, but studies suggest there is noticeable displacement from wintering areas where there have been construction of roadways and increased service vehicle traffic. Displacement disturbance caused during the installation process could have impacts that aren't measurable in direct mortality, but could have lasting affects including expenditure of extra energy during sensitive periods including winter and spring. Increased energetic demands caused by movement as a result of displacement can manifest in reduced over-winter survival in bucks and does, slower weight gain on fetuses, smaller birth weights in fawns, reduced fawn survival, etc.

Pronghorn. The proposed project area also encompasses pronghorn habitat. Pronghorn have inhabited this area in the past. While individuals or small groups have been shown feeding under towers with blades turning, there is some evidence that larger concentrations may be dispersed. It is not known what impacts will occur in the near and distant future. It is a fair speculation that pronghorn with ample available habitat surrounding the area being developed may better adjust to the displacement during the installation phase. A wind energy development with the associated infrastructure, construction and roads could have major impacts on the pronghorn population in this area.

Finally, it must be mentioned that migratory species, songbirds, raptors and most wildlife are protected by Federal and/or State law. Through design and placement of facilities that consider wildlife needs, much can be done to minimize both the risks and also the long-term impacts. If you or the applicant has any further questions, please feel free to call District Wildlife Manager Dan Cacho at (970) 466-0503.

Sincerely,



Larry Budde
Area Wildlife Manager

Cc: Steve Yamashita, Kathi Green, Dan Cacho, Janet George, Marty Stratman, Francie Pusateri, Wendy Figueroa, Celia Greenman

ENVIRON

July 18, 2008

Wendy Figueroa
Conservation Biologist
Colorado Division of Wildlife
122 East Edison
P.O. 128
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Dan Cacho
District Wildlife Manager
Colorado Division of Wildlife
122 East Edison
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Sandy Vana-Miller
U.S. Department of Interior
Fish & Wildlife Service
P.O. Box 25486 DFC (65412)
Denver, CO 80225-0486

Re: Colorado Highlands Wind Energy Project (f.k.a. Fleming Wind)
Logan County, Colorado

Thank you again for taking the time to meet with us at the Colorado Division of Wildlife office in Brush, Colorado, June 25, 2008 to discuss both the status for the Colorado Highlands Wind Project (project) and our plans moving forward. The purpose of this letter is to provide you with: 1) our planned buffer zones for construction activities and operational structures; and 2) a brief description of proposed activities that will be completed by Colorado Highlands Wind, LLC (CHW).

Buffer Zones

The Colorado Division of Wildlife (CDOW) letter of May 9, 2008 discussed recommendations for buffer zones to be observed during construction activities and for permanent structures that are part of the proposed project. The specific buffer zones discussed during our

meeting were related to raptor nesting sites and greater prairie chicken leks. The following presents the CDOW recommendations:

- Raptor Nests – No construction activities are to occur within 0.5 mile of an active raptor nest (currently inactive nests will be inspected prior to the start of construction in 2009) during the nesting season. The nesting season in the project area is considered to span the interval from February 1 through July 15. A 0.25 mile buffer from an active raptor nest is recommended for permanent structures.
- Greater Prairie Chicken Leks – No construction activities are to occur and no permanent structures are to be placed within 0.5 mile of a lek. John Imse of ENVIRON and Dan Cacho of CDOW met at the project site July 2, 2008 to establish the coordinates for the greater prairie chicken lek identified within the project boundaries.

As we discussed during the meeting, our project has already developed an optimized distribution of wind turbines. However, that distribution will be adjusted to be consistent with the above buffer zone recommendations presented by CDOW.

Proposed Activities

The following activities are proposed by CHW to provide additional information regarding the project area conditions prior to construction of the project, and activities that will be completed the start of full operations (scheduled for October 2009):

- Habitat Mapping – As presented during the meeting, this effort is scheduled to be completed during July 2008. In response to your comments during the meeting, this habitat mapping will include off-road mapping of habitat.
- Swift Fox – Den surveys will be conducted concurrent with July 2008 habitat mapping in off-road areas. In the event that a den is located this summer, then either 1) if a wind turbine generator (WTG) is immediately adjacent to the den then that WTG will be re-located, or 2) the location will be cordoned off-limits and construction activities next year will be delayed until the den is vacated. In addition, CHW will inform CDOW regarding any such dens encountered and consult with CDOW staff regarding appropriate actions.
- Avian Survey – An avian survey, with particular focus on raptors, will be conducted during Fall 2008, Winter 2008/2009, and Spring 2009. Several different protocols were discussed during

the meeting and the CDOW committed to working with CHW to develop an acceptable survey protocol to be utilized for this effort.

- Bat Survey – The discussion presented by the USF&WS included a suggestion for a pre-construction bat survey using the existing meteorological tower in the western portion of the project area as a monitoring point. CHW will install bat monitoring equipment (ANABAT®) at two separate heights on the existing tower to collect pre-construction bat data for the site. Microphones for the ANABAT units will be installed at 30-45 meters and at 5 meters above ground using standard manufacturer's protocols.
- Lek Survey – CHW will conduct a Spring 2009 survey to determine whether there are any greater prairie chicken leks, in addition to one identified during the Spring of 2008, within the project area.
- Construction Wildlife & Habitat Sweeps – Each turbine access road and turbine location will be surveyed and staked as a routine procedure prior to intrusive construction activities. CHW will conduct a wildlife and habitat sweep of each staked road and turbine location prior to intrusive construction activities. In the event that a nest is encountered, the site will be cordoned off-limits and construction activities will be delayed until the nesting season is completed and the nest is vacated. In addition, CHW will inform CDOW regarding any den or nest sites encountered during construction and consult with CDOW staff regarding appropriate actions.
- Post-Operational Monitoring – CHW will conduct post-operational monitoring for both avian and bat mortality. We have obtained and reviewed the 2008 report of avian and bat mortality monitoring completed for the Spring Canyon Wind Project located in northern Logan County. As discussed in our meeting, CHW plans to be operational at this project site in October 2009. Prior to the start of operations, CHW will prepare a plan that is consistent with the Spring Canyon project and provide it for your review and comment. That plan will include current relevant research methods for conducting post-operational bat and avian mortality surveys.

We believe the above approach identified for the CHW project incorporates CDOW's recommendations as discussed at the meeting on June 25, 2008. We look forward to working closely with CDOW in the future to successfully implement CDOW's recommendations for this important project. If you have any questions, please contact me.

Sincerely,

John P. Imse, R.G.
Principal

Cc: Jim Hartman - WAPA

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

NOV 19 2008

Mr. Edward Nichols, SHPO
Colorado Historical Society
Office of Archaeology and Historic Preservation
1300 Broadway
Denver, CO 80203

Dear Mr. Nichols:

Western Area Power Administration, Rocky Mountain Region (Western) is proposing to approve an Interconnection Agreement with Colorado Highlands Wind, LLC for a 90-megawatt (MW) wind generating facility (Project) in Logan County, Colorado. Western would be required to construct a switchyard (the Wildhorse Creek Switchyard) at the point of interconnection of the Project with Western's existing Sterling-Frenchman Creek 115-kV Transmission Line. Western is considering the impacts of the Project, including the switchyard, on cultural resources and is the lead federal agency for compliance with Section 106 of the National Historic Preservation Act.

In consideration of the effect of the undertaking on cultural resources the Project completed Class I and Class III surveys. The results of the surveys are documented in the enclosed report entitled: "A Class III Cultural Resource Inventory of the Proposed Colorado Highlands Wind Project, Logan County, Colorado". A Limited Results Survey Form is also enclosed to document the survey of Western's proposed switchyard. The report was prepared by Centennial Archaeology, Inc. under contract to ENVIRON International Corporation of Denver, Colorado.

The Project proposes to avoid impacting all historic properties identified in the Class I and Class III surveys. Western has determined that **no historic properties will be affected** as outlined in 36 CFR 800.4(d) (1). Additional project elements or alternatives that may subsequently be identified will require additional surveys, reporting, and consultation with your office before construction on these facilities would begin.

I. Description of the Undertaking Covered in the Draft Survey Report-
The Project includes a proposal to install 60 wind turbines, each capable of generating 1.5 MW for an installed capacity of 90 MW. The Project covers 7 square miles and is located on private land leased from landowners. The Project includes associated temporary and permanent access roads, an overhead transmission line, underground utilities, an operations and maintenance facility, a collector substation, and Western's switchyard. More detail on the proposed facilities is included in the enclosed report.

II. Methods and Reporting – Details on the Class I and Class III surveys are described in the enclosed survey report and Limited Results Survey Form. The field inventory

covered 1,506 acres. The Limited Results Survey Report covers approximately 15 acres that would encompass Western's proposed switchyard and a minor realignment of two spans of the Sterling-Frenchman Creek Transmission Line. All land is under private ownership. Eighteen sites and 15 isolated finds were recorded and described in the enclosed report; there were no findings reported for the Limited Results Survey.

III. Resources Located, Identified, and Evaluated- There are four prehistoric sites (including multicomponent sites with a prehistoric component) including two lithic scatters (5LO645 and 5LO653), a lithic scatter with ground stone and ceramics (5LO647) and a single lithic artifact at an otherwise historic site (5LO667). The presence of ceramics at 5LO647 indicates that the site dates to the Late Prehistoric stage; the other prehistoric sites are undated. Eight prehistoric isolated finds consist of five items of lithic debitage and three lithic tools, one of which is a Late Archaic projectile point.

Sixteen historic sites (including multicomponent sites with an historic component) consist of seven homestead remnants, most of which include only structural remains such as foundations and depressions but not standing structures; seven trash dumps and scatters; an abandoned powerline; and a segment of an active railroad. Seven historic isolated finds include five individual artifacts or small scatters of artifacts, a windmill remnant and a license plate. As a whole the historic remains date from the 1870s -1880s to the 1960s. However most of the evidence represents a narrower range from the first or second decade of the 20th century through the 1940s. Nearly all recorded homesteads have associated patent dates between 1900 and 1915, and all were abandoned by the middle of the 20th century. The overriding theme of historic occupation in the area is agriculture and agriculture-related settlement.

One additional historic resource that is not covered in the report is Western's Sterling – Frenchman Creek 115-kV transmission line. This line was evaluated by Kurt Schweigert in 1998 as a part of a larger project and is detailed in the report titled, *Historic Evaluation of Western Area Power Administration Facilities, Colorado, Wyoming, Nebraska, and Utah*. There is some disagreement in the available records from the Bureau of Reclamation and from Western's archives as to the age of the transmission line. The Bureau of Reclamation states the line was constructed in 1948 as a feature of the Colorado – Big Thompson Project, however Western's records indicate the line was constructed in 1984. Schweigert deduced the inconsistency is likely because the line underwent an extensive rebuild in the 1980's and as a result would no longer retain integrity as a historic resource. Additionally, he found no evidence that the line was a significant feature of the Colorado – Big Thompson Project and recommended that it was not eligible for the National Record of Historic Places (NRHP). Western concurred with this recommendation in 1999.

IV. Effects Determination and Compliance Decision – Of the 18 recorded sites, 15 are assessed as not meeting the eligibility criteria of the NRHP. The railroad, currently the Burlington Northern Santa Fe Railroad but historically the Chicago Burlington and Quincy Railroad, is evaluated in its entirety as eligible for inclusion on the NRHP. However, the recorded segment (5LO643.1) is evaluated as not eligible for the NRHP

because it has been modified and no longer exhibits its original construction attributes. None of the other historic sites are assessed as significant, and no further work is recommended. Prehistoric sites 5L0645, 5LO647 and 5LO653 are evaluated as NRHP-eligible. There is evidence of buried cultural materials at all three sites, and they have the potential to yield information important to the prehistory of northeastern Colorado. Western is recommending that these sites be avoided. Western also recommends that site 5LO647 be monitored by an archaeologist during construction activities on top of the dune. The remaining prehistoric site, 5LO667, is a single lithic artifact that comprises the prehistoric component of an otherwise historic site. It is not significant and no further work is recommended. By definition, isolated finds are not eligible for the NRHP so no work is necessary at any of these locations.

If construction plans change and avoidance is not feasible for sites 5LO645, 5LO647, and 5LO653, Western recommends that they be subjected to test excavation to determine the nature and extent of subsurface archaeological deposits. Additionally, Western recommends to the Project that locations not previously surveyed, which are subsequently identified for land disturbing activities be surveyed and that consultation with your office be completed prior to ground disturbing activities.

Western seeks your concurrence with our determination and recommends that the Project be allowed to proceed as planned.

If you have any questions about this, please telephone Ms. Ree Rodgers at (720) 962-7254 or Jim Hartman, Rocky Mountain Regional Office, Loveland, Colorado at (970) 461-7450.

Sincerely,

James Hartman
Environmental Manager.

Enclosures

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

NOV 25 2008

Ms. Susan Linner
U.S. Fish and Wildlife Service
Field Supervisor, Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (MS65412)
Denver, CO 80225-0486

Re: TAILS: 65412-2008-SL-0363

Dear Ms Linner:

This letter contains the Biological Assessment addressing potential impacts on federally-listed species in Nebraska from construction of the proposed Colorado Highlands Wind Project (CHW or Project) in Logan County, Colorado. Western Area Power Administration (Western) notified your office of the proposed action by letter dated April 11 and April 28, 2008 and we met with you and the Project Proponents (Alliance Power, Inc.) and their environmental contractor (ENVIRON, Inc.) in Brush Colorado on June 25, 2008. Western is the lead federal agency for the proposed action. Western proposes to approve a request for interconnection from CHW. The environmental assessment (EA) is enclosed for your review and information. We request initiation of Formal Consultation under Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA), concerning the whooping crane (*Grus americana*), interior least tern (*Sternula antillarum*), northern Great Plains population of the piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*) (collectively referred to as the target species), and designated critical habitat of the whooping crane. We further request initiation of Formal Consultation for the western prairie fringed orchid (*Platanthera praeclara*). We have determined that the Project is not likely to adversely affect the American burying beetle (*Nicrophorus americanus*) and will have no effect on the Eskimo curlew (*Numenius borealis*).

The work associated with this project includes the following actions:

- Construction of a 90 MW Wind Project in Logan County, Colorado as described in Chapter 2 of the enclosed EA.
- Construction of an approximately 3 acre electrical switchyard (called the Wildhorse Creek Switchyard) that will serve as the point of interconnection of the Project and Western's existing Sterling-Frenchman Creek 115-kV transmission line.
- The federal action is the approval of Large Generator Interconnection Agreement to allow CHW to interconnect with Western's existing transmission line.

CHW prepared a habitat survey and assessment report which is an appendix to the EA. This report includes information on biological resources in the Project areas. Based on the report and information in the EA, Western has determined the proposed action would not affect listed, proposed, or candidate species or their habitat.

This Project would result in some amount of new depletions to the South Platte River associated with the proposed construction of the Project. A one-time water use of approximately 22.6 acre-feet from the City of Sterling and/or Town of Fleming, Colorado municipal supply would occur during construction. Water would be used to mix concrete for foundations, for soil compaction and for dust abatement. Some groundwater from a small capacity well at an on-site maintenance facility will be used for sanitary purposes and periodic washing of wind turbine rotor blades during operation of the facility. Small amounts of water are used to clean wind turbine rotor blades in arid climates (where rainfall does not keep the blades clean). The purpose of blade cleaning is to eliminate dust and insect buildup, which otherwise deforms the shape of the airfoil and degrades performance. Water usage for cleaning is as low as 0.004 liters (0.001 gallons) per kWh (AWEA, undated). It is estimated that up to 2,000 gallons of water per year would be used to clean the wind turbine rotor blades. In addition, an exempt commercial water well would be installed at the O&M building for domestic purposes for the on-site O&M personnel. Estimated water usage would be on the order of 375 gallons per day during the O&M phase. The Project will ensure that the water use associated with this well complies with the requirements of the Platte River Recovery Implementation Program (PRRIP or Program). Neither Sterling nor Fleming are members of the South Platte Water Related Activities Program, Inc. (SPWRAP), which is a Colorado component of the South Platte River Recovery Program, described below. As a result, the Project will provide a one-time payment to participate in SPWRAP to cover both the construction and minimal ongoing operational water depletions from the project. Both the Project applicant and Mr. Urie on behalf of SPWRAP have agreed that the proposed Project should be covered by the Colorado Depletion Plan.

The PRRIP, established in 2006, is implementing actions designed to assist in the conservation and recovery of the target species and their associated habitats along the central and lower Platte River in Nebraska through a basin-wide cooperative approach agreed to by the States of Colorado, Nebraska, and Wyoming and the U.S. Department of the Interior [Program, I.A.1.]. The Program addresses the adverse impacts of existing and certain new water related activities on the Platte target species and associated habitats, and provides ESA compliance[1] for effects to the target species and whooping crane critical habitat from such activities including avoidance of any prohibited take of such species. [Program, I.A.2 & footnote 2.]. The State of Colorado is in compliance with its obligations under the Program.

[1] "ESA Compliance" means: (1) serving as the reasonable and prudent alternative to offset the effects of water-related activities that FWS found were likely to cause jeopardy to one or more of the target species or to adversely modify critical habitat before the Program was in place; (2) providing offsetting measures to avoid the likelihood of jeopardy to one or more of the target species or adverse modification of critical habitat in the Platte River basin for new or existing water-related activities evaluated under the ESA after the Program was in place; and (3) avoiding any prohibited take of target species in the Platte River basin.

For Federal actions and projects participating in the Program, the PRRIP Final Environmental Impact Statement (FEIS) and the June 16, 2006 programmatic biological opinion (PBO) serve as the description of the environmental baseline and environmental consequences for the effects of the Federal actions on the listed target species, whooping crane critical habitat, and other listed species in the central and lower Platte River addressed in the PBO. These documents are hereby incorporated into this Biological Assessment by this reference.

Table II-1 of the PBO (pages 21-23) contains a list of species and critical habitat in the action area, their status, and the Service's determination of the effects of the Federal action analyzed in the PBO. The Service determined in the PBO that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the continued existence of the endangered whooping crane, interior least tern, and pallid sturgeon, or the threatened northern Great Plains population of the piping plover. Further, the Service found that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the bald eagle and western prairie fringed orchid associated with the central and lower reaches of the Platte River in Nebraska, and was not likely to destroy or adversely modify designated critical habitat for the whooping crane. The bald eagle was subsequently removed from the federal endangered species list on August 8, 2007.

The Service also determined that the PBO Federal Action would have no effect to the endangered Eskimo curlew. There has not been a confirmed sighting since 1926 and this species is believed to be extirpated in Nebraska. Lastly, the Service determined that the PBO Federal Action, including the continued operation of existing and certain new water-related activities, was not likely to adversely affect the endangered American burying beetle.

The above-described Project operations qualify as a new water related activity because such operations constitute a new surface water or hydrologically connected groundwater activity which may affect the quantity or timing of water reaching the associated habitats of the target species implemented after July 1, 1997. [Program, I.A. footnote 3]. The Project conforms to the following criteria in Section H of Colorado's Plan for Future Depletions [Program, Attachment 5, Section 9]:

1. The Project is operated on behalf of Colorado water users;

2. The Project does not involve construction of a major on-stream reservoir located on the mainstem of the South Platte River anywhere downstream of Denver, Colorado;

3. The Project is not a hydropower diversion/return project diverting water including sediments from the mainstem of the South Platte River anywhere downstream of Denver and returning clear water to the South Platte River.

4. The Project does not cause the average annual water supply available to serve Colorado's population increase from "Wastewater Exchange/Reuse" and "Native South Platte Flows" to exceed 98,010 acre feet during the February-July period.

   Accordingly, the impacts of this activity to the target species, whooping crane critical habitat, and other listed species in the central and lower Platte River addressed in the PBO are covered and offset by operation of Colorado's Future Depletions Plan as part of the PRRIP.

The Applicant intends to rely on the provisions of the Program to provide ESA compliance for potential impacts to the target species and whooping crane critical habitat. Western intends to require, as a condition of any approval, that the Applicant fulfill the responsibilities required of Program participants in Colorado, which include participation in the South Platte Water Related Activities Program, Inc. (SPWRAP). Western also intends to retain discretionary Federal authority for the Project, consistent with applicable regulations and Program provisions, in case reinitiating Section 7 consultation is required.

This letter addresses consultation on federally-listed species and designated critical habitat in Nebraska, including the referenced target species and whooping crane critical habitat. Potential impacts from construction and operation of the Project to any other federally-listed threatened or endangered species and designated critical habitats will be addressed within the applicable biological opinion prepared by the Service, in accordance with the ESA.

Sincerely,

James Hartman
Environmental Manager

Enclosure
(Environmental Assessment)

Cc:
With copy of enclosure

Mr. Larry Budde
Area Wildlife Manager
Colorado Division of Wildlife
Brush Service Center
P.O. Box 128
Brush, CO 80723

December 3, 2008

James Hartman
Environmental Manager
Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, Colorado 80539-3003

Re: Colorado Highlands Wind Project, Logan County, Colorado (CHS # 53342)

Dear Mr. Hartman:

Thank you for your correspondence dated November 19, 2008 (received by our office on November 20, 2008) and the documentation regarding the subject project.

Following our review of the documentation provided, we concur with your determination that the following sites are **eligible** for the National Register of Historic Places (NRHP): 5LO.645, 5LO.647, and 5LO.653. In addition, we concur that the following sites are **not eligible** for the NRHP: 5LO.646, 5LO.648, 5LO.652, 5LO.654, 5LO.655, 5LO.656, 5LO.658, 5LO.660, 5LO.663, 5LO.664, 5LO.667, and 5LO.680. We further concur that the following resources lack integrity and therefore do not support the NRHP-eligibility of the larger linear resources of which they are a segment: 5LO.642.1 and 5LO.643.1. Finally, we concur that the following isolated finds are **not eligible** for the NRHP: 5LO.644, 5LO.649, 5LO.650, 5LO.651, 5LO.657, 5LO.659, 5LO.661, 5LO.662, 5LO.665, 5LO.666, 5LO.668, 5LO.681, 5LO.682, 5LO.683, and 5LO.684.

We **do not concur** that 5LO677 is not eligible for the NRHP. Our office feels that this site is a good example of vernacular architecture and may be eligible under criteria A and/or C.

In the future, please note that isolated finds (Ifs) are *not* by definition ineligible for the NRHP. The *Colorado Cultural Resource Survey Manual*, Revised 2007 Version changed the definition of isolated finds. The current language is, "Because of the limited information provided on an Isolated Find Form, SHPO staff will invariably find these resources not eligible. If you are recommending the resource be eligible or are recommending further work, the resource needs to be documented on the appropriate form."

We agree with the management recommendations provided within the documentation, including the avoidance of 5LO.645, 5LO.647, and 5LO.653 by all project related activities, as well as archaeological monitoring of site 5LO.647 during construction activities on top of the dune. We look forward to additional consultation regarding 5LO677.

Thank you for the opportunity to comment. If we may be of further assistance, please contact Shina duVall, Section 106 Compliance Manager, at (303) 866-4674 or shina.duvall@chs.state.co.us.

Sincerely,

Edward C. Nichols
State Historic Preservation Officer
ECN/SAD

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

JAN 0 9 2009

Mr. Edward Nichols, SHPO
Colorado Historical Society
Office of Archaeology and Historic Preservation
1300 Broadway
Denver, CO 80203

Dear Mr. Nichols:

Western Area Power Administration, Rocky Mountain Region (Western) is proposing to approve an Interconnection Agreement with Colorado Highlands Wind, LLC for a 90-megawatt (MW) wind generating facility (Project) in Logan County, Colorado. Western would be required to construct a switchyard (the Wildhorse Creek Switchyard) at the point of interconnection of the Project with Western's existing Sterling - Frenchman Creek 115-kV Transmission Line. Western is considering the impacts of the Project, including the switchyard, on cultural resources and is the lead federal agency for compliance with Section 106 of the National Historic Preservation Act, and implementing regulation 36 CFR 800, "Protection of Historic Properties."

Western coordinated one cultural resources inventory report for this project with your office in a letter dated November 19, 2008 (CHS # 53342). The enclosed report covers an additional transmission line segment proposed for the Project that was not included in the first coordination effort. Centennial Archaeology, Inc. (Centennial) performed the work between May and November 2008 under subcontract to ENVIRON International Corporation who is under contract to Colorado Highlands Wind, LLC.

Centennial's crew surveyed an approximately 300 foot-wide, 3.5 mile long corridor for the proposed transmission line corridor and an additional 10-acre block for a staging area at 20 meter intervals. The entire Area of Potential Effect (APE) covers approximately 60 acres and is located entirely on privately owned land. The corridor that is the subject of the enclosed report is a change from an earlier planned corridor, and is the corridor addressed in Western's Environmental Assessment. The Project is now caught up with their surveys on the transmission line routing and Western apologizes for any confusion this may cause. Centennial located one historic farmstead during the inventory, which is designated 5LO687. The farm complex is located in Section 5, T8N, R48W on the Fleming, CO 7.5' USGS topographic quadrangle in Logan County, Colorado, immediately north of County Road 36. The farm complex structures are largely in ruins and several of the structures have been altered, demolished, and rebuilt as recently as the 1980's. It property is abandoned and appears to have been abandoned in the last

ten to fifteen years. Centennial recommends the property as not eligible for the National Register of Historic Places (NRHP) based on the lack of integrity.

Western concurs with Centennial's recommendation of not eligible for site 5LO687. It is the responsibility of the lead federal agency to make determinations of eligibility and effect for historic properties that have the potential to be affected by its undertakings. Towards this end, Western has determined that site 5LO587 is **not eligible** for the NRHP. As a result, the utilization of the proposed transmission line corridor described in the enclosed report will pose **no effect to historic properties**.

Western looks forward to your review and comments and seeks concurrence with our determination. If you have any questions please contact Ms. Ree Rodgers, Archaeologist, at 720-962-7254, or Mr. Jim Hartman, Rocky Mountain Regional Office, Loveland, Colorado at 970-461-7450.

On another matter, Colorado Highlands Wind Project retained an architectural historian to re-evaluate 5LO677, which we discussed with your office based on comments in your letter dated December 3, 2008. Additional information on that site will be discussed with your office once we receive it from the Project proponents. We look forward to further discussion on that site.

Sincerely,

James Hartman
Environmental Manager

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (65412)
Denver, Colorado 80225-0486

IN REPLY REFER TO
ES/CO: ES/LK-6-CO-09-F-006
TAILS: 65412-2009-F-0108

FEB - 3 2009

Mr. James Hartman
Western Area Power Administration
Rocky Mountain Region
P.O. Box 3700
Loveland, Colorado 80539-3003

Dear Mr. Hartman:

This final biological opinion is provided in response to your request received on November 26, 2008, to initiate formal consultation pursuant to section 7(a) (2) of the Endangered Species Act of 1973 (ESA), as amended. Your Biological Assessment (BA) and Environmental Assessment (EA) for the Project described the potential effects of Colorado Highlands Wind, LLC's (CHW) proposed Wind Project (Project) located in Logan County, Colorado, on federally listed species and designated critical habitat associated with the Platte River in Nebraska. Your BA made no determination on the effects the proposed action may have on listed species/critical habitat in Colorado; therefore, this opinion will not address any listed species in Colorado.

On page 60 of the EA, the CHW committed to the following measures as described in their July 18, 2008, letter to the Colorado Division of Wildlife (CDOW) and the U.S. Fish and Wildlife Service (Service):

- Turbines located greater than 402 meters (0.25 mile) of known raptor nests.
- Turbines located greater than 805 meters (0.5 mile) of greater prairie-chicken leks.
- Seven back-up locations for turbines have been selected in order to address potential new wildlife-sensitive locations that may be discovered in subsequent surveys.
- Construction schedules would avoid breeding season activities and buffers for nesting raptors and prairie-chicken.
- Fall, winter, and spring raptor surveys would be conducted prior to the start of construction.
- Fall and spring bat acoustical monitoring would be conducted prior to the start of construction.
- Fall avian survey would be conducted in 2008.
- Lek survey would be conducted in spring 2009.

- Spring avian survey would be conducted in 2009.
- Grassland nesting bird sweeps would be conducted in advance of construction vehicles during the nesting season to avoid impacts to nesting birds.

The EA then stated that "CHW would prepare a mitigation plan outlining these actions and would commit to implement them". After discussing the EA with CDOW, we agreed that we would be interested in reviewing this mitigation plan early on so that we may provide comments in a timely manner with regard to the Project's construction schedule.

The Federal Action reviewed in this biological opinion is the proposed construction of CHW's Project, for which Western Area Power Administration (Western) is the lead federal agency. The CHW applied to Western for a Large Generator Interconnection Agreement to allow the Project to interconnect with Western's existing Sterling-Frenchman Creek 115-kV transmission line. The CHW proposes to construct a new 90 megawatt (MW) wind farm, a collector substation, an operation and maintenance facility, and an electrical switchyard that would serve as the point of interconnection of the Project and Western's existing line.

BACKGROUND

On June 16, 2006, the Service issued a programmatic biological opinion (PBO) for the Platte River Recovery Implementation Program (PRRIP) and water-related activities[1] affecting flow volume and timing in the central and lower reaches of the Platte River in Nebraska. The action area for the PBO included the Platte River basin upstream of the confluence with the Loup River in Nebraska, and the mainstem of the Platte River downstream of the Loup River confluence.

The Federal Action addressed by the PBO included the following:

> 1) funding and implementation of the PRRIP for 13 years, the anticipated first stage of the PRRIP; and
>
> 2) continued operation of existing and certain new water-related activities[2] including, but not limited to, Reclamation and Service projects that are (or may become)

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[1] The term "water-related activities" means activities and aspects of activities which (1) occur in the Platte River basin upstream of the confluence of the Loup River with the Platte River, and (2) may affect Platte River flow quantity or timing, including, but not limited to, water diversion, storage and use activities, and land use activities. Changes in temperature and sediment transport will be considered impacts of a "water related activity" to the extent that such changes are caused by activities affecting flow quantity or timing. Impacts of "water related activities" do not include those components of land use activities or discharges of pollutants that do not affect flow quantity or timing.

[2] "Existing water related activities" include surface water or hydrologically connected groundwater activities implemented on or before July 1, 1997. "New water-related activities" include new surface water or hydrologically connected groundwater activities including both new projects and expansion of existing projects, both those subject to and not subject to section 7(a)(2) of the ESA, which may affect the quantity or timing of

dependent on the PRRIP for ESA compliance during the first 13-year stage of the PRRIP for their effects on the target species[3], whooping crane critical habitat, and other federally listed species[4] that rely on central and lower Platte River habitats.

The PBO established a two-tiered consultation process for future federal actions on existing and new water-related activities subject to section 7(a)(2) of the ESA, with issuance of the PBO being Tier 1 and all subsequent site-specific project analyses constituting Tier 2 consultations covered by the PBO. Under this tiered consultation process, the Service will produce tiered biological opinions when it is determined that future federal actions are "likely to adversely affect" federally listed species and/or designated critical habitat in the PRRIP action area and the project is covered by the PBO. If necessary, the biological opinions will also consider potential effects to other listed species and critical habitat affected by the federal action that were not within the scope of the Tier 1 PBO (e.g., direct or indirect effects to listed species occurring outside of the PRRIP action area).

Although the water depletive effects of this Federal Action to central and lower Platte River species have been addressed in the PBO, when "no effect", or "may affect" but "not likely to adversely affect" determinations are made on a site-specific basis for the target species in Nebraska, the Service will review these determinations and provide written concurrence where appropriate. Upon receipt of written concurrence, section 7(a)(2) consultation will be considered completed for those federal actions.

Water-related activities requiring federal approval will be reviewed by the Service to determine if: (1) those activities comply with the definition of existing water-related activities and/or (2) proposed new water-related activities are covered by the applicable state's or the federal depletions plan. The Service has determined that the Project meets the above criteria and, therefore, this Tier 2 biological opinion regarding the effects of the Project on the target species, whooping crane critical habitat, and the western prairie fringed orchid in the central and lower Platte River can tier from the June 16, 2006 PBO.

CONSULTATION HISTORY

Table II-1 of the PBO (pages 21-23) contains a list of species and critical habitat in the action area, their status, and the Service's determination of the effects of the Federal Action analyzed in the PBO.

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water reaching the associated habitats and which are implemented after July 1, 1997.

[3] The "target species" are the endangered whooping crane (*Grus americana*), the interior least tern (*Sternula antillarum*), the pallid sturgeon (*Scaphirynchus albus*), and the threatened northern Great Plains population of the piping plover (*Charadrius melodus*).

[4] Other listed species present in the central and lower Platte River include the western prairie fringed orchid (*Platanthera praeclara*), American burying beetle (*Nicrophorus americanus*), and Eskimo curlew (*Numenius borealis*).

The Service determined in the Tier 1 PBO that the Federal Action, including the continued operation of existing and certain new water-related activities, may adversely affect but would not likely jeopardize the continued existence of the federally endangered whooping crane, interior least tern, and pallid sturgeon, or the federally threatened northern Great Plains population of the piping plover, western prairie fringed orchid, and bald eagle in the central and lower Platte River. Further, the Service determined that the Federal Action, including the continued operation of existing and certain new water-related activities, was not likely to destroy or adversely modify designated critical habitat for the whooping crane. The bald eagle was subsequently removed from the Federal endangered species list on August 8, 2007. Bald eagles continue to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. For more information on bald eagles, see the Service's webpage at: http://www.fws.gov/migratorybirds/BaldEagle.htm

The Service also determined that the PBO Federal Action would have no effect to the endangered Eskimo curlew. There has not been a confirmed sighting since 1926 and this species is believed to be extirpated in Nebraska. Lastly, the Service determined that the PBO Federal Action, including the continued operation of existing and certain new water-related activities, was not likely to adversely affect the endangered American burying beetle.

The effects of the continued operation of existing and certain new water-related activities on the remaining species and critical habitats listed in Table II-1 of the PBO were beyond the scope of the PBO and were not considered.

The Service has reviewed the information contained in your BA, which was received in this office on November 26, 2008, as well as supplemental BA information received on January 18, 25, and 29, 2009.

We concur with your determinations of "likely to adversely affect" for the endangered whooping crane, interior least tern, pallid sturgeon, the threatened northern Great Plains population of the piping plover, and the western prairie fringed orchid in the central and lower Platte River in Nebraska. We also concur with your determination of "likely to adversely affect" for designated whooping crane critical habitat in Nebraska.

The Service concurs with your determinations of "not likely to adversely affect" for the endangered American burying beetle, and "no effect" for the endangered Eskimo curlew.

SCOPE OF THE TIER 2 BIOLOGICAL OPINION

The proposed Project is a component of "the continued operation of existing and certain new water-related activities" needing a federal action evaluated in the Tier 1 PBO, and flow-related effects of the Federal Action are consistent with the scope and the determination of effects in the June 16, 2006 PBO. Because CHW has elected to participate in the PRRIP, ESA compliance for flow-related effects to federally listed endangered and threatened species

and designated critical habitat from the Project is provided to the extent described in the Tier 1 PBO.

This biological opinion applies to the Project's effects to listed endangered and threatened species and designated critical habitat as described in the PBO for the first thirteen years of the PRRIP (i.e., the anticipated duration of the first PRRIP increment).

DESCRIPTION OF THE FEDERAL ACTION

The Federal Action is CHW's need, as the project proponent, for the approval of a Large Generator Interconnection Agreement with Western to allow the Project to interconnect with Western's existing transmission line. The CHW proposes to construct a new 90 MW wind farm consisting of 60 General Electric 1.5 MW SLE wind turbines. The Project would also include construction of: a collector substation; an operations and maintenance facility; and the Wildhorse Creek Switchyard, to be located on 3-6 acres near the junction of County Road 87 and U.S. Highway 6 for the point of interconnection of the Wind Project and Western's existing Sterling-Frenchman Creek 115-kV transmission line, which is located along Highway 6 in Logan County. A one-time water use from the City of Sterling and/or Town of Fleming municipal supply(s) is needed during construction to mix concrete for foundations, for soil compaction, and for dust abatement. Some water also would be needed at the maintenance facility for domestic purposes for on-site personnel and periodic washing of wind turbine rotor blades during the operation of the wind facility.

STATUS OF THE SPECIES / CRITICAL HABITAT

Species descriptions, life histories, population dynamics, status and distributions are fully described in the PBO on pages 76-156 for the whooping crane, interior least tern, piping plover, pallid sturgeon and western prairie fringed orchid, and whooping crane critical habitat and are hereby incorporated by reference. Since issuance of the Service's PBO, there have been no substantial changes in the status of the target species/critical habitat other than the bald eagle delisting previously mentioned.

ENVIRONMENTAL BASELINE

The Environmental Baseline sections for the Platte River and for the whooping crane, interior least tern, piping plover, pallid sturgeon and western prairie fringed orchid, and whooping crane critical habitat are described on pages 157 to 219 of the Tier 1 PBO, and are hereby incorporated by reference. Since issuance of the Tier 1 PBO, there have been no substantial changes in the status of the target species/critical habitat in the action area other than the bald eagle delisting.

EFFECTS OF THE ACTION

Based on our analysis of the information provided in your BA and supplemental BA for the Project, the Service concludes that the proposed Federal Action will result in a new depletion to the Platte River system above the Loup River confluence. These depletions are associated with the withdrawal of approximately 22.6 acre-feet (af) of water during construction to mix concrete for foundations, soil compaction, and dust abatement. Additionally, water would be used at the Project's maintenance facility for domestic purposes for on-site personnel (about 375 gallons per day or approximately 3.5 af per year) and periodic washing of wind turbine rotor blades (up to 2,000 gallons per year) during operation of the wind facility.

As a new water-related activity, we have determined that the flow-related adverse effects of the Project are consistent with those evaluated in the Tier 1 PBO for the whooping crane, interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid, and whooping crane critical habitat, and these effects on flows are being addressed in conformance with the Colorado Plan for Future Depletions of the PRRIP.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private (non-federal) actions that are reasonably certain to occur in the action area considered in this biological opinion. A non-federal action is "reasonably certain" to occur if the action requires the approval of a State or local resource or land-control agency, such agencies have approved the action, and the project is ready to proceed. Other indicators which may also support such a "reasonably certain to occur" determination include whether: a) the project sponsors provide assurance that the action will proceed, b) contracting has been initiated; c) State or local planning agencies indicate that grant of authority for the action is imminent; or d) where historic data have demonstrated an established trend, that trend may be forecast into the future as reasonably certain to occur. These indicators must show more than the possibility that the non-federal project will occur; they must demonstrate with reasonable certainty that it will occur. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act and would be consulted on at a later time.

Cumulative effects are described on pages 194 to 300 of the Tier 1 PBO, and are hereby incorporated by reference. Since the Tier 1 PBO was issued, there have been no substantial changes in the status of cumulative effects.

CONCLUSION

The Service concludes that the proposed CHW Wind Project is consistent with the Tier 1 PBO for effects to listed species and critical habitat addressed in the Tier 1 PBO. After reviewing site specific information, including: 1) the scope of the Federal Action, 2) the environmental baseline, 3) the status of the whooping crane, interior least tern, piping plover,

pallid sturgeon, and the western prairie fringed orchid in the central and lower Platte River and their potential occurrence within the project area, as well as whooping crane critical habitat, 4) the effects of the Project, and 5) any cumulative effects, it is the Service's biological opinion that the Project, as described, is not likely to jeopardize the continued existence of the federally endangered whooping crane, interior least tern, and pallid sturgeon, or the federally threatened northern Great Plains population of the piping plover, or western prairie fringed orchid in the central and lower Platte River. The Federal Action is also not likely to destroy or adversely modify designated critical habitat for the whooping crane.

INCIDENTAL TAKE STATEMENT

Section 9 of ESA and federal regulations pursuant to section 4(d) of ESA prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct, and applies to individual members of a listed species. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of ESA do not apply to the incidental take of federally listed plant species (e.g., Colorado butterfly plant, Ute ladies' tresses orchid, and western prairie fringed orchid). However, limited protection of listed plants from take is provided to the extent that ESA prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on non-federal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law. Such laws vary from state to state.

The Department of the Interior, acting through the Service and Bureau of Reclamation, is implementing all pertinent Reasonable and Prudent Measures and implementing Terms and Conditions stipulated in the Tier 1 PBO Incidental Take Statement (pages 309-326 of the PBO) which will minimize the anticipated incidental take of federally listed species. In instances where the amount or extent of incidental take outlined in the Tier 1 PBO is exceeded, or the amount or extent of incidental take for other listed species is exceeded, the specific PRRIP action(s) causing such take shall be subject to reinitiation expeditiously.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of an action on listed species or critical habitat, to help implement recovery plans, or to develop information. Conservation recommendations are provided in the PBO (pages 328-329) and are hereby incorporated by reference.

REINITIATION AND CLOSING STATEMENT

Any person or entity undertaking a water-related activity that receives federal funding or a federal authorization and which relies on the PRRIP as a component of its ESA compliance in section 7 consultation must agree: (1) to the inclusion in its federal funding or authorization documents of reopening authority, including reopening authority to accommodate reinitiation upon the circumstances described in Section IV.E. of the Program document, which addresses program termination; and (2) to request appropriate amendments from the federal action agency as needed to conform its funding or authorization to any PRRIP adjustments negotiated among the three states and the Department of the Interior, including specifically new requirements, if any, at the end of the first PRRIP increment and any subsequent PRRIP increments. The Service believes that the PRRIP should not provide ESA compliance for any water-related activity for which the funding or authorization document does not conform to any PRRIP adjustments (Program Document, section VI).

Reinitiation of consultation over the CHW Wind Project will not be required at the end of the first 13-years of the PRRIP provided a subsequent Program increment or first increment Program extension is adopted pursuant to appropriate ESA and NEPA compliance procedures, and, for a subsequent increment, the effects of the Project are covered under a Tier 1 PBO for that increment addressing continued operation of previously consulted-on water-related activities.

This concludes formal consultation on the actions outlined in the request from Western, which was received in this office on November 26, 2008. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the specific action(s) causing such take shall be subject to reinitiation expeditiously.

Requests for reinitiation, or questions regarding reinitiation should be directed to the Service's Colorado Field Office at the above address. If you have any questions regarding this consultation, please contact Sandy Vana-Miller of my staff at (303) 236-4748.

Sincerely,

Susan C. Linner
Colorado Field Supervisor

cc: FWSR6/WTR, Don Anderson
FWSR6/ES/NE, June Deweese
FWSR6/ES/LK, Sandy Vana-Miller
CDOW-Brush, Wendy Figueroa

LITERATURE CITED

Platte River Recovery Implementation Program document. 2006.

U.S. Department of the Interior. 2006. Platte River Recovery Implementation Program Final Environmental Impact Statement.

U.S. Fish and Wildlife Service. 2006. Biological opinion on the Platte River Recovery Implementation Program.

APPENDIX B
SCOPING AND PUBLIC NOTIFICATION

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P O Box 3700
Loveland, CO 80539-3003

APR 1 1 2008

Notice of Decision to Prepare an Environmental Assessment And Request for Comments

Proposal to Approve an Interconnection Request for Fleming Wind Project, Logan County, CO

The Western Area Power Administration (Western), a power marketing administration within the U.S. Department of Energy (DOE), will prepare an environmental assessment (EA) for its proposal to approve an interconnection agreement with Wind Energy Prototypes, LLC (WEP) for the Fleming Wind Energy Project, Logan County, CO. The EA will be used by Western to comply with the requirements of the National Environmental Policy Act, as well as to comply with other applicable environmental laws, regulations and policies. This notice provides a brief project description and invites your comments on the proposed project. A map of the location for the proposed project is enclosed.

Send comments to Mr. Jim Hartman, Environmental Manager, Western Area Power Administration, P.O. Box 3700, Loveland, CO 80539, or to Mr. Hartman's email address: HARTMAN@WAPA.GOV. Comments should be sent within 30 days of the date stamped on this notice. If you submit comments you will automatically be placed on the mailing list for notification that the EA is available for public review and comment. If you do not wish to be notified of the availability of the EA, please state that in your comments. If you wish to receive a copy of the EA, please state your preference for a hard copy or a CD.

The Project is located northeast of the Town of Fleming. The Project area includes approximately 9500 acres of primarily agricultural land. The electricity produced would be transferred to Western's Sterling-Frenchman Creek 115-kilo Volt transmission line at a new electrical substation. The Project would consist of 60 wind turbine generators with an anticipated total generating capacity of up to approximately 90 MW. The

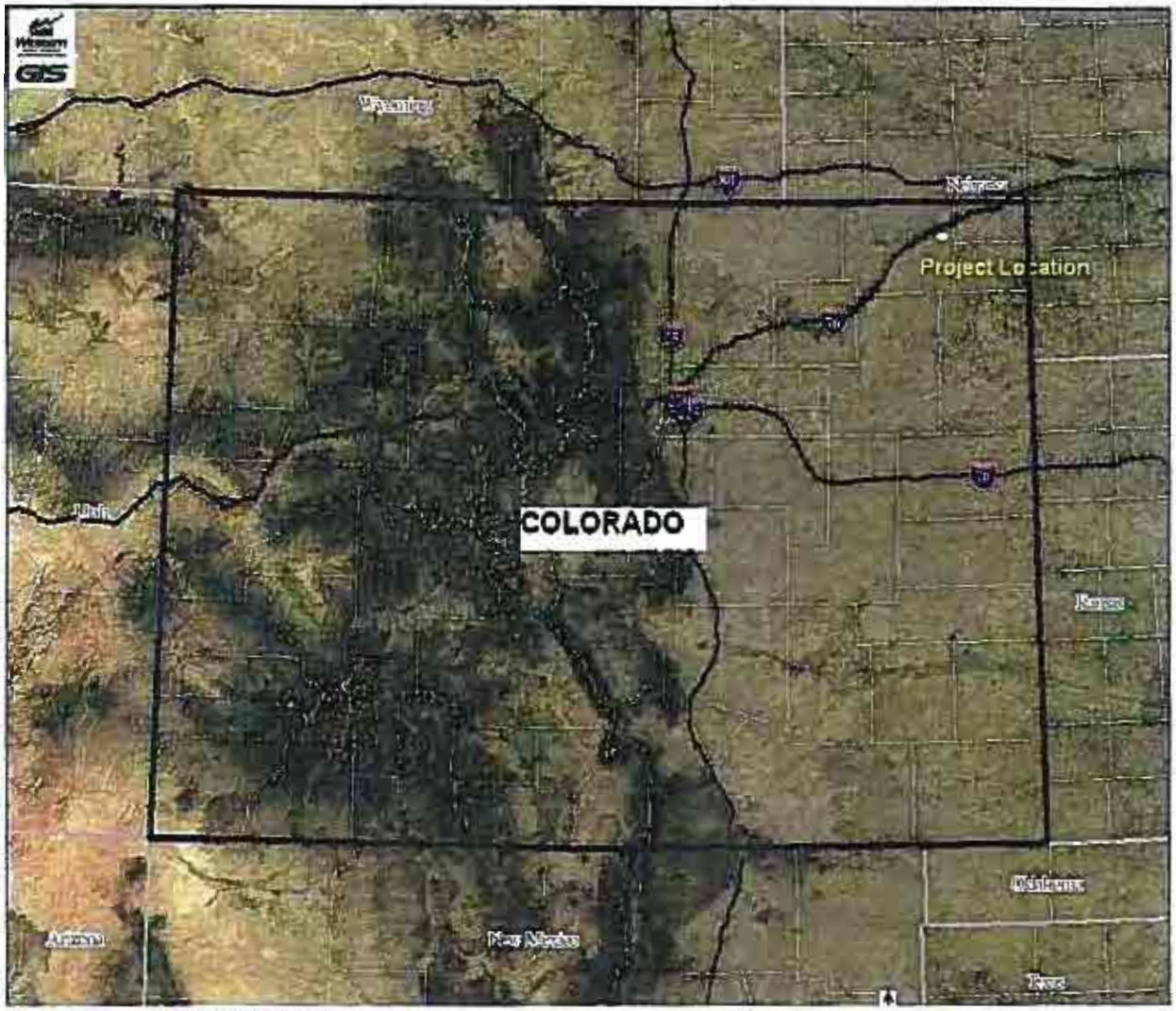
maximum blade tip height for the wind turbines is approximately 385 feet (117.5 meters). Other Project components would include underground and overhead electrical systems and access roads. The Project would also include a switching station, access roads, an operation and maintenance (O&M) building and other facilities that will be described in the EA. The design and locations of these facilities is currently being done by WEP.

Western accepts requests from electric utilities, firm-power customers, private power developers and independent power generators to interconnect with its transmission system. Western is required to accept and evaluate requests for interconnection to its transmission system in accordance with its procedures and Tariff. Interconnection requests are often accompanied by transmission service requests that must be addressed in accordance with the provisions of the Open Access Transmission Service Tariff. There are several steps in the interconnection process. Detailed information on the interconnection process and requirements can be found in: *Western Area Power Administration. September 1999. General Requirements for Interconnection.* Each request for interconnection is evaluated on a case-by-case basis and must meet reasonable needs of the requesting entity.

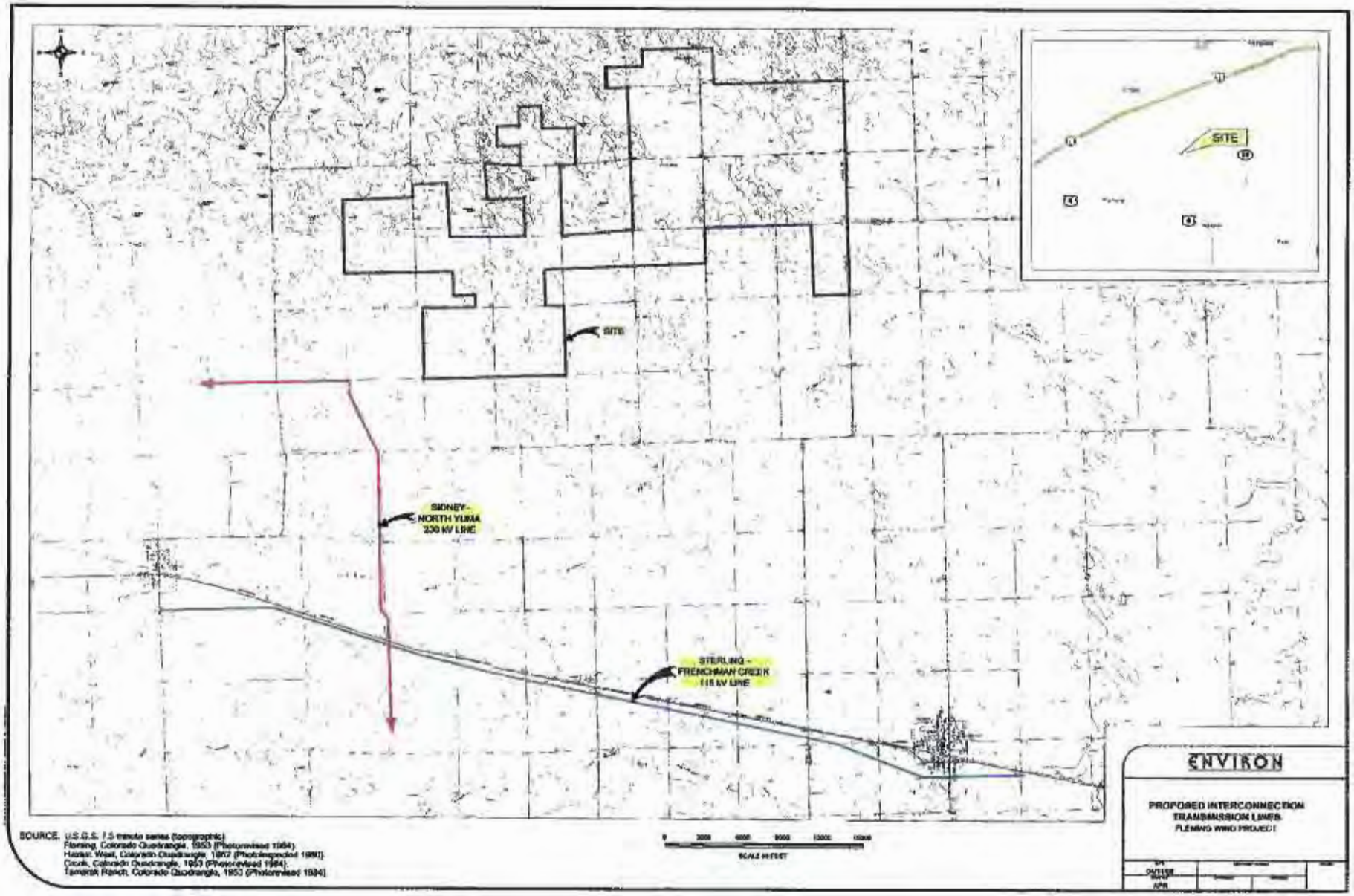
Western's decision is limited to determining if the wind project proposed by the applicant can be interconnected with the federal transmission system. Western's approval of the interconnection request would enable the wind project to proceed. The EA will evaluate the environmental impacts associated with constructing, operating and maintaining the wind project as well as impacts associated with transmission system modifications needed to interconnect the project.

Jim Hartman
Environmental Manager

Enc osure



Project Location in Colorado



SOURCE: U.S.G.S. 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984)
Hasker West, Colorado Quadrangle, 1952 (Photoinspected 1981)
Crook, Colorado Quadrangle, 1953 (Photorevised 1984)
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984)

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

APR 22 2008

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Rodney Bordeaux
President
Rosebud Sioux Tribal Council
P.O. Box 430
Rosebud, SD 57570

Dear President Bordeaux:

The Western Area Power Administration (Western) is a federal power marketing administration in the U.S. Department of Energy. Western proposes to approve a request from Wind Energy Prototypes, LLC (WEP), to interconnect their proposed Fleming Wind Energy Project (Project) located in Logan County, Colorado, with Western's electrical transmission system (refer to enclosed maps). Western is the lead agency for complying with the National Environmental Policy Act and National Historic Preservation Act (NHPA). Western will prepare an environmental assessment (EA) for the proposal. Under its responsibilities in Section 106 of the NHPA, Western has determined that the Project is a Federal undertaking that has the potential to cause effects on historic properties. Pursuant to 36 CFR 800.4(a)(4), Western is initiating consultation with Tribes for input concerning the Project. Western is also consulting with the State Historic Preservation Officer (SHPO).

We request comments from you and other consulted Tribes and parties concerning the Project. Comments may include identification of Traditional Cultural Properties and other issues. At your request, cultural resource survey reports will be sent to your office if you wish to review them. The reports will be sent to the SHPO for review and comment. We also request information that you have on known archaeological resources in the Project area. In order to help keep the Project on schedule, we respectfully request that you respond to this letter within 30 days. Western will determine the appropriate action for identifying historic properties. Western may decide to prepare a Programmatic Agreement for complying with Section 106.

The Area of Potential Effect (APE) for the Project has not yet been determined. Additional Project design information from WEP will be used to define the APE.

The Project would be constructed within the following townships, ranges, and sections (Table 1):

TABLE 1		
Facility Location		
Township	**Range**	**Section**
9N	48W	2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 24, 29, 30
9N	49W	13, 24

The Project is located northeast of the Town of Fleming and North of the Town of Dailey. The Project area includes approximately 9500 acres of primarily private agricultural land. The electricity produced would be transferred to Western's Sterling-Frenchman Creek 115-kilovolt (kV) transmission line at a new electrical substation. The Project would consist of 60 wind turbine generators with an anticipated total generating capacity of up to approximately 90 megawatts (MW). The maximum blade tip height for the wind turbines is approximately 385 feet (117.5 meters). Other Project components would include underground and overhead electrical systems and access roads. The Project would also include a switching station, access roads, an operation and maintenance (O&M) building, and other facilities that will be described in the EA. The design and locations of these facilities is currently being done by WEP.

If you have any questions or concerns, please do not hesitate to contact Mr. Steve Tromly at (720) 962-7256.

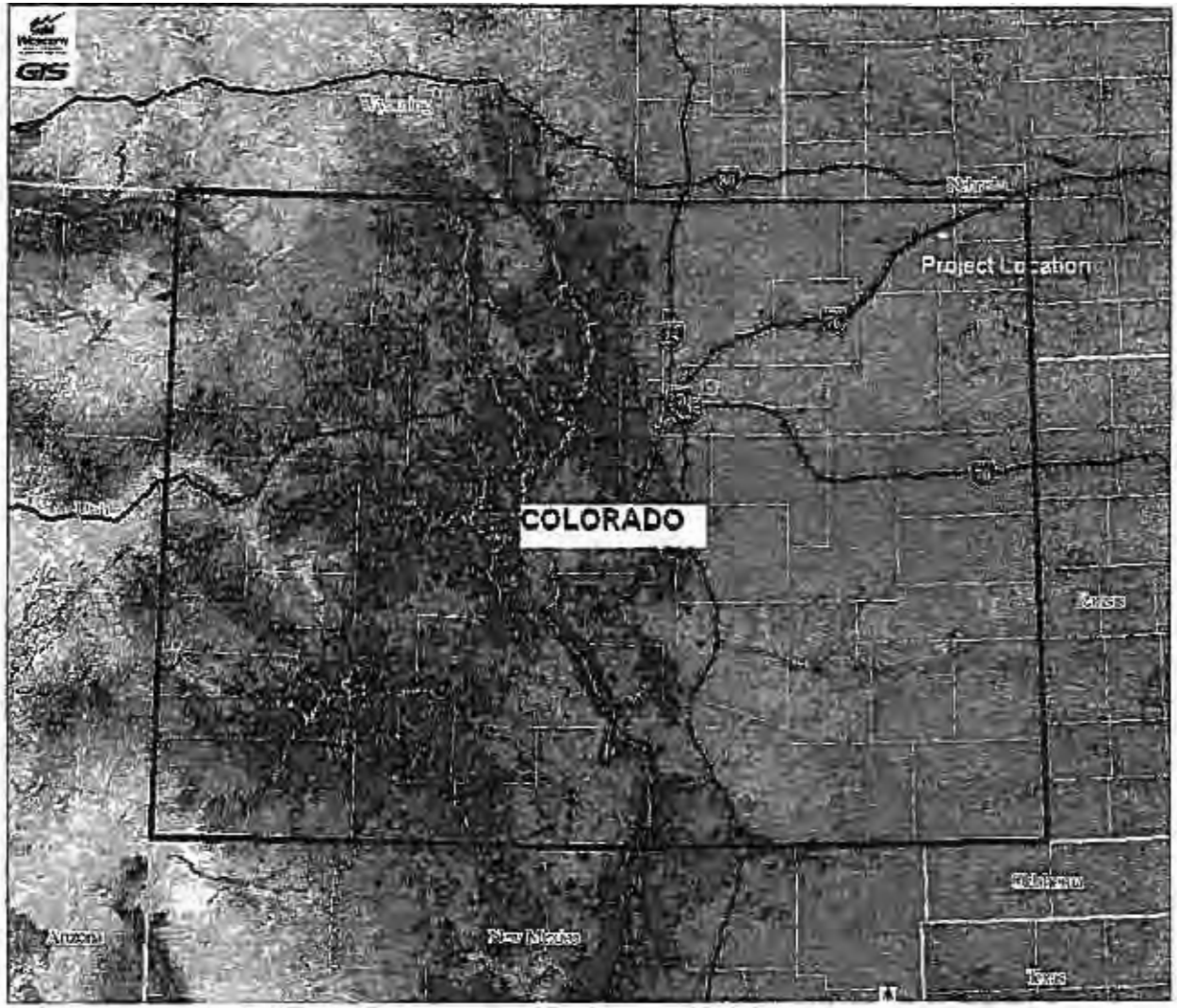
Sincerely,

JIM HARTMAN

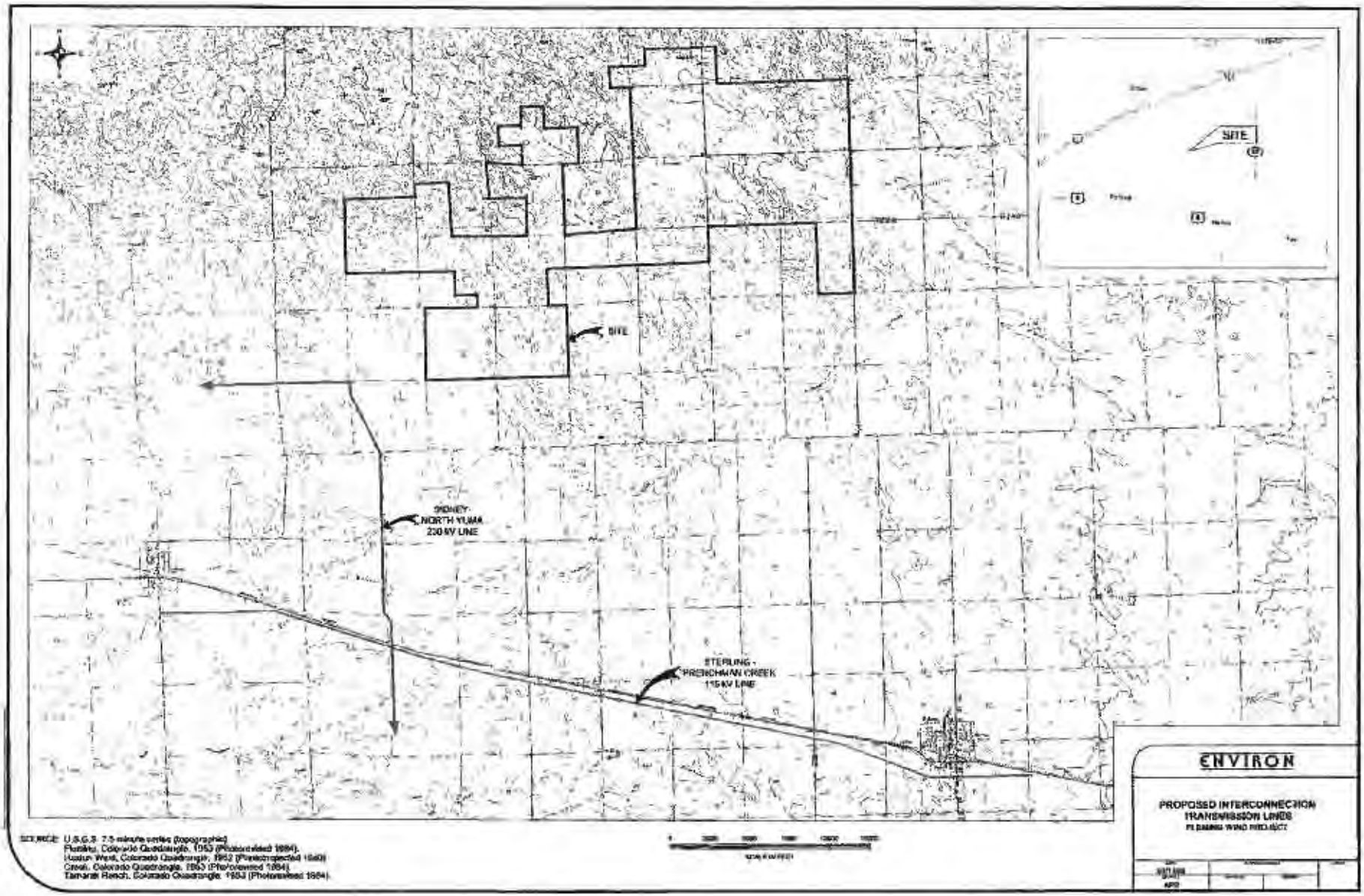
James Hartman
Environmental Manager

2 Enclosures

cc: (w/copy of enclosures)
Mr. Terry Gray
Cultural Resource Coordinator
Rosebud Sioux Tribe
Sinte Gleska College
P.O. Box 675
Mission, SD 57555



Project Location in Colorado



SOURCE: U.S.G.S. 7.5 minute series (topographic)
Pawnee, Colorado Quadrangle, 1953 (Photorevised 1984).
Huston West, Colorado Quadrangle, 1952 (Photoinspected 1980)
Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tamarak Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

ENVIRON

PROPOSED INTERCONNECTION TRANSMISSION LINES
PEAKING WIND PROJECT

Tribal Consultation for Fleming Wind Project (RMR)

EASTERN SHOSHONE TRIBE:

Mr. Ivan Posey, Chairman (Send original here, certified mail)
Shoshone Business Council
P.O. Box 538
Fort Washakie, WY 82514
(307) 332-3532 or 4932

cc:

Arlen Shoyo
Shoshone Business Council
P.O. Box 538
Fort Washakie, WY 82514
(307) 332-3532 or 4932

Ms. Reba Tehran
Shoshone Cultural Office
P.O. Box 1008
Fort Washakie, WY 82514

NORTHERN ARAPAHO TRIBE:

Mr. Richard Brannan, Chairman
Arapaho Business Council
P.O. Box 396
Fort Washakie, WY 82514
(307) 332-6120 or (307) 856-3461
FAX (307) 332-7543
E-mail: arapahotribe@hotmail.com

cc: Ms. JoAnn White
Tribal Historic Preservation Officer
Northern Arapaho Tribe
P.O. Box 1056
Fort Washakie, WY 82514
cell: (307) 851-9617

UTE TRIBE:

Ms. Maxine Natchees, Chairwoman (send original here, certified mail)
Ute Tribal Council
P.O. Box 190
Tribal Office Building
Fort Duchesne, UT 84026

cc:

Ms. Betsy Chapoose, Director
Cultural Rights and Protection
Ute Indian Tribe
P.O. Box 190
Fort Duchesne, UT 84026
(435) 722-4992 or (435) 722-0592

NORTHERN CHEYENNE TRIBE:

Mr. Eugene Littlecoyote, President
Northern Cheyenne Tribal Council
P.O. Box 128
Lame Deer, MT 59043
(406) 477-6284

(Send original here, certified mail)

cc:

Mr. Conrad Fisher
Tribal Historic Preservation Officer
P.O. Box 128
Lame Dear, MT 59043
(406) 477-6035

Mr. Steven Brady
Traditional Spokesperson
P.O. Box 542
Lame Deer, MT 59043
(406) 477-8344

OGLALA LAKOTA NATION:

Ms. Cecelia Firethunder, President
Oglala Sioux Tribal Council
P.O. Box H
Pine Ridge, SD 57770
(605) 867-5821
Fax (605) 867-5659

(Send original here, certified mail)

ROSEBUD SIOUX TRIBE:

Mr. Rodney Bordeaux President
Rosebud Sioux Tribal Council
P.O. Box 430
Rosebud, SD 57570
(605) 747-2381
Fax (605) 747-2243

(Send original here, certified mail)

cc:

Mr. Terry Gray
Cultural Resource Coordinator
Rosebud Sioux Tribe
Sinte Gleska College
P.O. Box 675
Mission, SD 57555
(605) 856-4901

CHEYENNE RIVER SIOUX TRIBE:

Mr. Herold Frazier, Chairman (Send original here, certified mail)
Cheyenne River Sioux Tribal Council
P.O. Box 590
Eagle Butte, SD 57625
(605) 964-4155
Fax (605) 964-4155

cc:

James Ticotte
Tribal Historic Preservation Officer
Cheyenne River Sioux Tribe
P.O. Box 590
Eagle Butte, SD 57625
(605) 964-7554

STANDING ROCK SIOUX:

Mr. Ron His-Horse-Is-Thunder, Chairman
Standing Rock Sioux Tribal Council
P.O. Box D
Fort Yates, ND 58538
(701)-854-7448

cc:

Mr. Tim Mentz
Tribal Historic Preservation Officer
P.O. Box D
Fort Yates, ND 58538
(701) 854-2120

SHOSHONE-BANNOCK TRIBES:

Ms. Alonzo A. Coby, Chairman (Send original here, certified mail)
Shoshone-Bannock Tribes of Fort Hall
Business Council
P.O. Box 306 Pima Drive
Fort Hall, ID 83203-0306
(208) 478-3700
Fax (208) 237-0797

cc:

Ms. LaRae Buckskin
Interim Cultural Resource Coordinator
Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, ID 83203-0306
(208) 478-3707

CROW TRIBE:

Mr. Carl Venne, Chairman (Send original here, certified mail)
Crow Tribal Council
P.O. Box 159
Crow Agency, MT 59022
(406) 638-3708
Fax (406) 638-7283

cc:

Mr. Dale Old Horn
Tribal Historic Preservation Officer
Crow Cultural Department
P.O. Box 159
Crow Agency, MT 59022
(406) 638-3793

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P.O. Box 3700
Loveland, CO 80539-3003

APR 2 8 2008

Ms. Susan Linner
U.S. Fish and Wildlife Service
Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (MS 65412)
Denver, CO 80225-0486

Re: Initiation of Informal Consultation
Wind Energy Prototype's Fleming Wind Project, Logan County, Colorado

Dear Ms. Linner:

Western Area Power Administration (Western) proposes to approve an interconnection agreement for the Wind Energy Prototype (WEP) Fleming Wind Project (Project) in Logan County, Colorado. Maps of the proposed Project location are enclosed. Western determined that an environmental assessment (EA) will be prepared under the National Environmental Policy Act (NEPA) and is the lead federal agency for the NEPA process. To initiate informal Section 7 consultation under the Endangered Species Act and to assist in Project scoping, Western requests information on threatened and endangered species, sensitive habitats, and other issues or concerns regarding biological resources that you may be aware of for this Project.

The Project is located northeast of the Town of Fleming and north of the Town of Dailey. The Project will be sited on mostly private land with agriculture (farming and grazing) as the primary current land use. Wind Energy Prototype's proposed project would include the installation and operation of approximately 60 wind turbines with a total combined nameplate capacity of 90 megawatts (MW). The Project includes related facilities such as an electrical substation or substation expansion, an operations and maintenance facility, installation of equipment, construction of short transmission lines, and other actions that will be described in the EA. The wind farm would be interconnected with Western's existing 115-kV Sterling to Frenchman Creek Transmission Line.

This Project is proposed by WEP. The applicant's representatives for environmental matters are Mr. John Imse and Mr. Dave Beeson, Environ International Corporation, Denver, Colorado. Western expects that most of the day-to-day communication on the project will take place between your office and Environ International.

Please contact me if you have any questions concerning this Project, by phone at (970) 461-7450, or e-mail at HARTMAN@wapa.gov. Thank you for your attention and interest in this Project.

Sincerely,

JIM HARTMAN

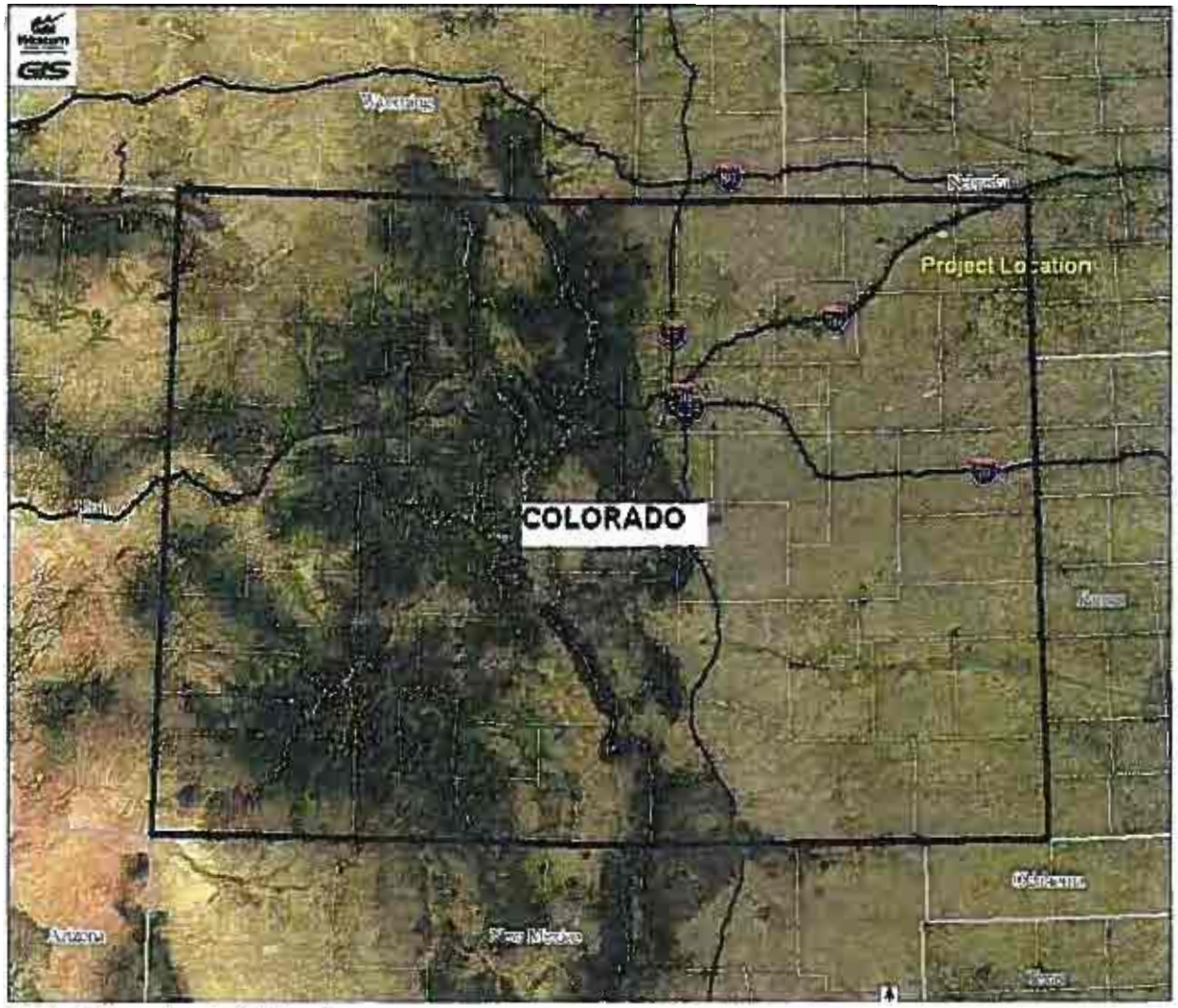
James Hartman
Environmental Manager

2 Enclosures

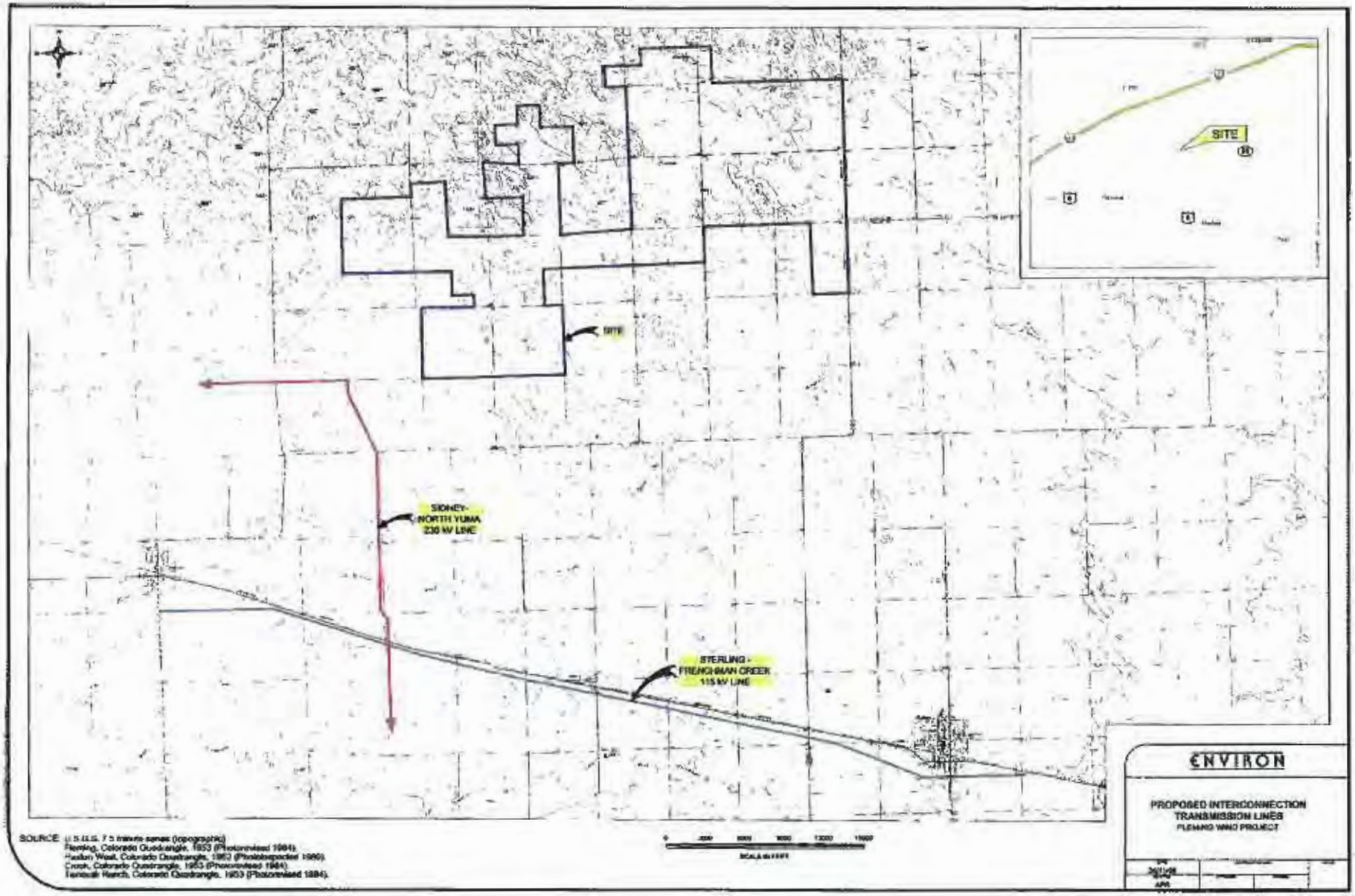
cc: (w/copy of enclosures)
Mr. Larry Budde
Area Wildlife Manager
Colorado Division of Wildlife
Brush Service Center
P.O. Box 128
Brush, CO 80723

bcc: (w/copy of enclosure)
J. Bridges, A7400, Lakewood, CO
J0400

J0400:JHartman:kk:x7450:4/25/08:P:\Correspondence\fleming WInd USFWS Species Request Letter Apr08.doc



Project Location in Colorado



SOURCE: U.S.G.S. 7.5 minute series (topographic)
Fleming, Colorado Quadrangle, 1953 (Photorevised 1984).
Haxtun West, Colorado Quadrangle, 1962 (Photoinspected 1980).
Crook, Colorado Quadrangle, 1953 (Photorevised 1984).
Tennessee Ranch, Colorado Quadrangle, 1953 (Photorevised 1984).

NOTICE OF PUBLIC MEETING

Colorado Highlands Wind, LLC is proposing to build a 90 Megawatt wind generating facility to increase Colorado's inventory of renewable energy resources. The project, Colorado Highlands Wind, will be comprised of 60 wind turbines, each capable of generating 1.5 Megawatts of renewable energy. The project will cover approximately 6 square miles and will be located on private lands leased from individual owners. The proposed location for the project is approximately 3 miles northeast of the Town of Fleming in eastern Logan County, Colorado.

Western Area Power Administration (Western), a power marketing agency within the U.S. Department of Energy, is preparing an Environmental Assessment for this renewable energy project. Western is proposing to approve an interconnection request from Colorado Highlands Wind, LLC to connect to Western's electrical transmission system. The Environmental Assessment, completed in consultation with State and Federal Agencies, will evaluate the effects of the project on the natural and human environment. The results of the studies will assist Western in its response to the interconnection request, in planning for new substations and related facilities required for the interconnection, and in identifying potential mitigation measures for the proposed project.

Representatives of Western and the Colorado Highlands Wind project team will be available to meet with interested members of the public to discuss the Environmental Assessment activities and the project in general at the following date, time and location:

Tuesday, September 30, 2008
6 pm – 9 pm
Open house: Participants are welcome to arrive and depart at their convenience throughout the evening. CHW staff will be in attendance to provide an overview of the project, and questions and comments will be received.

Northeastern Junior College
Tennant Art Gallery, Hays Student Center
100 College Avenue
Sterling, Colorado 80751

Campus Map:
http://www.njc.edu/publications/files/campusmap.pdf

Department of Energy
Western Area Power Administration
Rocky Mountain Customer Service Region
P O Box 3700
Loveland, CO 80539-3003

NOV 25 2008

Colorado Highlands Wind Project Interconnection Request
Logan County, Colorado

Environmental Assessment
Available for Review and Comments
Comments Requested by January 7, 2009

The environmental assessment (EA) prepared by the Western Area Power Administration (Western) for the Colorado Highlands Wind Project Interconnection Request is available for review and comment. Landowners, the general public, federal, state and local and state government agencies, and Native American Tribes who requested a copy of the EA, or who have decisions to make regarding the project are receiving a copy of the EA with this notice. If the EA is included with this notice, it is provided either as hardcopy or a CD, depending on your request. Persons who are interested in receiving a copy of the EA may request one from the address below:

John P. Imse, Principal
ENVIRON International Corporation
303 E. 17th Avenue, Suite 400
Denver, CO 80203
Phone: 303.382.5467
jimse@environcorp.com

You may request the EA in hardcopy or CD format. Your comments will be considered in Western's decision. Western requests your comments on the EA by January 7, 2009.

Wind Energy Prototypes, LLC (WEP), submitted an interconnection request to Western to interconnect the proposed Colorado Highlands Wind Project (Project or CHW Project) to the existing Sterling-Frenchman Creek 115-kV transmission line. Colorado Highlands Wind, LLC (CHW) acquired all interest of WEP in the Project in June 2008. The Project is located approximately 5.8 kilometers (3.6 miles) northeast of the town of Fleming in east central Logan County, Colorado. Approximately 60 1.5 megawatt wind generators would be installed, along with related facilities. The maximum blade tip height of the wind generators is approximately 385 feet. Related facilities include electrical substations, operations and maintenance building, access roads (temporary and permanent), installation of equipment, construction of short transmission lines, and other actions that are described in the EA. Construction is expected to begin during February 2009 and extend through October 2009. The Project would be fully operationally before January 1, 2010.

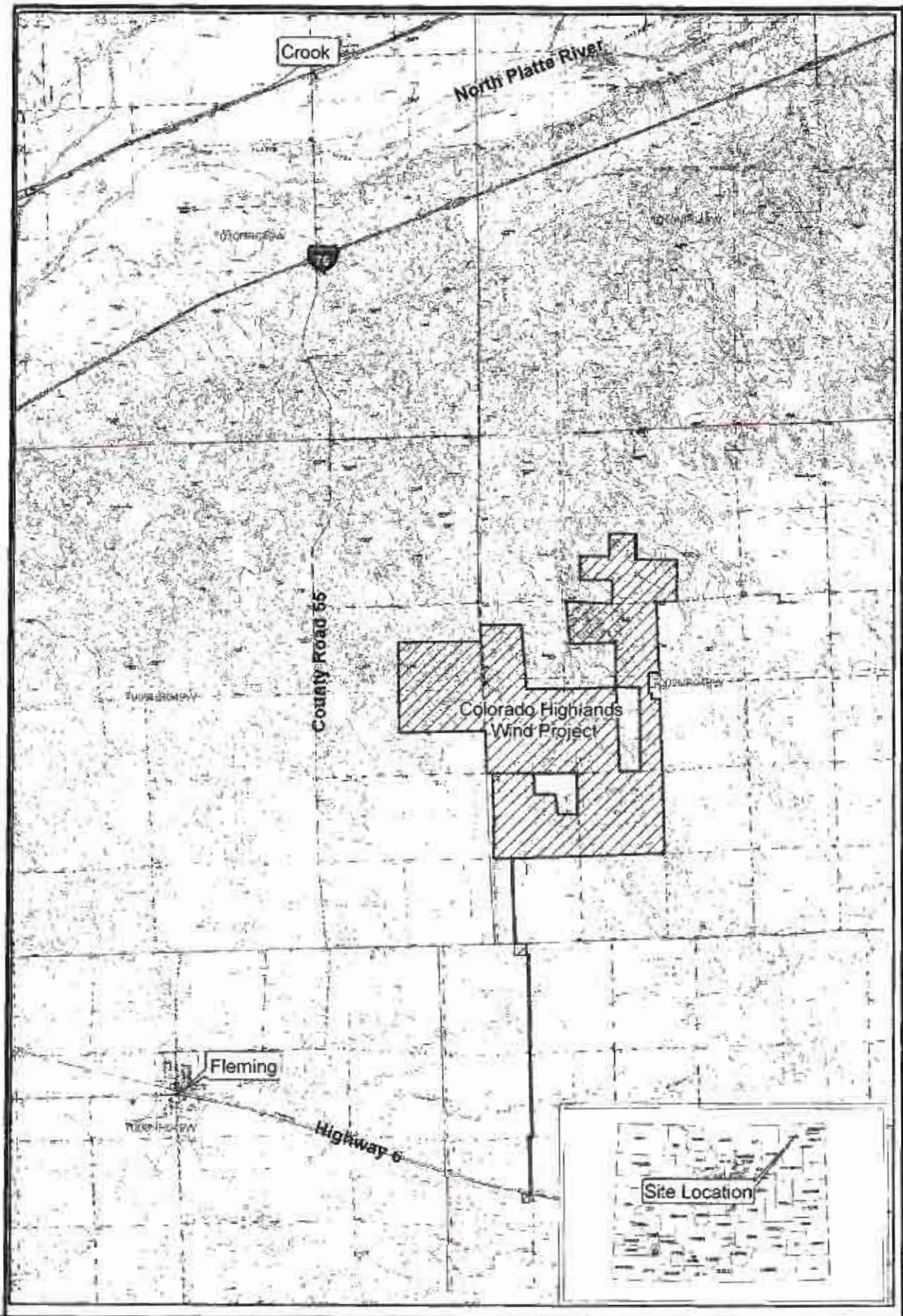
Western is the lead federal agency for compliance with the National Environmental Policy Act of 1969 (NEPA), 42 United States Code 4231 *et seq.*, as amended. There are no cooperating agencies. The EA was prepared in accordance with NEPA, the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA, 40 Code of Federal Regulations (CFR) §§ 1500-1508 and the Department of Energy NEPA implementing procedures (10 CFR part 1021), to assess the impacts of constructing and operating the Project. Western's would decide if the wind project proposed by CHW can be interconnected with the federal electrical transmission system. The EA evaluates the environmental impacts associated with constructing, operating and maintaining the wind project as well as impacts associated with transmission system modifications Western needs to interconnect the project. The EA evaluates the short-term, long-term, direct, indirect and cumulative impacts to a wide variety of resources including wildlife, surface water, wetlands, air quality, ground water, ambient noise, visual resources, air quality, vegetation, cultural resources, socioeconomics, and traffic. The EA addresses Western's no action alternative and the construction alternative. The EA describes mitigation strategies for minimizing adverse impacts.

Provide Comments to:

Mr. Jim Hartman
Environmental Manager
Western Area Power Administration
P.O. Box 3700
Loveland, CO 80539
Phone: 970-461-7450
Facsimile: 970-461-7213
E-mail: hartman@wapa.gov

You may provide comments by telephone, facsimile, letter, or e-mail.

Jim Hartman
Environmental Manager
Rocky Mountain Region
Western Area Power Administration



SITE LOCATION
COLORADO HIGHLANDS WIND PROJECT
LOGAN COUNTY, COLORADO

Figure
1.1

APPENDIX C
FEDERALLY LISTED SPECIAL STATUS WILDLIFE SPECIES FOR LOGAN COUNTY, COLORADO

STATE LISTED THREATENED, ENDANGERED, AND SPECIES OF SPECIAL CONCERN WITH KNOWN OR POTENTIAL OCCURRENCE WITHIN THE COLORADO HIGHLANDS PROJECT AREA

Table 1. Federally Listed Special Status Wildlife Species for Logan County, Colorado

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence on Project Site	Habitat
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	FE	None	River habitat downstream of Logan County.
Nongame				
Least tern (interior population)	*Sterna antillarum*	FE	None	River habitat downstream of Logan County.
Piping plover	*Charadrius melodus*	FT	Very Unlikely	Mudflats and shorelines of reservoirs and lakes
Whooping crane	*Grus americana*	FE	Unlikely	River habitat downstream of Logan County.

[1]Status: FE = Federally Endangered, FT = Federally Threatened, in accordance with the United States Fish and Wildlife Service

Table 2. State Listed Threatened, Endangered, and Species of Special Concern with Known or Potential Occurrence Within the Colorado Highlands Project Area.

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence on Project Site	Habitat
Game Birds				
Plains Sharp-Tailed Grouse	*Tympanuchus phasianellus jamesii*	SE	Possible	Native and introduced tall grasslands, CRP lands, grassland/sandsage
Raptors				
American peregrine falcon	*Falco peregrinus anatum*	SC	Observed migrant	Cottonwood riparian, shelterbelt trees.
Bald Eagle	*Haliaeetus leucocephalus*	ST	Possible migrant	Cottonwood riparian, shelterbelt trees.
Burrowing owl	*Athene cunicularia*	ST	Observed	Grassland, abandoned black-tailed prairie dog and rodent burrows.
Ferruginous hawk	*Buteo regalis*	SC	Observed	Grassland, prairie dog towns, rock outcrops, shelterbelt trees.
Shorebirds				
Greater sandhill crane	*Grus canadensis tabida*	SC	Possible migrant	Agricultural areas, moist meadows
Whooping crane	*Grus americana*	FE, SE	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes, agricultural areas.
Piping plover	*Charadrius melodus*	FT, ST	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes
Western snowy plover	*Charadrius alexandrinus*	SC	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes
Mountain plover	*Charadrius montanus*	SC	Possible	Shortgrass prairies and steppe; prefers areas with little vegetative cover, such as prairie dog colonies
Long-billed curlew	*Numenius americanus*	SC	Possible migrant	Grassland, plains, foothills, wet meadows
Neotropical Migrants				
Western yellow-billed cuckoo	*Coccyzus americanus*	SC	Possible migrant	Lowland riparian, shelterbelt trees.
Mammals				
Black tailed prairie dog	*Cynomys ludovicianus*	SC	Observed	Short and midgrass prairies.
Swift fox	*Vulpes velox*	SC	Possible	Short and midgrass prairies.
Reptiles				
Yellow mud turtle	*Kinosternon flavescens*	SC	Possible	Permanent and semi-permanent ponds near grasslands and sandsage.

[1]Status: FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; SC = Species of Special Concern in Colorado

APPENDIX D
COLORADO NATURAL HERITAGE QUERY

Colorado State University

Knowledge to Go Places

May 29, 2008

Colorado Natural Heritage Program
Colorado State University
8002 Campus Delivery
Fort Collins, Colorado 80523-8002
(970) 491-1309
FAX: (970) 491-3349
www.cnhp.colostate.edu

Danielle Cassidy
Ecologist
Walsh Environmental Scientists and Engineers LLC
4888 Pearl East Cir Ste 108
Boulder CO 80301-2475

Dear Danielle:

The Colorado Natural Heritage Program (CNHP) is in receipt of your request for information regarding a proposed wind farm project in Logan County, CO. In response, I have searched our Biodiversity Tracking and Conservation System (BIOTICS) for natural heritage elements (occurrences of significant natural communities and rare, threatened or endangered plants and animals) documented from the vicinity of the area specified in your request, specifically within a two mile radius of the township, range and sections listed in your request.

The enclosed report describes natural heritage resources known from this area and gives location (by Township, Range, and Section), precision information, and the date of last observation of the element at that location. This report includes elements known to occur within the specified project site, as well as elements known from similar landscapes near the site. Please note that "precision" reflects the resolution of original data. For example, an herbarium record from "4 miles east of Colorado Springs" provides much less spatial information than a topographic map showing the exact location of the occurrence. "Precision" codes of Seconds, Minutes, and General are defined in the footer of the enclosed report.

The report also outlines the status of known elements. We have included status according to Natural Heritage Program methodology and legal status under state and federal statutes. Natural Heritage ranks are standardized across the Heritage Program network, and are assigned for global and state levels of rarity. They range from "1" for critically imperiled or extremely rare elements, to "5" for those that are demonstrably secure.

You may notice that some occurrences do not have sections listed. Those species have been designated as "sensitive" due to their rarity and threats by human activity. Peregrine falcons, for example, are susceptible to human breeders removing falcon eggs from their nests. For these species, CNHP does not normally provide location information beyond township and range. Please contact us should you require more detailed information for sensitive occurrences.

There are two CNHP designated Potential Conservation Areas (PCAs) located within your project area (see enclosed PCA site reports and shapefile). In order to successfully protect populations or occurrences, it is necessary to delineate conservation areas. These conservation areas focus on capturing the ecological processes that are necessary to support the continued existence of a particular element of natural heritage significance. Conservation areas may include a single occurrence of a rare element or a suite of rare elements or significant features.

Natural Heritage Program
COLORADO

The goal of the process is to identify a land area that can provide the habitat and ecological processes upon which a particular element or suite of elements depends for their continued existence. The best available knowledge of each species' life history is used in conjunction with information about topographic, geomorphic, and hydrologic features, vegetative cover, as well as current and potential land uses. The proposed boundary does not automatically exclude all activity. It is hypothesized that some activities will cause degradation to the element or the process on which they depend, while others will not. Consideration of specific activities or land use changes proposed within or adjacent to the preliminary conservation planning boundary should be carefully considered and evaluated for their consequences to the element on which the conservation unit is based.

The Colorado Division of Wildlife has legal authority over wildlife in the state. CDOW would therefore be responsible for the evaluation of and final decisions regarding any potential effects a proposed project may have on wildlife. If you would like more specific information regarding these or other vertebrate species in the vicinity of the area of interest, please contact the Colorado Division of Wildlife.

The information contained herein represents the results of a search of Colorado Natural Heritage Program's (CNHP) Biodiversity Tracking and Conservation System (BIOTICS), and can be used as notice to anticipate possible impacts or identify areas of interest. Care should be taken in interpreting these data. Sensitive elements are currently known from within the proposed project area, and additional, but undocumented, elements may also exist (see enclosed Adobe PDF elements report). Additionally, we searched our observations database for non-fully tracked species that produced a few additional records (see enclosed MS Excel observations data report). Please note that the absence of data for a particular area, species, or habitat does not necessarily mean that these natural heritage resources do not occur on or adjacent to the project site, rather that our files do not currently contain information to document their presence. CNHP information should not replace field studies necessary for more localized planning efforts, especially if impacts to wildlife habitat are possible.

Although every attempt is made to provide the most current and precise information possible, please be aware that some of our sources provide a higher level of accuracy than others, and some interpretation may be required. CNHP's data system is constantly updated and revised. Please contact CNHP for an update or assistance with interpretation of this natural heritage information.

Sincerely,

Michael Menefee
Environmental Review Coordinator

Enc.

Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a Two-mile Radius of the Proposed Project Area for Wind Farm Project in Logan County, CO

Report generated: 29 May 2008

EO_ID	major group	scientific name	common name	Prec	last obs	Town/ Range	Sec	TRS Note	grank	srank	eo-rank	ESA	fed stat	st stat
3,224	Birds	*Tympanuchus cupido pinnatus*	Greater Prairie Chicken	S	2005-05-20	009N048W			G4T4	S3	C	-	USFS	
						009N048W								
						009N048W								
						009N049W								
						009N049W								
						010N047W								
						010N047W								
						010N047W								
						010N047W								
						010N047W								
						010N047W								
						010N048W								
						010N048W								
						010N048W								
						010N048W								
						010N048W								
						010N048W								
						010N049W								
						010N049W								
						010N049W								
10,189	Natural Communities	*Artemisia filifolia / Andropogon hallii Shrubland*	Northern Sandhill Prairie	S	1997-08-01	010N048W	08		G3?	S2	B	-		
						010N048W	09							
						010N048W	10							
						010N048W	15							
						010N048W	16							
						010N048W	17							
						010N048W	18							
						010N048W	19							
						010N048W	20							
						010N048W	21							
						010N048W	22							
						010N048W	28							
						010N048W	29							

precision codes: S = "seconds", location known within 100m; M = "minutes", location known within 1 mile; G = "general", location known within 5 miles

Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a Two-mile Radius of the Proposed Project Area for Wind Farm Project in Logan County, CO

Report generated: 29 May 2008

EO_ID	major group	scientific name	common name	Prec	last obs	Town/ Range	Sec	TRS Note	grank	srank	eo-rank	ESA	fed stat	st stat
						010N048W	30							
						010N048W	31							
						010N048W	32							
						010N048W	33							
						010N049W	13							
						010N049W	23							
						010N049W	24							
						010N049W	25							
						010N049W	36							
4,104	Natural Communities	*Populus deltoides - (Salix nigra) / Spartina pectinata - Carex spp. Woodland*	Plains Cottonwood Riparian Woodland	S	1995-08-24	010N048W	03		G1	S1	B	-		
						010N048W	04							
						010N048W	07							
						010N048W	08							
						010N048W	09							
						010N048W	10							
						010N048W	18							
						010N049W	12							
						010N049W	13							
						010N049W	14							
						010N049W	15							
						010N049W	16							
						010N049W	17							
						010N049W	19							
						010N049W	20							
						010N049W	30							
						010N050W	25							
						010N050W	26							
						010N050W	27							
						010N050W	33							
						010N050W	34							
5,864	Natural Communities	*Populus deltoides / Carex pellita Woodland*	Plains Cottonwood Riparian Woodland	S	1995-08-27	010N048W	03		G2	S1	B	-		
						010N048W	04							
						010N048W	07							

precision codes: S = "seconds", location known within 100m; M = "minutes", location known within 1 mile; G = "general", location known within 5 miles

Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a Two-mile Radius of the Proposed Project Area for Wind Farm Project in Logan County, CO

Report generated: 29 May 2008

EO_ID	major group	scientific name	common name	Prec	last obs	Town/ Range	Sec	TRS Note	grank	srank	eo-rank	ESA	fed stat	st stat
						010N048W	08							
						010N048W	09							
						010N048W	10							
						010N048W	18							
						010N049W	12							
						010N049W	13							
						010N049W	14							
						010N049W	15							
						010N049W	16							
						010N049W	17							
						010N049W	19							
						010N049W	20							
						010N049W	30							
						010N050W	25							
						010N050W	26							
						010N050W	27							
						010N050W	33							
						010N050W	34							
3,546	Natural Communities	*Populus deltoides / Symphoricarpos occidentalis Woodland*	Plains Cottonwood Riparian Woodland	S	1995-08-27	010N048W	03		G2G3	S2	B	-		
						010N048W	04							
						010N048W	07							
						010N048W	08							
						010N048W	09							
						010N048W	10							
						010N048W	18							
						010N049W	12							
						010N049W	13							
						010N049W	14							
						010N049W	15							
						010N049W	16							
						010N049W	17							
						010N049W	19							
						010N049W	20							
						010N049W	30							

precision codes: S = "seconds", location known within 100m; M = "minutes", location known within 1 mile; G = "general", location known within 5 miles

Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a Two-mile Radius of the Proposed Project Area for Wind Farm Project in Logan County, CO

Report generated: 29 May 2008

EO_ID	major group	scientific name	common name	Prec	last obs	Town/ Range	Sec	TRS Note	grank	srank	eo-rank	ESA	fed stat	st stat
						010N050W	25							
						010N050W	26							
						010N050W	27							
						010N050W	33							
						010N050W	34							
3,866	Natural Communities	*Salix exigua / Barren Shrubland*	Coyote Willow/Bare Ground	S	1995-08-24	010N048W	03		G5	S5	B	-		
						010N048W	04							
						010N048W	07							
						010N048W	08							
						010N048W	09							
						010N048W	10							
						010N048W	18							
						010N049W	12							
						010N049W	13							
						010N049W	14							
						010N049W	15							
						010N049W	16							
						010N049W	17							
						010N049W	19							
						010N049W	20							
						010N049W	30							
						010N050W	25							
						010N050W	26							
						010N050W	27							
						010N050W	33							
						010N050W	34							
12,172	Reptiles	*Eumeces multivirgatus multivirgatus*	Northern Many-lined Skink	S	1982-05-18	010N049W	26		G5T5	S4	H	-		
2,606	Vascular Plants	*Lesquerella arenosa var. argillosa*	secund bladderpod	G	1983-07-09	011N048W	02		G5T3	S1	H	-		

precision codes: S = "seconds", location known within 100m; M = "minutes", location known within 1 mile; G = "general", location known within 5 miles

APPENDIX E
HABITAT AND WILDLIFE ASSESSMENT AND HABITAT MAPPING REPORTS AND ADDENDUM TO THE HABITAT AND WILDLIFE ASSESSMENT REPORT

Habitat and Wildlife Assessment

Fleming Wind Energy Project, Logan County, Colorado

September 9, 2008

Prepared for:

Environ
1860 Blake Street, Suite 560
Denver, CO 80202

Prepared by:

Walsh Environmental Scientists and Engineers, Inc.
4888 Pearl East Circle, Suite 108
Boulder, Colorado 80301

Carron Meaney, Ph.D.
Senior Biologist

And

Danielle Cassidy
Biologist

And

Scott Severs
Biologist

TABLE OF CONTENTS

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INTRODUCTION

Colorado Highlands is proposing to construct a wind farm, the Fleming Wind Energy Project (project), to be located in Logan County, Colorado. Walsh Environmental Scientists and Engineers, LLC (Walsh) prepared this report to provide an assessment of habitat conditions and wildlife onsite.

PROJECT LOCATION AND DESCRIPTION

The project is located in Logan County, Colorado, northeast of the town of Fleming and south of the South Platte River floodplain (Figure 1). Geographically, it is located on the Crook, Fleming, Haxtun West, and Tamarack Ranch USGS Quadrangle Maps for the State of Colorado in the following Township, Ranges, and Sections:

Crook Quadrangle, T9N, R49W, S13; T9N, R48W, S18

Fleming Quadrangle, T9N, R48W, S19, 30; T9N, R49W, S24

Haxtun West Quadrangle, T9N, R48W, S17, 20-22, 24, 29

Tamarack Ranch Quadrangle, T9N, R48W, S2, 3, 4, 8-15, 17

The proposed project consists of 60 1.5 megawatt (MW) wind turbines for a total output capacity of 90 MW of renewable energy. The 1.5 MW wind turbines have a monopole tower design with an 80-meter hub height and 77-meter rotor diameter for a total maximum blade tip height of 117.5 meters. The associated transmission line will run north-south, extending south from the proposed location on the east side of County Road 85 to approximately one-half mile north of County Road 42. The line continues south for 2.5 miles along CR 85, jogs east for 0.3 miles at CR 38, and then continues south along CR 87 for 3.0 miles, terminating just south of State Highway 6. The line will connect into the existing Sterling-Frenchman Creek 115-kV transmission line.

The project will require the installation of two electrical substations with an approximate footprint of 5 acres and an operations and maintenance facility with an approximate footprint of 1 to 2 acres to include a warehouse-type structure of an undetermined size. Depending on where these structures are located, access roads might also be needed. Figure 2 illustrates the project site boundary and associated transmission line location relative to roads and other features illustrated on USGS topographic maps.

SITE CHARACTERIZATION

The proposed wind site comprises nearly 4,500 acres of primarily agricultural lands. Elevation ranges from approximately 4,070 feet to 4,215 feet above mean sea level. The area is a mix of virtually uninterrupted sections delineated by unpaved county roads along section lines. The homes, outbuildings, and metal stock ponds of the private lands are widely dispersed. Other structures include about half a dozen abandoned farm sites. Barbed wire fences surround many of the fields within the project area.

Conservation Reserve Program (CRP) grasses (planted as part of the Natural Resources Conservation Service's program) are prevalent in the northeastern portion and southeastern portions of the site. Agricultural activity is present, as evidenced by cultivated fields. Grazing, as evidenced by the presence of livestock and cropped vegetation, also occurs in the project area.

METHODS

Data contained in this report were collected during an onsite reconnaissance of the project area on May 6th and 7th, and a follow-up raptor nesting survey on June 2nd, 2008. The purpose of these visits was to record current land use and site conditions, identify dominant habitat types within the project area, and to determine if habitat is present that could support special status plant and animal species. The surveys consisted of driving throughout the project area and along the proposed route for the transmission line using existing dirt roads, stopping at various points to make additional observations on foot such as viewing active and inactive raptor nests, and visiting a known greater prairie-chicken (*Tympanuchus cupido*) lek. Photographs taken during each site visit were used to generate a photographic log documenting the habitat types, specific wildlife habitat, and other areas of interest (Photographs 1 – 11).

Assessments of species presence were made using Walsh's experience with Colorado landscapes; the Colorado Breeding Bird Atlas (Kingery 1998), the Mammals of Colorado (Fitzgerald et al. 1994); Amphibians and Reptiles of Colorado (Hammerson 1999); a query to the Colorado Natural Heritage Program (CNHP) database for a listing of wildlife species and natural communities known or likely to occur in the project area (CNHP 2008); and by contacting the CRP office in Sterling, CO (Travis McCay, personal communication, May 2008).

Prior to the initial site visit, Walsh used the U.S. Fish and Wildlife Service's (USFWS) list of Endangered, Threatened, and Candidate Species for Colorado Counties (www.fws.gov/mountain%2Dprairie/endspp/countylists/colorado.pdf), and the Colorado Division of Wildlife's (CDOW) list of Species of Special Concern for the State of Colorado (http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm) to generate federal and state species of concern lists for the project area. In the field, the presence or absence of listed species within the project area was assessed.

The June 2nd, 2008 survey focused specifically on locating nesting raptors within the project area. A field data form was completed for each potential nest site. Binoculars were used to search for raptors on the wing and for nests on the ground and in trees. Data collected included nest location, substrate (built upon), status (active or inactive). Nest visits were as brief as possible. For each active nest, the location and species was recorded on a Garmin Map 60 GPS, documented, and digitized using ArcMap GIS software (Figure 2).

HABITAT

The project area is in the Lower South Platte River watershed of the central shortgrass prairie ecoregion of the United States (Hazlett 1998) and the southern portion of the Great Plains-Palouse Dry Steppe Province (Bailey 1995). The project area's rolling terrain is formed by a series of roughly east-west trending ridges separated by swaths of upland grasses and agricultural fields. A shift in plant species composition from grassland to sandsage prairie is associated with shifts in topography from the flat fields to sides and tops of ridges. Moisture regime is limited due to the rain shadow effect created by the Rocky Mountains (Hazlett 1998).

Over the past 100 or more years since settlement, the landscape has shifted from shortgrass prairie to agricultural lands with remnants of sandsage prairie habitat on ridges. Since 1986, much of eastern Colorado's lands have been enrolled in the Natural Resource Conservation Service's program, which offers payments to farmers that remove land from

annual crop production in order to lessen erosion and water-quality problems on a long-term basis. The property's only surface waters are playas (natural dry lakebeds that contain water temporarily) and man-made stock ponds for cattle and horses.

Due to various habitat conversions taking place since the time of settlement including agriculture, grazing, and planting CRP species, the project area does not currently support sensitive species. Accordingly, no federal or state-listed sensitive plant species occur within the project area. Plant nomenclature follows Weber and Wittman (2001).

Habitat Types in the Project Area

Five major habitat types characterize the proposed project area. Habitat types are described in more detail below.

Agricultural

Agricultural habitat is characterized by open fields with flat or gently rolling topography. In the project area, this habitat is typically a cropland of vegetables such as corn or a cultivated field of grains such as wheat (Photograph 1).

CRP Lands

On the proposed project area, large expanses of CRP-planted reclamation species such as switchgrass (*Panicum vergatum*), Indian ricegrass (*Achnatherum hymenodies*), sand bluestem (*Andropogon hallii*), and western wheatgrass (*Pascopyrum smithii*) dominate. Sand dropseed is the dominant naturally-occurring grass species (Travis McCay, personal communication, May 2008). Sand dropseed dominated habitat occurs on open flat areas with sandy, well-draining soils. In many disturbed areas such as roadsides and fencelines within the project area, sand dropseed grass occurs with smooth brome (*Bromopsis inermis*) and less frequently with cheatgrass (*Anisantha tectorum*).

Grassland

Grasslands are flat or gently rolling plains dominated by grass species with some forb and shrub species. The project area's dominant grassland habitats are sand dropseed (*Sporobolus cryptandrus*), sandsage prairie, and pasture (Photographs 2-5). Remnant short-grass prairie, dominated by blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*), likely occurs in patches throughout and at the base of sandsage prairie ridges. Blowout grass (*Redfieldia flexuosa*) habitat is prevalent adjacent to the project area.

Forbs are scarce but include purple prairie clover (*Dalea purpurea*), chamomile (*Anthemis* sp.), purple mustard (*Chorispora tenella*), and alfalfa (*Medigaco sativa*). The dominant sub-shrub is sand sagebrush (*Artemisia filifolia* [*Oligosporus fillifolius*]).

Historically, sandsage prairie on Colorado's eastern plains was dominated by sand sagebrush. Associated grass, forb, and shrub species included Indian ricegrass, sand dropseed, sand bluestem, prairie sandreed (*Calimovilfa longifolia*), blowout grass, little bluestem (*Schizachyrium scoparium*), lemon scurfpea (*Psoralidium lanceolatum*), and rabbitbrush (*Chrysothamnus* sp.) (EPA undated). In the project area, due to the prevalence of CRP-planted grasses and other changes to the landscape, sand sagebrush prairie is restricted to the low ridges that are scattered throughout the project area. In flatter areas, sandsage prairie begins to co-occur with grasses including sand dropseed, switchgrass, and little bluestem. Some yucca (*Yucca glauca*) and skunkbrush (*Rhus aromatica* var. *trilobata*) shrubs were observed.

Pastures of grazed grasslands are characterized by open areas and short vegetation. Finally, blowout grass is native to the eastern plains, grows on sandy soil, and is not preferentially grazed by cattle. Patches of blowout grass inhabit areas just outside project boundaries.

Very few noxious weeds or introduced species occur on the site. In areas of higher disturbance such as roadway edges and adjacent field edges, species diversity tends to be lower with weedy species such as smooth brome dominating. Areas with discontinued human activities, such as abandoned farmsteads, tend to have a greater diversity of weeds including cheatgrass, Russian thistle (*Salsola* sp.), and purple mustard (*Chorispora tenella*).

Shelterbelt

Shelterbelts or windbreaks are characterized by trees and shrubs planted to protect downwind habitat. In the project area, shelterbelts are planted in closely spaced rows between fields or grasslands, or they are planted in groves around homesteads for wind protection or privacy. Dominant tree species include plains cottonwood (*Populus deltoides*), Siberian elm (*Ulmus pumila*), juniper (*Juniperus* sp.), ponderosa pine (*Pinus ponderosa*), and skunkbrush (Photographs 5-6).

Playas

Project area surface water is present only as playas, also called prairie potholes or eastern plains depressional wetlands. Playas are seasonally wet shallow depressions with a ring of riparian vegetation often dominated by sedges (*Carex* sp.) and rushes (*Juncus* sp.) with other species including western wheatgrass, blue grama, common dandelion (*Taraxacum officinale*), and salsify (*Tragopogon dubius*). Playas can be excellent stopovers for migratory birds when water is present (Photograph 7). Three playas were identified during this assessment (Figure 2): 1) a playa was identified immediately east of County Road 89, in the NW ¼ of the NW ¼ of Section 16; 2) one playa was identified just southeast of the intersection of County Road 85 and County Road 40 in the NE ¼ of the NE ¼ of Section 36; and 3) a playa was observed further south on the west side of County Road 85 opposite from the proposed interconnection transmission line (NE ¼ of Section 36). All three playas were out of the project area.

COLORADO NATURAL HERITAGE PROGRAM TRACKED SPECIES

The Colorado Natural Heritage Program (CNHP) tracks and ranks Colorado's rare and imperiled species and habitats, and provides information and expertise on these topics to promote the conservation of Colorado's valuable biological resources. A query was made and list of CNHP tracked resources in the project area. They provided database results within a two-mile buffer surrounding the project area. This database query resulted in records of natural plant communities (northern sandhill priaire, riparian woodland, etc.) and wildlife (greater prairie chicken, ferruginous hawk, Cassin's sparrow, northern many-lined skink) in the project area and beyond. None of these records are surprising or different from general observations reported here. The database query results are shown in the Appendix.

WILDLIFE

This section describes the existing wildlife present in the project area as determined from field site visits. Wildlife observed were typical species of native sandsage prairie, agricultural fields and species adapted to human settlements and artificially planted shelterbelts of trees.

Birds

Raptors (Birds of Prey, Avian Predators)

A variety of raptors were observed during the surveys. These are described below.

Buteo Hawks – This group of large broad-winged hawks includes three species that occur or are likely to occur in the project area: the red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*) and the ferruginous hawk (*Buteo regalis*). Red-tailed hawks and Swainson's hawks nest in large trees and hunt in nearby open habitats. Swainson's hawks feed mostly on insects, and both species prey on snakes, ground squirrels, smaller mammals, lagomorphs (jackrabbits and cottontails), and small birds. Red-tails are present year-round, while Swainson's are summer residents. Both species adapt to human presence and commonly nest in proximity to human habitation. The ferruginous hawk occurs near native grasslands generally away from human settlements and nests in lone trees or on the ground near hilltops. It feeds primarily on ground squirrels and lagomorphs.

Two red-tailed hawks were seen onsite, one SSE of County Road 46 and 85 and another individual was observed NNE of County Road 42 and 87. Two active Swainson's hawk nests were observed onsite: one at the NE ¼ of the SE ¼ of Section 30 and another at the NW ¼ of the NW ¼ of Section 16 (Figure 1). A single ferruginous hawk (*Buteo regalis*), was observed near the intersections of County Road 42 and 89.

Harrier Hawks – The northern harrier (*Circus cyaneus*) is common in native and non-native grasslands, agricultural pastures, and marshes. It nests on the ground especially in emergent wetlands, and additionally in croplands and shrublands. A female northern harrier was observed WNW of the intersection of County Road 40 and 87, in the project area.

Falcons – Two falcon species were observed onsite, the American kestrel (*Falco sparverius*) and the peregrine falcon (*Falco peregrinus*). The American kestrel ("sparrow hawk") is a smaller falcon that nests in tree cavities and hunts in nearby grasslands and pastures for small mammals, small birds, and large insects. The kestrel likely nests onsite in ranch and shelterbelt trees and will use the area for hunting in summer and winter. Nesting habitat for peregrine or prairie falcons (*Falco mexicanus*), foothills cliffs, is not available on the site. Both species would likely use the property in migration or during winter for foraging for their avian prey, generally larger songbirds, doves, and upland fowl. A single peregrine was observed ESE of the intersection of County Road 87 and 42, in the project area.

Owls – These nocturnal hunters are similar to diurnal raptors in representing a range of physical sizes and prey/habitat preferences. Potentially five species of owls could nest in the habitats provided in the project area, including barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), burrowing owl (*Athene cunicularia*), long-eared owl (*Asio otus*) and short-eared owl (*Asio flammeus*). Barn owls typically use barns or silos for nest sites. This is also true of great horned owls. Shelterbelts containing old crow nests are reused by great horned owls and long-eared owls. Short-eared owls and burrowing owls nest in prairie habitat, the latter in burrows of ground dwelling squirrels, especially black-tailed prairie dogs. Two great horned owls were observed onsite: one roosting in a shelterbelt and another in an abandoned barn. The presence of great horned owls could exclude barn and long-eared owls, as they prey upon those species.

Upland Fowl

The sandsage and mid-grass prairies, along with the CRP and cultivated lands, provide foraging and nesting cover for grouse and pheasant, a group collectively known as upland fowl. Two species were detected during the initial survey: greater prairie-chicken (*Tympanuchus cupido*) and ring-necked pheasant (*Phasianus colchicus*).

Greater prairie-chicken – Nine males were observed displaying on a lek (an area used for the performance of communal breeding displays) at the NW ¼ of NW ¼ of Section 29 on the property of Maynard Yost (Figure 1). Prairie-chickens generally locate their leks in areas with shorter grasses and good visibility. Once they have mated at the lek the females disperse to the surrounding sandsage and mid-grass prairies to nest. Some cultivated land is also important to this species as corn and other small grains provide a valuable food source, especially in winter. Additional leks are known from a number of miles to the west and the north of the project area (CDOW, personal communication). Originally endangered in Colorado, efforts of the CDOW have stabilized and increased the population of this species to a level that can sustain limited hunting with a special permit (although not currently in Logan County). This species no longer occupies much of its original range in North America due to habitat loss.

Ring-necked pheasant – Introduced from Asia, pheasants first appeared in Colorado in 1894. They prefer agricultural croplands with associated shelterbelts and thickets in which to nest. Several pheasants were detected during the survey, especially near ranches and fallow corn fields. This species is especially important to the hunting community of the county, and several landowners lease property for pheasant hunting.

Non-Passerine Birds

This diverse group of unrelated species (treated as a group in this report for convenience) includes goatsuckers, hummingbirds, swifts, sapsuckers, flickers, doves, and woodpeckers. The term "non-passerine" refers to the fact that these species, while not waterbirds, upland fowl, or raptors, are also not "perching birds" (passerines). Of the taxa lumped into this category, two species, the northern flicker (*Colaptes auratus*) and mourning dove (*Zenaida macroura*), were observed onsite. The northern flicker has a wide range in Colorado, and would most likely nest onsite in the shelterbelts. Mourning doves were also observed onsite. These ubiquitous birds are highly adaptable and have no restricted habitat preference; they would commonly nest in shelterbelts, or on the ground in grasslands.

Passerines (Perching Birds, Songbirds)

Grassland Species – These songbirds almost exclusively nest in grasslands of various types. The most abundant species observed was the grasshopper sparrow (*Ammodramus savannarum*), using a variety of native and non-native grassland/pasture, followed closely by horned lark (*Eremophila alpestris*). Native grassland and sandsage prairie were dominated by (in order of abundance) lark bunting (*Calamospiza melanocorys*), western meadowlark (*Sturnella neglecta*), lark sparrow (*Chondestes grammacus*), vesper sparrow (*Pooecetes gramineus*), and Cassin's sparrow (*Aimophila cassinii*). The presence of native grassland has resulted in a relatively intact complex of native grassland bird species.

Tree Dependant Species – These songbirds require trees for nesting, whether in a shelterbelt or occurring naturally. Species observed (in order of abundance) included western kingbird (*Tyrannus verticalis*), American robin (*Turdus migratorius*), loggerhead shrike (*Lanius ludovicianus*), northern mockingbird (*Mimus polyglottos*), Bullock's oriole

(*Icterus bullockii*), black-billed magpie (*Pica hudsonia*), and brown thrasher (*Toxostoma rufum*). Many of these species forage in grasslands and pastures adjacent to their nestsites.

Human Adapted Species – These species are commonly found nesting on ranch houses or farm buildings. The two detected species included the house sparrow (*Passer domesticus*) and the Say's phoebe (*Sayornis saya*). Brown-headed cowbirds (*Molothrus ater*) commonly occur around livestock. Barn swallows (*Hirundo rustica*) are likely nesting in ranch yards throughout the project.

Raptor Nests

Two active Swainson's hawk nests were found during the nest survey (Figure 2). They are located in the northeastern and south central portions of the project area at: SW ¼ of NW ¼ of section 17, and SW ¼ of SE ¼ of section 19 Township 9 North Range 48 West Three inactive nests were located on the first survey on May 6, 2008, and were still inactive on a follow-up survey on June 2, 2008 (Figure 2). These nests, likely created by Buteo hawks, are probably alternative nest sites, or abandoned for one reason or another. They are located at: SE ¼ of SE ¼ of Section 29 (Maynard Yost property) and SW ¼ of NW ¼ of Section 18.

Mammals

Ungulates or Hoofed Mammals

Mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) are known to occur in the project area. Neither species was observed during field work.

Carnivores

No carnivores were spotted during field work. Coyote (*Canis latrans*) scat found in the area revealed their presence. Swift fox (*Vulpes velox*) is indicated for the sandsage prairie. Long-tailed weasel (*Mustela frenata*), American badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*) are likely present. The potential presence of swift foxes is addressed below.

Rabbits and Rodents – No rabbits were observed in the project area. Desert cottontails (*Sylvilagus audubonii*) and black-tailed jackrabbits (*Lepus californicus*) are likely in the habitats of the project area. The white-tailed jackrabbit (*Lepus townsendii*) is less likely due to its preference for less disturbed native grasslands. Possible squirrels include the spotted ground squirrel (*Spermophilus spilosoma*) and the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*). Black-tailed prairie dogs (*Cynomys ludovicianus*) are also possible but were not observed. This species receives intense pressure from ranching/agricultural interests leading to its eradication. Signs for Ord's kangaroo rat (*Dipodomys ordii*) and plains pocket gopher (*Geomys bursarius*) were observed along the roadsides. Skulls of hispid pocket mice (*Chaetodipus hispidus*) were found in owl pellets. Other rodent species potentially or likely to be present include the plains pocket mouse (*Perognathus flavescens*), silky pocket mouse (*Perognathus flavus*), western harvest mouse (*Reithrodontomys megalotis*), plains harvest mouse (*Reithrodontomys montanus*), deer mouse (*Peromyscus maniculatus*), northern grasshopper mouse (*Onychomys leucogaster*), house mouse (*Mus musculus*), and prairie vole (*Microtus ochrogaster*).

Shrews, Moles, and Bats – No shrews or bats were observed during field work. Least shrews (*Cryptotis parva*) are known to be found in grassy areas that are quite dry such as occur in the project area. Eastern moles (*Scalopus aquaticus*) may occur in the project

area as extensions of the broad South Platte River riparian corridor. Bat surveys would need to be conducted to detect resident or migratory species present. Possible resident species include little brown myotis (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*).

Amphibians and Reptiles

No amphibians or reptiles were observed but species expected for sandsage and mid-grass prairie include: plains spadefoot (*Spea bombifrons*), Woodhouse's toad (*Bufo woodhousii*), Great Plains toad (*Bufo cognatus*), ornate box turtle (*Terrapene ornate*), lesser earless lizard (*Holbrookia maculate*), prairie lizard (*Sceloporus undulates*), six-lined racerunner (*Aspidoscelis sexlineata*), many-lined skink (*Eumeces multivirgatus*), glossy snake (*Arizona elegans*), western hognose snake (*Heterodon nasicus*), bullsnake (*Pituophis catenifer*), milk snake (*Lampropeltis triangulum*), and western rattlesnake (*Crotalus viridis*) (Hammerson 1999). Amphibians especially will make use of the playas when water is present.

Federally-listed Threatened and Endangered Species

The USFWS lists three bird species and one fish species for Logan County on their county list for Colorado as threatened or endangered (Table 1). Three species, pallid sturgeon (*Scaphirhynchus albus*), least tern (*Sterna antillarum*), and whooping crane (*Grus americana*) are included in the Logan County lists because water projects in the county may affect downstream habitats of these species by causing depletions to waters of the South Platte River. However, this project will not impact water sources downstream as there are no water depletions. Whooping cranes on migration could make a stopover in agricultural fields; there are no records to indicate that this is known to occur in the project area. Another species, the piping plover (*Charadrius melodus*), is an unlikely migrant due to the lack of suitable shoreline habitat in the project area.

State-listed Threatened, Endangered, and Species of Special Concern

The CDOW state-listed species were evaluated for their potential occurrence using appropriate local references, consultations with area biologists, and staff knowledge of the species and habitats of Logan County (Table 2).

Plains Sharp-Tailed Grouse (*Tympanuchus phasianellus jamesii*) – This endangered species traditionally occurred across much of eastern Colorado, but has been nearly eliminated from the state. Individuals have wandered into nearby Tamarack Ranch (a State Wildlife Area located 1.0 to 2.0 miles north of County Road 46 outside the project area) from Nebraska, where they occupy sandsage prairie. These individuals have hybridized with greater prairie-chickens (Kingery 1998). Although suitable habitat occurs for this species in the project area, no individuals were observed during the assessment. Follow-up habitat mapping currently planned will provide information regarding the extent of potentially suitable habitat.

American Peregrine Falcon (*Falco peregrinus anatum*) – This species has a broad area of migration, and will forage on birds in grassland habitat, especially during spring and fall. Adequate nesting habitat (cliffs) does not exist in the project area. One individual was observed flying over the greater prairie chicken lek.

Bald Eagle (*Haliaeetus leucocephalus*) – Bald eagles were recently de-listed from the federal list, but are listed on the state list. Good foraging habitat for this species, especially

black-tailed prairie dog colonies, does not exist in the project area, however taller trees could occasionally host a bird in transition from breeding grounds to wintering areas.

Burrowing Owl (*Athene cunicularia*) – This species generally prefers shortgrass prairie associated with black-tailed prairie dog colonies, as they often nest in burrows within an active colony. Surveys failed to detect the shortgrass prairie and prairie dogs that this species prefers. Individuals could certainly use other mammal burrows, but taller grasses and shrubs usually preclude their occurrence.

Ferruginous Hawk (*Buteo regalis*) – One individual of this state species of Special Concern was observed on the project area near the intersections of County Road 42 and 89. A hawk of grasslands and shrublands, this species primarily forages upon prairie dogs, ground squirrels, and jackrabbits. Surveys failed to detect prairie dogs in the project area; alternative prey species were present. No nests were located. Nesting does occur in Logan County and a possible nest site was reported north of the project site during the Breeding Bird Atlas survey in the 1990s. These records are recorded in 2.9 mile by 3.5 mile blocks; the block's southern boundary is County Road 44. Conversion of native grassland habitats to agriculture, energy development and urbanization as well as the eradication of the majority of black-tailed prairie dogs in eastern Colorado has led to the Special Concern status (non-statutory). Nests of this species are highly prone to abandonment if disturbed during the incubation period (Wheeler 2003).

Greater Sandhill Crane (*Grus canadensis tabida*) – Appropriate nesting habitat for this species does not exist in the project area. Birds on migration could make a stopover in agricultural fields.

Whooping Crane (*Grus Americana*) – Appropriate habitat for this species does not exist in the project area (see previous section).

Piping Plover (*Charadrius melodus*) – Appropriate habitat for this species does not exist in the project area (see previous section).

Snowy Plover (*Charadrius alexandrinus*) – Appropriate habitat for this species does not exist in the project area although this species could fly through the area during migration.

Mountain Plover (*Charadrius montanus*) – This species is intimately associated with heavily grazed shortgrass prairie, as occurs where cattle and/or prairie dogs are present. Fallow fields may also be used. Surveys failed to detect this species and suitable habitat for this species.

Long-Billed Curlew (*Numenius americanus*) – This species nests in shortgrass prairie and occasionally in wheat or fallow fields. However the lack of adequate standing water would preclude this species nesting in the project area. Migrant birds could stopover in pastures and open grasslands.

Western Yellow-Billed Cuckoo (*Coccyzus americanus*) – Closed canopy riparian forests are the preferred nesting habitat of this species, and do not occur on the site. However, shelterbelts in the project area could host migrant cuckoos.

Black-Tailed Prairie Dog (*Cynomys ludovicianus*) – This species inhabits short and mixed-grass prairies. Suitable habitat occurs in the project area, however, surveys did not detect any of this colonial species. It is likely that the species was extirpated from the project area in years past.

Swift Fox (*Vulpes velox*) – This species inhabits short and mixed-grass prairies throughout eastern Colorado. Suitable habitat occurs in the project area in the form of remnant short-

grass prairie, and grazed areas. Habitat mapping can serve to elucidate the extent of suitable habitat present, which can serve to suggest likelihood of occurrence (Martin et al. 2007). Follow-up habitat mapping is being conducted.

Yellow Mud Turtle (*Kinosternon flavescens*) – Habitat for this reptile includes permanent and semi-permanent ponds, temporary rain pools near grasslands and sandsage prairie. Sandsage habitat is especially used in the summer time by nesting females. The CDOW website shows this species only as "likely to occur", not "known to occur", indicating perhaps a lower likelihood of its presence (http://ndis.nrel.colostate.edu/plugins/co_maps/030998.jpg).

Table 1. Federally Listed Special Status Wildlife Species for Logan County, Colorado

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence on Project Site	Habitat
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	FE	None	River habitat downstream of Logan County.
Migratory				
Least tern (interior population)	*Sterna antillarum*	FE	None	River habitat downstream of Logan County.
Piping plover	*Charadrius melodus*	FT	Very Unlikely	Mudflats and shorelines of reservoirs and lakes.
Whooping crane	*Grus americana*	FE	Unlikely	River habitat downstream of Logan County.

[1]Status: FE = Federally Endangered; FT = Federally Threatened, in accordance with the United States Fish and Wildlife Service

Table 2. State Listed Threatened, Endangered, and Species of Special Concern with Known or Potential Occurrence Within the Fleming Project Area.

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence on Project Site	Habitat
Game Birds				
Plains Sharp-Tailed Grouse	*Tympanuchus phasianellus jamesii*	SE	Possible	Native and introduced tall grasslands, CRP lands, grassland/sandsage
Raptors				
American peregrine falcon	*Falco peregrinus anatum*	SC	Observed migrant	Cottonwood riparian, shelterbelt trees.
Bald Eagle	*Haliaeetus leucocephalus*	ST	Possible migrant	Cottonwood riparian, shelterbelt trees.
Burrowing owl	*Athene cunicularia*	ST	Possible	Grassland, abandoned black-tailed prairie dog and rodent burrows.
Ferruginous hawk	*Buteo regalis*	SC	Observed	Grassland, prairie dog towns, rock outcrops, shelterbelt trees.
Shorebirds				
Greater sandhill crane	*Grus canadensis tabida*	SC	Possible migrant	Agricultural areas, moist meadows.
Whooping crane	*Grus americana*	FE, SE	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes, agricultural areas
Piping plover	*Charadrius melodus*	FT, ST	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes
Western snowy plover	*Charadrius alexandrinus*	SC	Unlikely migrant	Mudflats and shorelines of reservoirs and lakes
Mountain plover	*Charadrius montanus*	SC	Possible	Shortgrass prairies and steppe; prefers areas with little vegetative cover, such as prairie dog colonies.
Long billed curlew	*Numenius americanus*	SC	Possible migrant	Grassland, plains, foothills, wet meadows
Neotropical Migrants				
Western yellow-billed cuckoo	*Coccyzus americanus*	SC	Possible migrant	Lowland riparian, shelterbelt trees.
Mammals				
Black-tailed prairie dog	*Cynomys ludovicianus*	SC	Unlikely	Short and midgrass prairies.
Swift fox	*Vulpes velox*	SC	Possible	Short and midgrass prairies.
Reptile				
Yellow mud turtle	*Kinosternon flavescens*	SC	Possible	Permanent and semi-permanent ponds near grasslands and sandsage.

[1]Status: FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; SC = Species of Special Concern in Colorado

Agency Coordination

Consulting with local regulatory agencies was initiated by letter April 11, 2008, with a Notice of Decision to Prepare an Environmental Assessment and Request for Comments from Jim Hartmann of the Department of Energy. Responses were received from the USFWS on May 7, and from the CDOW on May 9, 2008 (see letters in Appendix). Walsh met onsite with Wendy Figueroa (Conservation Biologist) and Dan Cacho (District Wildlife Manager) of the CDOW on May 7, 2008. During the site visit, Dan Cacho took the team to the greater prairie-chicken lek, described above. No meeting has been held with the USFWS representative. The USFWS administers and enforces the Migratory Bird Treaty Act (MBTA) and the Endangered Species Act (ESA). The CDOW administers hunting and fishing regulations, and state endangered species regulations, often coordinating with local landowners. The CDOW can provide unique knowledge of wildlife in a given area due to their unique familiarity of the resources, and would provide specific help in guiding energy development in a proactive manner with wildlife populations in the project area.

The USFWS recommends following their Interim Guidance for wind farms (USFWS 2003) and the guidance for Avian Protection on Power Lines (APLIC 2006) in their letter. They also indicate that their oversight of the MBTA, Bald and Golden Eagle Protection Act, and Endangered Species Act prohibits any harm to migratory birds, eagles, and/or endangered species.

The CDOW letter and meeting resulted in a large number of recommendations and suggestions. These relate to buffer distances of 0.5 mile from any lek for turbines and transmission lines; no turbine maintenance before 10 A.M. and after 5 P.M. between March 1 and June 30 to protect prairie-chickens; and that prairie-chicken lek surveys be conducted between late March to mid-April 2009. For raptors, the CDOW recommends a 0.25 mile buffer from nest sites (active and inactive) and no construction during nesting season (mid-February through mid-July). Other recommendations include pre-construction and post-construction monitoring for two years unless otherwise agreed; avoidance of impacts to sandhills and playas; and active noxious weed eradication program. Additional recommendations are also made (see letter in Appendix).

Conclusion

The project area contains habitats typical of the eastern prairies of Colorado, where cultivation and subsequent CRP conversion has occurred, and areas of remaining native grassland and sandsage prairie. Wildlife species present are adapted to these habitats, and benefit from the relative lack of disturbance that occurs in agricultural areas compared with urban landscapes.

Wildlife

Forty-two species of birds were observed during three days of surveys. Five species are migratory, and the remaining 37 species are breeding birds. The count detected six species of raptors (two species of State Concern). Although not a species of concern, the greater prairie-chicken is one that the CDOW is paying particular attention to due to historic population declines and in association with successful agency efforts to restore populations.

Overall 28 mammal species are reported for the habitat types in the project area, two of which are State Species of Concern, swift fox and black-tailed prairie dog; the latter are easily seen if present, and were not observed. Swift foxes are nocturnal and not readily seen when present. Bats, especially migratory species, are likely underrepresented due to limited knowledge of their migratory habits and their nocturnal behavior.

Habitats in the project area (especially grasslands) could support 13 species of amphibians and reptiles, one of which is a State Species of Concern, the yellow mud turtle. However, there are no records of its occurrence in the county.

Special Status Wildlife

Of the federal and state special status species (17 total) listed for the project area, two species were observed, nine were possible, four species were unlikely or very unlikely to occur and two would not occur in the project area. Four species are federally listed for Logan County for potential dewatering of the Platte River; but this project will not affect water levels in the Platte River drainage as discussed in the Environmental Assessment prepared for the Project. Two of the federally listed and state listed species (piping plover and whooping crane) have an unlikely chance of migrating through the project area. However, it should be noted that there have been whooping crane sightings in Cheyenne County, Nebraska, directly north of Logan County. Cheyenne County is on the western edge of the migratory corridor for whooping cranes.

Of the species that were observed or possible, five are possible migrants (American peregrine falcon, bald eagle, greater sandhill crane, long-billed curlew, and western yellow-billed cuckoo), and seven are possible residents or onsite breeders (plains sharp-tailed grouse, burrowing owl, ferruginous hawk, mountain plover, swift fox, and yellow mud turtle). The ferruginous hawk (potential nesting and foraging habitat) and swift fox (suitable year-round habitat) will be addressed by a planned habitat survey of the project area.

REFERENCES

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection 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. http://www.aplic.org/SuggestedPractices2006(LR-2watermark).

Bailey, R.G. 1995. Description of the ecoregions of the United States. 2d ed. Rev. and expanded (1st ed. 1980). Miscellaneous Publications. 1391 (rev.). Washington, DC: USDA Forest Service. 108 p. with separate map at 1:7,500,000.

Colorado Division of Wildlife (CDOW) http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm.

Colorado Natural Heritage Program (CNHP). 2008. Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a Two-mile Radius of the Proposed Project Area for Wind Farm Project in Logan County, CO. Colorado State University. Fort Collins, CO. May 29, 2008.

Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. University Press of Colorado and Denver Museum of Natural History. 467pp.

Hammerson, G.A. 1999. Amphibians and Reptiles in Colorado. Second Edition. University Press of Colorado and Colorado Division of Wildlife. Niwot, Colorado.

Hazlett, D.L. 1998. Vascular Plant Species of the Pawnee National Grassland. Rocky Mountain Research Station: General Technical Report RMRS-GTR-17

Kingery, H.E. 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife.

Martin, J.D., G.C. White, and F.M. Pusateri. 2007. Occupancy rates by swift foxes (*Vulpes velox*) in eastern Colorado. Southwestern Naturalist 52:541-551.

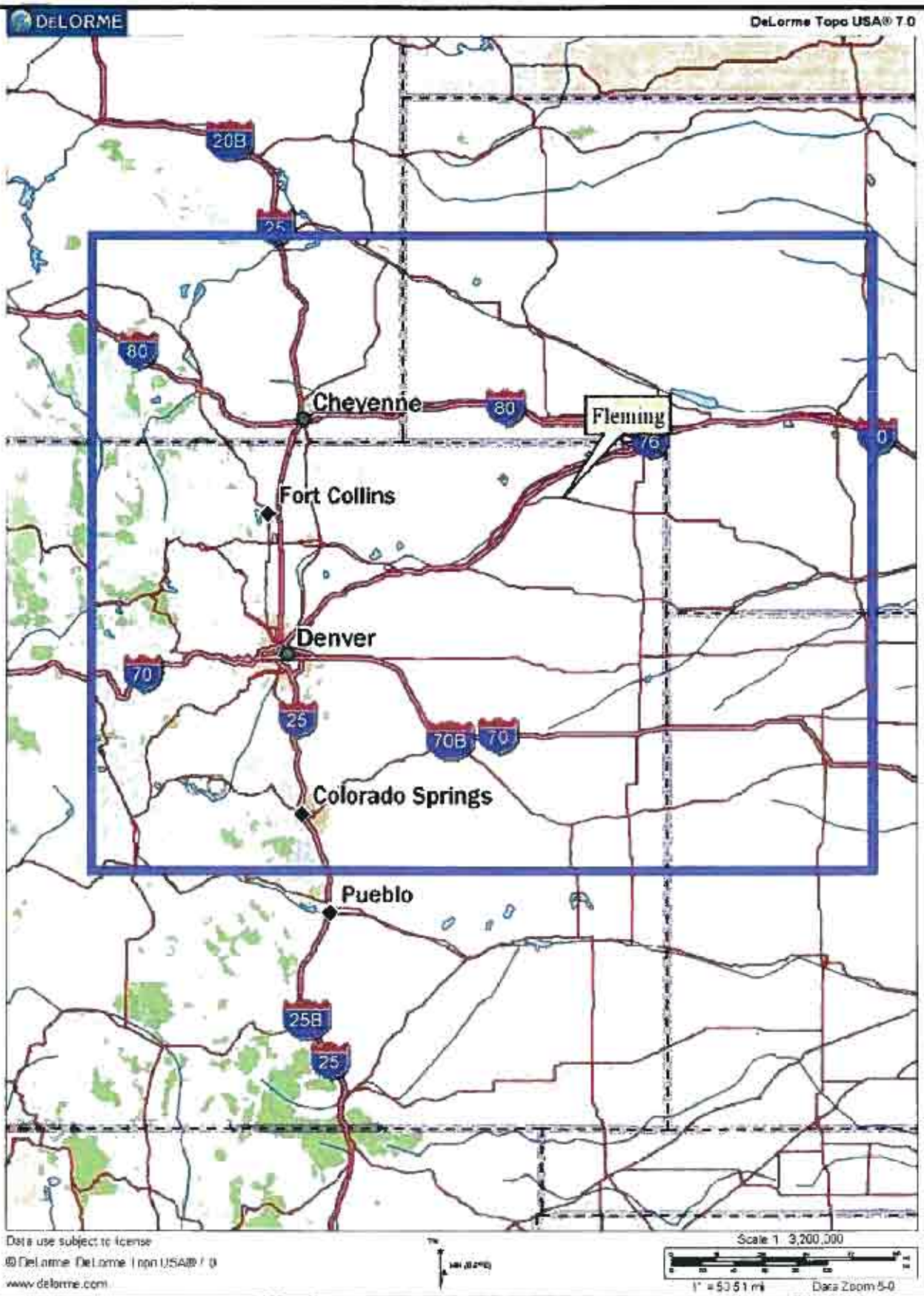
U.S. Environmental Protection Agency (EPA). Date unknown. Ecoregions of Colorado. ftp://ftp.epa.gov/wed/ecoregions/co/co_front.pdf

U. S. Fish and Wildlife Service. 2003. Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines. Wind Turbine Siting Working Group, Washington, DC. http://www.fws.gov/habitatconservation/wind.pdf.

U.S. Fish and Wildlife Service. 2008. Endangered, Threatened, and Candidate Species and Designated Critical Habitat for Colorado Counties. http://www.fws.gov/mountain%2Dprairie/endspp/countylists/colorado.pdf. February 2008.

Weber, W.A., and R.C. Wittman. 2001. Colorado Flora: Eastern Slope. University of Colorado Press. Third Edition.

Wheeler, B.K. 2003. Raptors of Western North America. Princeton University Press. Princeton, New Jersey.



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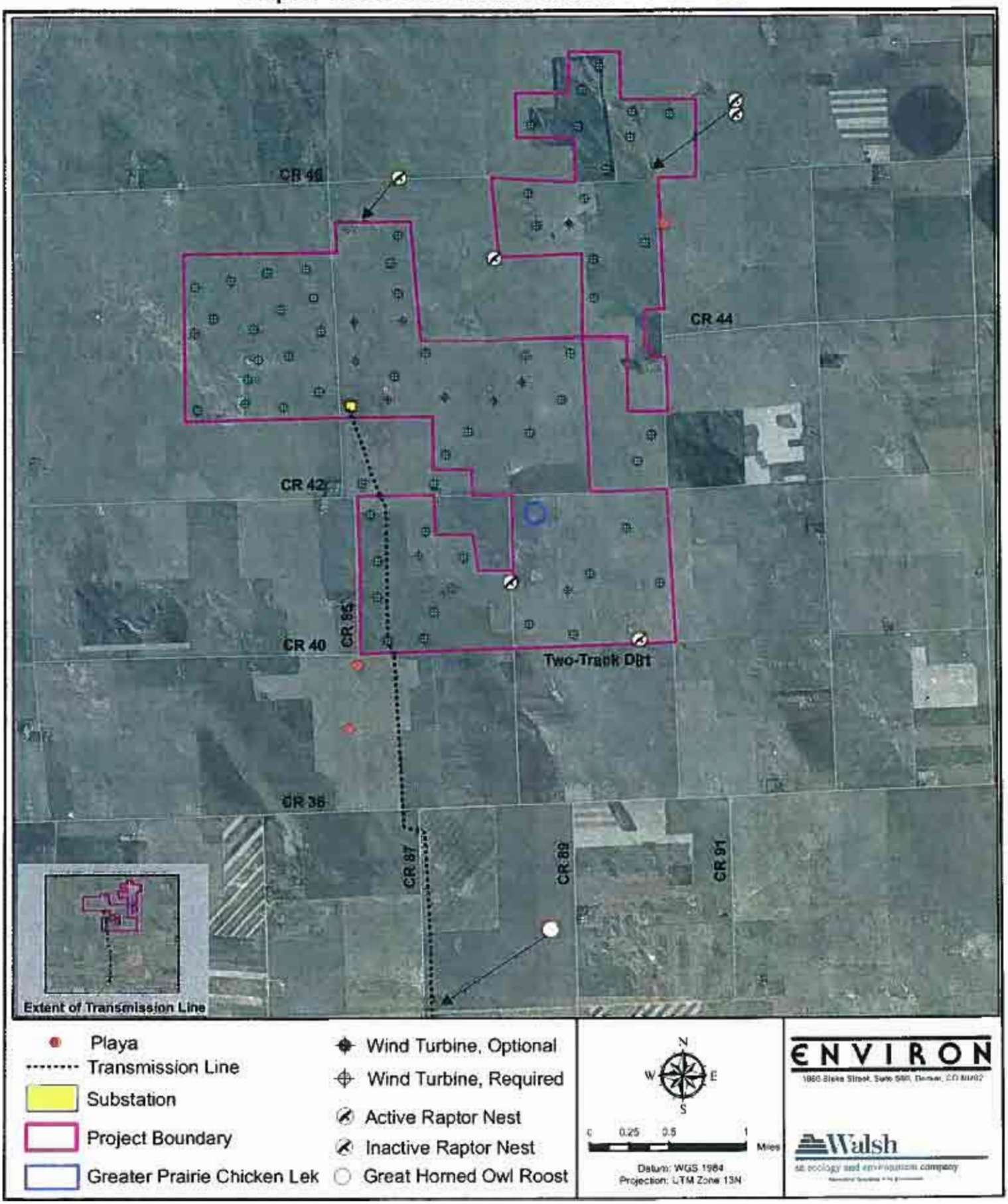
ENVIRON

SITE LOCATION MAP
FLEMING WIND PROJECT

Figure
1

Drafter: APR | Date: 12/14/07 | Contract Number: | Approved: | Revised:

Figure 2. Fleming Wind Project
Raptor Nests and Greater Prairie Chicken Lek



PHOTOGRAPHS

Photograph 1: Agricultural corn field (on right).

Photograph 2: CRP planted sand dropseed and sandy soil, with smooth brome in foreground. The blades of sand dropseed get shredded in the open windy habitat of Colorado's eastern plains.

Photograph 3: Sandsage prairie (left and background, on ridge) and sand dropseed grassland (right).

Photograph 4: Blowout grass naturally occurs in large patches and is not used as foraged by cattle.

Photograph 5: Grazed grassland in foreground and sandsage prairie in background on ridge.

Photograph 6: Shelterbelt comprising a row of junipers (out of photograph), a row of Siberian elms (at left), a two-track grown in with grass species, and a row of skunkbrush shrubs.

Photograph 7: Shelterbelt of Plains cottonwoods with sand dropseed in the foreground.

Photograph 8: Wetland habitat - a Playa or eastern plains shallow depression.

Photograph 9: Juvenile male greater prairie-chicken perched above his lek located in the project area (photograph taken through a spotting scope).

Photograph 10: Inactive raptor nest (tree in background) along the proposed transmission line route.

Photograph 11: Active Swainson's hawk nest near P & L Hart property in south of project area (left of center tree).

APPENDIX

Colorado Natural Heritage Program Query

Colorado Division of Wildlife Letter

U.S. Fish and Wildlife Service Letter

EATURE_ID	ELCODE	SF_ID	GNAME	SNAME	GCOMNAME	SCOMNAME	INDEPENDEN
46509	ABPBX91070	19326.000000	Aimophila cassinii	Aimophila cassinii	Cassin's Sparrow	Cassin's Sparrow	Y
67448	ABNKC19120	25687.000000	Buteo regalis	Buteo regalis	Ferruginous Hawk	Ferruginous Hawk	Y
73904	ABPBX91070	28173.000000	Aimophila cassinii	Aimophila cassinii	Cassin's Sparrow	Cassin's Sparrow	Y
74481	ABPBX91070	28552.000000	Aimophila cassinii	Aimophila cassinii	Cassin's Sparrow	Cassin's Sparrow	Y

ELMNT_ID	GRANK	SRANK	FEDSENS	SPROT	MAJORGRP	LABEL	LOCATOR
19553.000000	G5	S4B	USFS		Birds	Orth, P.B. 2003	
19973.000000	G4	S3B,S4N	BLM/USFS	SC	Birds	RMBO 2006	Galien
19553.000000	G5	S4B	USFS		Birds	RMBO 2004	
19553.000000	G5	S4B	USFS		Birds	RMBO 2004	Tamarack Ranch SWA

SE_CLASS	TYPE	DISTANCE	UNIT	DIGI_COM	MAP_COM	DIGI_BASE	TRS_
	Areal - Estimated	0.100000	Miles	[CNHP:] Coordinates provided by RMBO, Section Survey database, in 2004.	[CNHP:] Coordinates of survey point collected at road. Observation is within 1/10 of a mile.	GPS - 25 meter accuracy	5947
	Areal - Estimated	175.000000	Meters	[CNHP:] Coordinates provided by RMBO, Point Count Transects database, in 2006.	[CNHP:] Added 25m to radial distance provided by RMBO (150m) to account for GPS error.	GPS - 25 meter accuracy	7880
	Areal - Estimated	125.000000	Meters	[CNHP:] Coordinates provided by RMBO, Section Survey database, in 2006.	[CNHP:] Coordinates of survey point collected at road. Added 25m to distance provided by RMBO (100m) to account for GPS error.	GPS - 25 meter accuracy	5947
	Areal - Estimated	122.000000	Meters	[CNHP:] Coordinates provided by RMBO, Point Count Transects database, in 2006.	[CNHP:] Added 25m to radial distance provided by RMBO (97m) to account for GPS error.	GPS - 25 meter accuracy	4090

TRS_ID	CLASS	TYPEB	STATE	GRANT	TWP	TDIR	RNG
5966	1	2	5	0	9.0	N	49.0
7843	1	2	5	0	8.0	N	50.0
5966	1	2	5	0	9.0	N	49.0
4123	1	2	5	0	10.0	N	49.0

RDIR	GITISEC	MERIDIAN	TOWNRANGE	SECTION	TRS	TRSNOTE
	11	6	9.0N 49.0W	11	9.0N 49.0W11	
	1	6	8.0N 50.0W	1	8.0N 50.0W 1	
	11	6	9.0N 49.0W	11	9.0N 49.0W11	
	13	6	10.0N 49.0W	13	10.0N 49.0W13	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (65412)
Denver, Colorado 80225-0486

IN REPLY REFER TO:
ES/CO: T&E/Species list
TAILS: 65412-2008-SL-0363

MAY - 7 2008

Mr. James Hartman
Department of Energy
Western Area Power Administration
Rocky Mountain Region
P.O. Box 3700
Loveland, Colorado 80539-3003

Dear Mr. Hartman:

The U.S. Fish and Wildlife Service (Service) received your letters dated April 11, 2008, and April 28, 2008, regarding your proposal to approve an interconnection agreement with Wind Energy Prototypes, LLC (WEP) for the Fleming Wind Energy Project in Logan County, Colorado. These comments have been prepared under the provisions of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et. seq.), the Bald and Golden Eagle Protection Act of 1940 (BGEPA), as amended (16 U.S.C. 668 et. seq.), the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 et. seq.), and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321-4327).

For your convenience, we have enclosed a list of Colorado's threatened and endangered species, as well as the counties in which they are known to occur. We do not have site specific information available to us. If questions regarding the presence of an endangered species, the extent of its habitat, or the effects of a particular action need to be resolved, the Service recommends that a knowledgeable consultant conduct habitat assessments, trapping studies, or provide recommendations regarding options under the ESA. Due to staffing constraints, the Colorado Field Office cannot provide you with these services.

The Service supports the development of wind power as an alternative energy source. However, if not appropriately designed and sited, turbines and wind farms can have negative impacts on wildlife and their habitats. On July 10, 2003, we released *Interim Guidance on Avoiding and Minimizing Impacts to Wildlife from Wind Turbines* (Guidance) (http://www.fws.gov/r9dhchfa/wind.pdf). These voluntary siting guidelines are intended to assist developers in avoiding and minimizing impacts from wind turbines to wildlife and their habitats. They are based on the best information available and were developed by a team of Federal, State, university, and wind energy industry biologists.

Post-construction monitoring to identify any wildlife impacts is highly recommended at all developed sites. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist without regard to his/her affiliation or interest in the site.

Please also be aware of the potential application of the MBTA and the BGEPA. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and

nests, except when specifically authorized by the Department of the Interior. Unlike the ESA, neither the MBTA nor its implementing regulations (50 CFR Part 21) provide for permitting "incidental take" of migratory birds.

The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed at structures such as wind turbines even if all reasonable measures to protect them 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 minimize their impacts on migratory birds, and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without implementing all reasonable measures to avoid take.

Protective measures to help reduce possible impacts to migratory birds and other raptors should be installed whenever possible. For example, 7 CFR § 1724.52 allows for deviations from construction standards for raptor protection, provided that structures are designed and constructed in accordance with the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006,* by the Edison Electric Institute, APLIC, and the California Energy Commission. The regulation requires that such structures be in accordance with the National Electrical Safety Code and applicable State and local regulations.

Any future mitigation recommended by the Service for the proposed wind project would be voluntary on the part of the developer unless made a condition of a Federal license, permit or other authorization. However, mitigation does not apply to "take" of species under the MBTA, BGEPA, or ESA. The goal of the Service under these laws is the elimination of loss of migratory birds and endangered and threatened species due to wind energy development. The Service will actively expand partnerships with regional, national, and international organizations, States, tribes, industry, and environmental groups to meet this goal.

If the Service can be of further assistance, please contact Sandy Vana-Miller in this office at (303) 236-4773.

Sincerely,

Susan C. Linner
Colorado Field Supervisor

Enclosure: Species List

cc: FWSR6/ES/LK, Sandy Vana-Miller

Colorado Field Office County List
Updated February 2008

Update 2-19-08

Symbols:

* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.

▲ Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other states.

© There is designated critical habitat for the species within the county.

T Threatened

E Endangered

P Proposed

X Experimental

C Candidate

For additional information contact: U.S. Fish and Wildlife Service, Colorado Field Office, PO Box 25486 DFC (MS 65412), Denver, Colorado 80225-0486, telephone 303-236-4773
U.S. Fish and Wildlife Service, Western Colorado Field Office, 764 Horizon Drive, Building B, Grand Junction, Colorado 81506, telephone 970-243-2778

Species	Scientific Name	Status
ADAMS		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ALAMOSA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
ARAPAHOE		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T

Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ARCHULETA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Mexican spotted owl	Strix occidentalis lucida	T
Pagosa skyrocket	Ipomopsis polyantha	C
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
BACA		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
BENT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
BOULDER		
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
BROOMFIELD		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E

Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
CHAFFEE		
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
CHEYENNE		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
CLEAR CREEK		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
CONEJOS		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
COSTILLA		
Black footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
CROWLEY		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E

Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
CUSTER		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
DELTA		
Black-footed ferret	Mustela nigripes	E
Bonytail	Gila elegans	E
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow©	Ptychocheilus lucius	E
Humpback chub	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
DENVER		
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
DOLORES		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
DOUGLAS		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E

Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
EAGLE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
ELBERT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Whooping crane▲	Grus americana	E
EL PASO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
FREMONT		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E

Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
GARFIELD		
Bonytail	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Humpback chub	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Parachute beardtongue	Penstemon debilis	C
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
GILPIN		
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
GRAND		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Osterhout milkvetch	Astragalus osterhoutii	E
Penland beardtongue	Penstemon penlandii	E
Razorback sucker*	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
GUNNISON		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C

HINSDALE		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
HUERFANO		
Arkansas darter	Etheostoma cragini	C
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
JACKSON		
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sternula antillarum	E
North Park phacelia	Phacelia formosula	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
JEFFERSON		
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
KIOWA		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T

KIT CARSON		
Black-footed ferret	Mustela nigripes	E
LAKE		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Penland alpine fen mustard	Eutrema penlandii	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
LA PLATA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Knowlton cactus	Pediocactus knowltonii	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
LARIMER		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
North Park phacelia	Phacelia formosula	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
LAS ANIMAS		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
New Mexico meadow jumping mouse	Zapus hudsonius luteus	C
LINCOLN		

Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
LOGAN		
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
MESA		
Bonytail©	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Humpback chub©	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MINERAL		
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
MOFFAT		
Black-footed ferret	Mustela nigripes	E
Bonytail©	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Humpback chub©	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker©	Xyrauchen texanus	E
Ute ladies'-tresses orchid (Yampa River floodplain)	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C

MONTEZUMA		
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Mancos milkvetch	Astragalus humillimus	E
Mesa Verde cactus	Sclerocactus mesae-verdae	T
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Sleeping Ute milkvetch	Astragalus tortipes	C
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
MONTROSE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MORGAN		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
OTERO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Piping plover	Charadrius melodus	T
OURAY		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E

Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
PARK		
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Penland alpine fen mustard	Eutrema penlandii	T
Piping plover ▲	Charadrius melodus	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Whooping crane ▲	Grus americana	E
PHILLIPS		
None		
PITKIN		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Yellow-billed cuckoo	Coccyzus americanus	C
PROWERS		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sternula antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
PUEBLO		
Arkansas darter	Etheostoma cragini	C
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Mexican spotted owl	Strix occidentalis lucida	T

RIO BLANCO		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Dudley Bluffs bladderpod	Lesquerella congesta	T
Dudley Bluffs twinpod	Physaria obcordata	T
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
White River beardtongue	Penstemon scariosus var. albifluvis	C
Yellow-billed cuckoo	Coccyzus americanus	C
RIO GRANDE		
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
ROUTT		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAGUACHE		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison's prairie dog	Cynomys gunnisoni	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN JUAN		

Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN MIGUEL		
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SEDGWICK		
Least tern (interior population)	Sternula antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane▲	Grus americana	E
SUMMIT		
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Penland alpine fen mustard	Eutrema penlandii	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
TELLER		
Gunnison's prairie dog	Cynomys gunnisoni	C
Least tern (interior population)▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Whooping crane▲	Grus americana	E

WASHINGTON		
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sternula antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
WELD		
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sternula antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
YUMA		
None		T

Habitat Mapping

Colorado Highlands Wind Energy Project, Logan County, Colorado

September 10, 2008

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INTRODUCTION

Colorado Highlands Wind LLC is proposing to construct a wind farm, the Colorado Highlands Wind Energy Project (project), to be located in Logan County, Colorado. Walsh Environmental Scientists and Engineers, LLC (Walsh) prepared this report to provide habitat mapping of the site. A previous report titled "Habitat and Wildlife Assessment, Fleming Wind Energy Project, Logan County, Colorado", dated September 9, 2008, outlined habitat types and wildlife use. These are maintained in the present report along with the mapping effort. Previous coordination with the Colorado Division of Wildlife (CDOW) had raised the issue of potential swift fox (*Vulpes velox*) dens on site. The present effort included a search for den sites. A determination that swift fox presence is possible on site was made during a prior site visit (May 7th, 2008) with Dan Cacho and Wendy Figueroa of CDOW and by referencing Mammals of Colorado (Fitzgerald et al. 1994).

PROJECT LOCATION AND DESCRIPTION

The project is located in Logan County, Colorado, northeast of the town of Fleming and south of the South Platte River floodplain (Figure 1). Geographically, it is located on the Crook, Fleming, Haxtun West, and Tamarack Ranch USGS Quadrangle Maps for the State of Colorado.

The proposed project consists of 60 1.5 megawatt (MW) wind turbines for a total output capacity of 90 MW of renewable energy. The 1.5 MW wind turbines have a monopole tower design with an 80-meter hub height and 77-meter rotor diameter for a total maximum blade tip height of 117.5 meters. The associated transmission line will run north-south, extending south from the proposed location on the east side of County Road 85 to approximately one-half mile north of County Road 42. The line continues south for 2.5 miles along CR 85, jogs east for 0.3 miles at CR 38, and then continues south along CR 87 for 3.0 miles, terminating just south of State Highway 6. The line will connect into the existing Sterling-Frenchman Creek 115-kv transmission line.

The project will require the installation of two electrical substations with approximate footprints of 5 acres each and an operations and maintenance facility with an approximate footprint of 1 to 2 acres to include a warehouse-type structure of an undetermined size. Depending on where these structures are located, there will also be associated access roads.

SITE CHARACTERIZATION

The proposed wind site comprises nearly 9,500 acres of primarily pasture and grasslands. Elevation ranges from approximately 4,070 feet to 4,215 feet above mean sea level. The area is a mix of virtually uninterrupted sections delineated by unpaved county roads along section lines. The homes, outbuildings, and metal stock ponds of the private lands are widely dispersed. Other structures include about half a dozen abandoned farm sites. Barbed wire fences surround most of the fields within the project area.

HABITAT

The project area is in the Lower South Platte River watershed of the central shortgrass prairie ecoregion of the United States (Hazlett 1998) and the southern portion of the Great Plains-Palouse Dry Steppe Province (Bailey 1995). The project area's rolling terrain is formed by a series of roughly east-west trending ridges separated by swaths of upland grasses and agricultural fields. A shift in plant species composition from grassland to sandsage prairie is associated with shifts in topography from the flat fields to the sides and tops of ridges. Moisture regime is limited due to the rain shadow effect created by the Rocky Mountains (Hazlett 1998).

Over the past 100 or more years since settlement, the landscape has shifted from intact shortgrass prairie to pasture and agricultural lands with remnants of shortgrass prairie in level, low-lying areas and remnants of sandsage prairie on ridges. Since 1986, much of eastern Colorado's lands have been enrolled in the Natural Resource Conservation Service's Conservation Reserve Program (CRP) program, which offers payments to farmers that remove land from annual crop production in order to lessen erosion and water-quality problems on a long-term basis. The property's only wetlands are playas (natural dry lakebeds that contain water temporarily), and man-made stock ponds for cattle and horses. Moisture also accumulates seasonally in scattered, shallow, lowland areas.

Due to various habitat conversions taking place since the time of settlement including agriculture, grazing, and CRP plantings, the project area supports lower biodiversity than it did prior to settlement. No federal or state-listed sensitive plant species occur within the project area. Plant nomenclature follows Weber and Wittman (2001).

Habitat Types in the Project Area

Five major habitat types characterize the proposed project area. Habitat types are described in more detail below.

Agricultural

Agricultural habitat is characterized by open fields with flat or gently rolling topography. In the project area this habitat is typically a cropland of vegetables such as corn or a cultivated field of grains such as wheat (Photograph 1).

CRP Land

Within the project area, large expanses of CRP-planted reclamation species such as smooth brome (*Bromopsis inermis*), switchgrass (*Panicum vergatum*), Indian ricegrass (*Achnatherum hymenodies*), sand bluestem (*Andropogon hallii*), and western wheatgrass (*Pascopyrum smithii*) dominate. Sand dropseed is the dominant naturally-occurring grass species (Travis McCay, personal communication, May 2008). Sand dropseed dominated habitat occurs on open flat areas with sandy, well-draining soils. In many disturbed areas such as roadsides and along fencelines, sand dropseed occurs with smooth brome and less frequently with cheatgrass (*Anisantha tectorum*).

Grassland

Grasslands are flat or gently rolling plains dominated by grass species with some forb and shrub species. The project area's dominant grassland habitats are sand dropseed (*Sporobolus cryptandrus*), sandsage prairie, and pasture land (Photographs 2-5). Remnant shortgrass prairie, dominated by blue grama (*Bouteloua gracilis*), sand dropseed, and buffalograss (*Buchloe dactyloides*), occurs in patches throughout and at the base of sandsage prairie ridges. Blowout grass (*Redfieldia flexuosa*) habitat exists adjacent to the project area.

Forbs are scarce but include purple prairie clover (*Dalea purpurea*), chamomile (*Anthemis* sp.), purple mustard (*Chorispora tenella*), and alfalfa (*Medigaco sativa*). The dominant sub-shrub is sand sagebrush (*Artemisia filifolia* [*Oligosporus filifolius*]).

Historically, sandsage prairie on Colorado's eastern plains was dominated by sand sagebrush. Associated grass, forb, and shrub species included Indian ricegrass, sand dropseed, sand bluestem, prairie sandreed (*Calimovilfa longifolia*), blowout grass, little bluestem (*Schizachyrium scoparium*), lemon scurfpea (*Psoralidium lanceolatum*), and rabbitbrush (*Chrysothamnus* sp.) (EPA undated). In the project area, due to the prevalence of CRP-planted grasses and other changes to the landscape, sand sagebrush prairie is restricted to ridges. In flatter areas,

sandsage prairie begins to co-occur with grasses including sand dropseed, switchgrass, and little bluestem. Some yucca (*Yucca glauca*) and skunkbrush (*Rhus aromatica* var. *trilobata*) shrubs were observed.

Pastures of grazed grasslands are characterized by open areas and short vegetation. Finally, blowout grass is native to the eastern plains, grows on sandy soil, and is not preferentially grazed by cattle. Patches of blowout grass inhabit areas just outside project boundaries.

With the exception of cheatgrass, very few noxious weeds or introduced species occur on site. In areas of higher disturbance such as roadway edges and adjacent field edges, species diversity tends to be lower with weedy species such as smooth brome dominating. Areas with discontinued human activities, such as abandoned farmsteads, tend to have a greater diversity of weeds including cheatgrass, Russian thistle (*Salsola* sp.), and purple mustard (*Chorispora tenella*).

Shelterbelt

Shelterbelts or windbreaks are characterized by trees and shrubs planted to protect downwind habitat. In the project area, shelterbelts are planted in closely spaced rows between fields or grasslands, or they are planted in groves around homesteads for wind protection or privacy. Dominant tree species include plains cottonwood (*Populus deltoides*), Siberian elm (*Ulmus pumila*), juniper (*Juniperus* sp.), ponderosa pine (*Pinus ponderosa*), and skunkbrush (Photographs 6-7).

Playas

Project area surface water is present only as playas, also called prairie potholes or eastern plains depressional wetlands. Playas are seasonally wet shallow depressions with a ring of riparian vegetation often dominated by sedges (*Carex* sp.) and rushes (*Juncus* sp.) with other species including western wheatgrass, blue grama, common dandelion (*Taraxacum officinale*), and salsify (*Tragopogon dubius*). Playas can be excellent stopovers for migratory birds when water is present (Photograph 8). Three playas were identified during a previous site assessment:

- A playa was identified immediately east of County Road 89, in the NW ¼ of the NW ¼ of Section 16;
- A playa was identified just southeast of the intersection of County Road 85 and County Road 40 in the NE ¼ of the NE ¼ of Section 36; and
- A playa was observed further south on the west side of County Road 85 opposite from the proposed interconnection transmission line (NE ¼ of Section 36).

All three playas are outside the project area.

METHODS

Habitat mapping field work was conducted on July 17, and a swift fox den survey was conducted with CDOW personnel on July 18, 2008. The purpose of these visits was to map the project area's dominant habitat types and to determine if swift foxes or their habitat is present in the project area. The surveys consisted of observing parcels on foot, driving along the proposed transmission line route on existing two-tracks or dirt roads, and surveying interior portions of the project area on all-terrain vehicles. Frequent vehicle stops were made to note relevant observations. Photographs taken during these and previous surveys were used to generate a photographic log documenting habitat types, specific wildlife habitat, and other areas of interest (Photographs 1 – 11).

Results

Five habitat types including agricultural lands, CRP lands, grasslands, shelterbelts, and wetlands were identified and mapped (Figure 2). All of these habitats are characteristic of Colorado's eastern plains post-settlement landscape.

During the current field effort no swift foxes were observed and no dens were detected. On July 18, 2008 a small black-tailed prairie dog (*Cynomys ludovicianus*) colony (roughly 150 meters by 200 meters in size) was found east of the transmission line. Associated with this colony, a family of burrowing owls (*Athene cunicularia*) comprising six or seven individuals was observed (Figure 2). Burrowing owls are listed as endangered by the state of Colorado (http://wildlife.state.co.us March 26, 2008).

An ornate box turtle (*Terrapene ornata*) was observed in grazed short-grass prairie (Photograph 11). This species has experienced declines due to habitat loss as a result of cultivation, as well as the illegal collection of animals for pets and motor vehicle collisions. It is not a species of special concern, and its presence is a result of the presence of remnant native habitat.

Discussion and Conclusion

Habitat mapping confirms that the project area contains habitats typical of the eastern prairies of Colorado, where cultivation and subsequent CRP conversion has occurred, and where remnants of native grassland and sandsage prairie remain. Wildlife species such as swift foxes, black-tailed prairie dogs, and burrowing owls are adapted to these habitats and benefit from the relative lack of disturbance that occurs in pasture lands and agricultural areas compared with urban landscapes.

Swift foxes inhabit short and mixed-grass prairies throughout eastern Colorado. Although swift fox dens were not observed, suitable habitat occurs in the project area in the form of remnant short-grass prairie and grazed areas.

Burrowing owls generally prefer shortgrass prairie associated with black-tailed prairie dog colonies, as they often nest in burrows within an active colony (Photograph 9-10). In Colorado, burrowing owls begin breeding in mid- to late March, they nest a few weeks later, and nests with above ground young appear between late April and mid August (Kingery 1998). In an effort not to interfere with burrowing owl and prairie dog activity, a GPS reading of the area was taken from the two-track under the existing power line and Google Earth was used to estimate the center of the burrowing owl activity east of the transmission line.

To protect burrowing owl habitat CDOW enforces a seasonal restriction between March 15 and October 31 allowing no human encroachment within 150 feet (46 meters) of burrowing owl nest sites. Future burrowing owl surveys may be recommended to ascertain the continued presence of burrowing owls in the area. These can readily be conducted as part of pre-construction fieldwork planned in the project area.

References

Bailey, R.G. 1995. Description of the Ecoregions of the United States. 2d ed. Rev. and expanded (1st ed. 1980). Miscellaneous Publications. 1391 (rev.). Washington, DC: USDA Forest Service. 108 p. with separate map at 1:7,500,000.

Colorado Division of Wildlife (CDOW). March 26, 2008. Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors. http://wildlife.state.co.us.

Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. University Press of Colorado and Denver Museum of Natural History. 467pp.

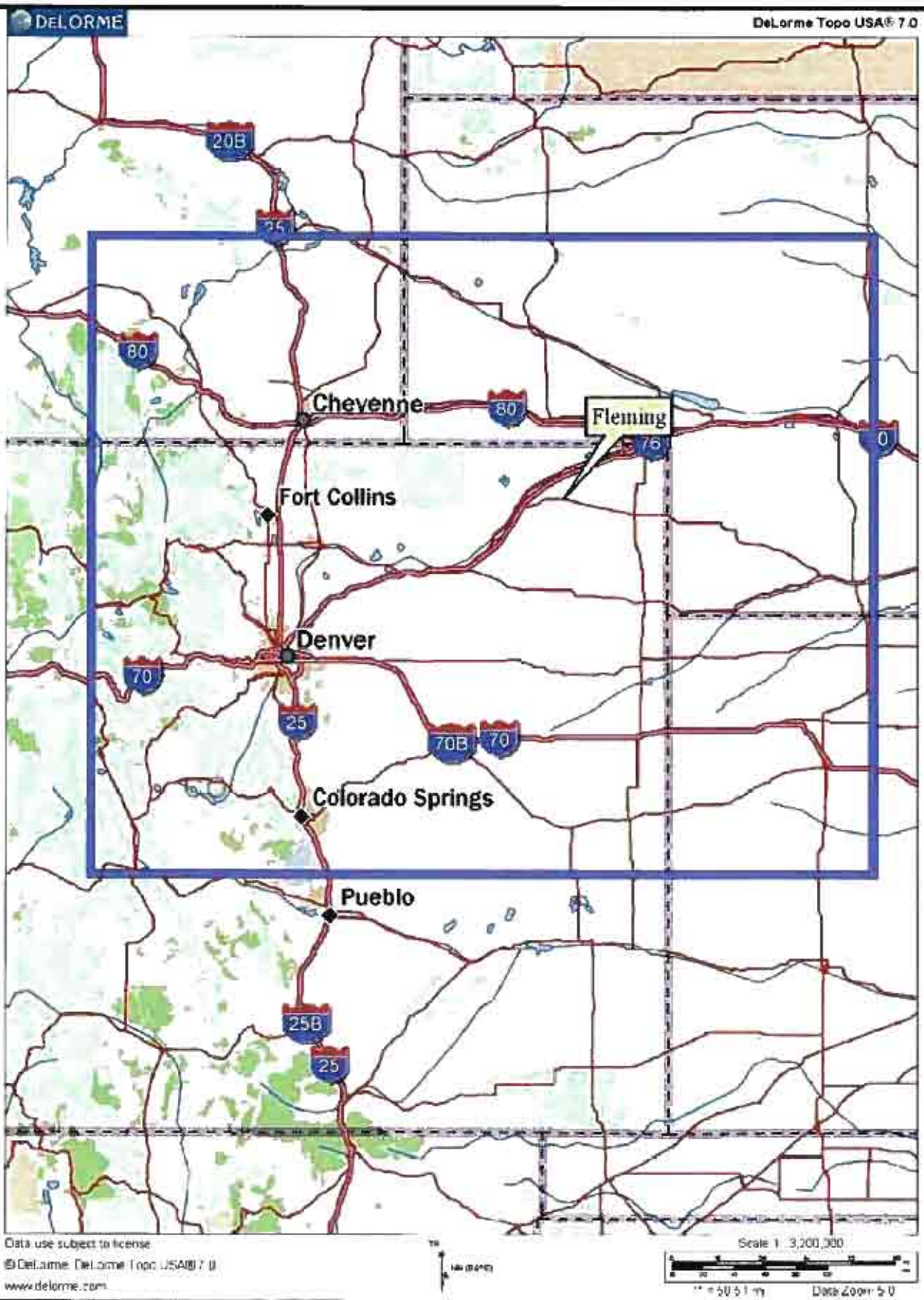
Hazlett, D.L. 1998. Vascular Plant Species of the Pawnee National Grassland. Rocky Mountain Research Station: General Technical Report RMRS-GTR-17

Kingery, H.E. 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife.

Martin, J.D., G.C. White, and F.M. Pusateri. 2007. Occupancy rates by swift foxes (*Vulpes velox*) in eastern Colorado. Southwestern Naturalist 52:541-551.

U.S. Environmental Protection Agency (EPA). Date unknown. Ecoregions of Colorado. ftp://ftp.epa.gov/wed/ecoregions/co/co_front.pdf

Weber, W.A., and R.C. Wittman. 2001. Colorado Flora: Eastern Slope. University of Colorado Press. Third Edition.



ENVIRON

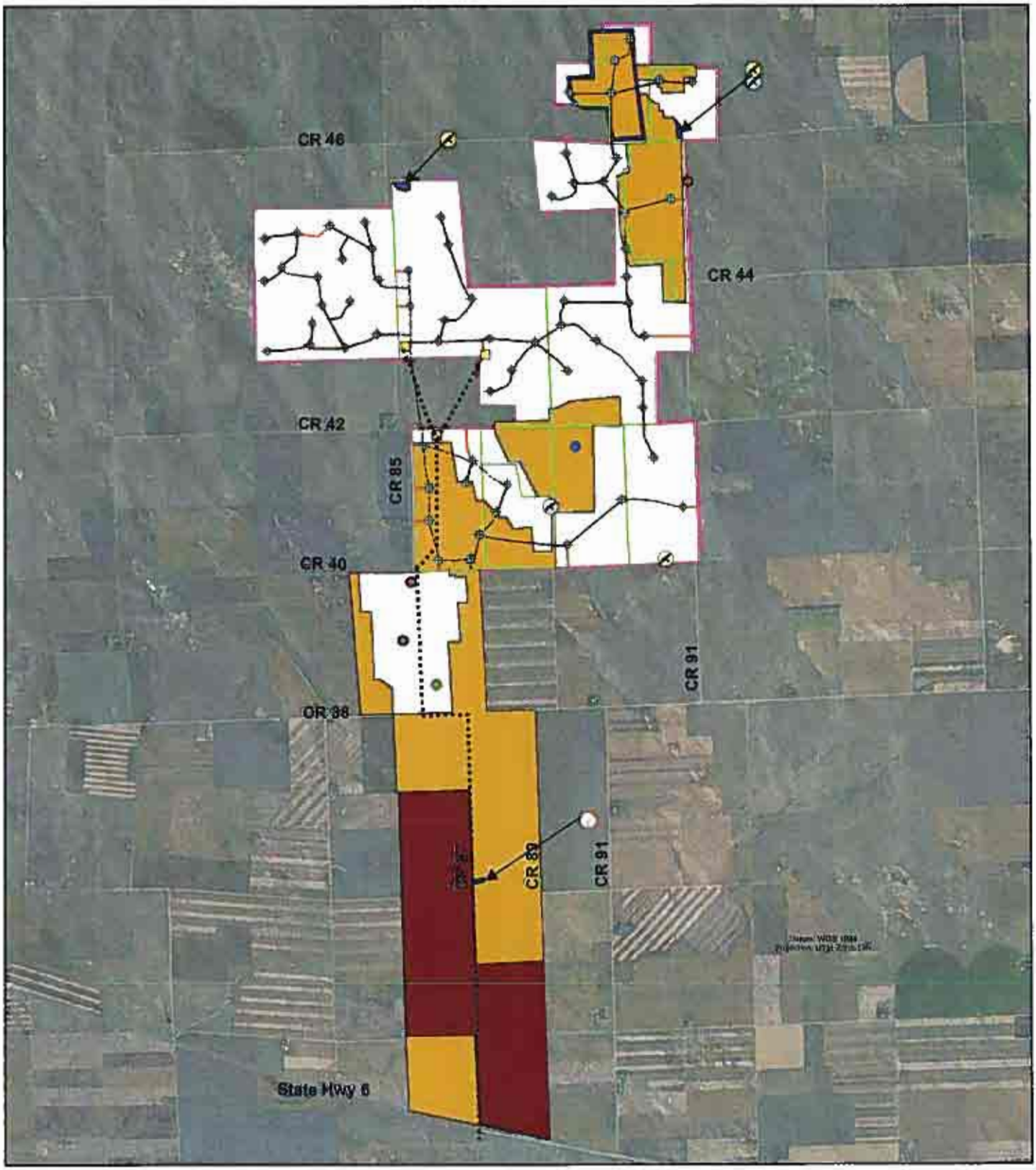
SITE LOCATION MAP
FLEMING WIND PROJECT

Figure
II-1

Drafter: APR | Date: 12/14/07 | Contract Number: | Approved: | Revised:

R:\Client Project Files\Fleming Wind Project\Figures\II-1_Site Location Map 1(2).dwg

Figure 2. Colorado Highlands Wind Project
Habitat Mapping



ENVIRON

Walsh

- Active Raptor Nest
- Inactive Raptor Nest
- Great Horned Owl Roost
- Greater Prairie Chicken Lek
- Burrowing Owl Family and Prairie Dogs
- Playa
- Substations
- Agricultural
- CRP Lands
- Grassland
- Shelterbelt
- Transmission Line
- Wind Turbine
- Powerline
- Roads
- Land Ownership
- Project Boundary

N

0 0.25 0.5 1 Miles

PHOTOGRAPHS

Photograph 1: Agricultural corn field (on right).

Photograph 2: CRP planted sand dropseed and sandy soil, with smooth brome in foreground. The blades of sand dropseed get shredded in the open windy habitat of Colorado's eastern plains.

Photograph 3: Sandsage prairie (left and background on ridge) and sand dropseed grassland (right and foreground).

Photograph 4: Blowout grass naturally occurs in large patches and is not used as foraged by cattle.

Photograph 5: Grazed grassland in foreground and sandsage prairie in background on ridge.

Photograph 6: Shelterbelt comprising a row of junipers (out of photograph), a row of Siberian elms (at left), a two-track grown in with grass species, and a row of skunkbrush shrubs.

Photograph 7: Shelterbelt of Plains cottonwoods with sand dropseed in the foreground.

Photograph 8: Wetland habitat - a Playa or eastern plains shallow depression.

Photograph 9: Burrowing owl perched above prairie dog colony along proposed transmission line route.

Photograph 10: An individual from a burrowing owl family inhabiting an active prairie dog colony east of proposed transmission line.

Photograph 11: Ornate box turtle in a grazed shortgrass prairie area.

Addendum to Habitat and Wildlife Assessment and Habitat Mapping Reports

Colorado Highlands Wind Energy Project, Logan County, Colorado

November 11, 2008

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INTRODUCTION

Colorado Highlands is proposing to construct a wind farm, the Fleming Wind Energy Project (project), to be located in Logan County, Colorado. Walsh Environmental Scientists and Engineers, LLC (Walsh) prepared this report to provide information that became available after preparation of the *Habitat and Wildlife Assessment* (dated September 9, 2008) and *Habitat Mapping* (dated September 10, 2009) reports. Specifically, the present report updates existing information as a result of additional field work and GPS readings, as well as mapping changes. The main components of this addendum are:

Field Work

- An additional 200 acres added to the project had habitat mapping and raptor nest searches conducted;
- Additional raptor nest surveys conducted to encompass 0.5 miles outside the project perimeter;
- Investigation of a purported golden eagle nest; and
- A site visit to the small prairie dog colony near the transmission line;
- The additional 6-acre Wildhorse Creek switchyard area added to the project had habitat mapping and raptor nest searches conducted.

GPS/Mapping

- Lands that had previously been mapped and were recently excluded from the project; and
- Additional GPS readings were collected for raptor nests and tree clumps.

Changes in Infrastructure

- Rather than two substations on site, there is only one on site and a second one at the interconnection with the Sterling-Frenchman Creek 115-kV transmission line.

PROJECT LOCATION AND DESCRIPTION

The project is located in Logan County, Colorado, northeast of the town of Fleming and south of the South Platte River floodplain (Figure 1). Geographically, it is located on the Crook, Fleming, Haxtun West, and Tamarack Ranch USGS Quadrangle Maps for the State of Colorado in the following Township, Ranges, and Sections:

Crook Quadrangle, T9N, R49W, S13; T9N, R48W, S18

Fleming Quadrangle, T9N, R48W, S19, 30; T9N, R49W, S24

Haxtun West Quadrangle, T9N, R48W, S17, 20-22, 24, 29

Tamarack Ranch Quadrangle, T9N, R48W, S2, 3, 4, 8-15, 17

The proposed project consists of 60 1.5 megawatt (MW) wind turbines for a total output capacity of 90 MW of renewable energy. The 1.5 MW wind turbines have a monopole tower design with an 80-meter hub height and 77-meter rotor diameter for a total maximum blade tip height of 117.5 meters. The associated transmission line will run north-south, extending south from the proposed location on the east side of County Road 85 to approximately one-half mile north of County Road 42. The line continues south for 2.5 miles along CR 85, jogs east for 0.3

miles at CR 38, and then continues south along CR 87 for approximately 2.5 miles, terminating just south of State Highway 6 at the Wildhorse Creek switchyard. The line will connect into the existing Sterling-Frenchman Creek 115-kV transmission line.

The project will require the installation of one electrical substation onsite with an approximate footprint of one acre, the Wildhorse Creek substation south of Highway 6, and an operations and maintenance facility (warehouse-type structure) with an approximate footprint of 1 to 2 acres. Depending on where these structures are located, access roads might also be needed. Figure 2 illustrates the project site boundary and associated transmission line and proposed substation location relative to roads and other features.

Site Characterization

The proposed wind site comprises nearly 4,500 acres (Figure 2). Acreage south of the project area, for the transmission line Right-of-Way (ROW) and 0.5 miles adjacent to it is primarily CRP land. The combined parcels total 9,500 acres. The elevation ranges from approximately 4,070 feet to 4,215 feet above mean sea level. The area is a mix of virtually uninterrupted sections divided by unpaved county roads along section lines. The homes, outbuildings, and metal stock ponds on private lands are widely dispersed. Other structures include about half a dozen abandoned farm sites. Barbed wire fences surround many of the fields within the project area.

Conservation Reserve Program (CRP) grasses (planted as part of the Natural Resources Conservation Service's program) are prevalent in the northeastern and southeastern portions of the site. Agricultural activity is present, as evidenced by cultivated fields. Grazing, as evidenced by the presence of livestock and cropped vegetation, also occurs in the project area.

Methods

Because an eagle nest was reported by landowners, a field site visit was conducted on August 12, 2008. The site was located, observations were made, and GPS location and photographs were taken.

Two hundred acres were added to the project, and a perimeter boundary search for raptor nests was needed to ensure that no turbines encroached within a 0.5 mile buffer. On September 2, 2008, a team went out to conduct habitat mapping on this parcel, and to search for raptor nests within 0.5 miles of the project boundary. Binoculars were used to search for raptors on the wing and for nests on the ground and in trees. Because young have fledged and raptors don't associate with their nest during the fall months, activity could not be determined. For each nest, the location was recorded on a Garmin Map 60 GPS, documented, and digitized using ArcMap GIS software (Figure 2).

Another site visit was made on September 19, 2008, to calibrate bat acoustical monitoring equipment (to be reported on subsequently) and to collect additional GPS points from a clump and a strip of trees where raptor nests had been sighted on the site visit of September 2, 2008. At this time, the perimeter of the prairie dog colony by the transmission line was delineated using a Garmin Map 60 GPS.

An additional site visit was made on October 30, 2008 to complete habitat mapping southwest of the intersection of Highway 6 and County Road 87 in the 6-acre switchyard area, the area planned for substation construction. This area was also search for raptor nests.

Maps were revised to reflect these changes and new GPS locations.

RESULTS

The additional 200 acres comprises grassland and two small shelterbelt inclusions along County Road 42. It is surrounded by a large area of grassland habitat. The 6-acre Wildhorse Creek switchyard area consists of CRP planted grasses (Photograph 5). These updates are reflected in the revised habitat map, as is the omission of areas that are no longer included in the project area (Figure 2).

Raptor nest surveys on the 200 acres and perimeter resulted in nine additional raptor nests located in three areas. These raptor nests are all marked as "Fall Raptor Nests". It is not known if they are active or not because the survey was conducted subsequent to the nesting season (Figure 2). No raptor nests were found in the switchyard area.

Six nests were found in the easternmost shelterbelt within the 200 acre area. One nest was found north of the intersection of County Roads 85 and 42 within the 0.5 mile perimeter (near Turbine 53). Two nests were found northwest of the project boundary along County Road 85 in a strip of trees. There were three more nests found in this strip of trees, but they were outside the 0.5 mile perimeter. Mapping also includes those active and inactive nests found during spring nesting surveys.

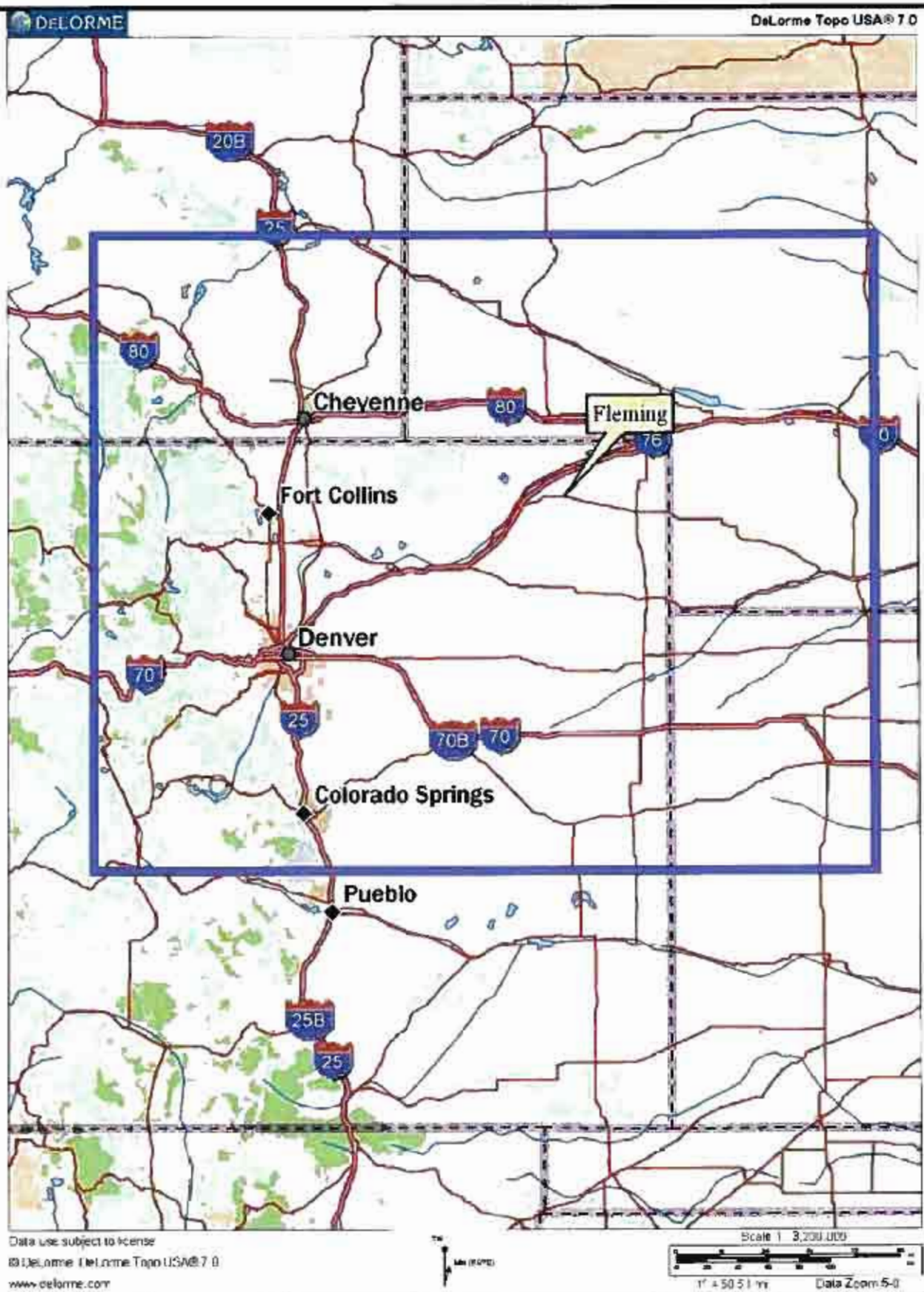
The purported golden eagle nest was visited. This nest had collapsed on the ground, under the tree in which it had been built originally (Photograph 1). Golden eagles will nest in trees on the plains, and residents in the area indicated having observed eagles. Although this nest is clearly not active now, it may have been in the past. Adjacent to it, in another tree, was a Swainson's hawk nest (Photograph 2). Although no young were present, the two adults were in view and stayed in the area. This behavior indicates that they reared a brood at this site in the spring and early summer. This adds one raptor nest to the nine described above.

A GPS polygon was created around the small prairie dog colony near the transmission line. Burrowing owls were present, as they had been earlier in the season (Photographs 3 and 4).

The CDOW letter (in *Wildlife and Habitat Assessment* report) and meeting resulted in a large number of recommendations. For raptors, the CDOW recommends a 0.25 mile buffer from nest sites (active and inactive) and no construction during nesting season (mid-February through mid-July). CDOW recommends no development activity within 150 feet of active burrowing owl nest sites between March 15 and October 31. Spring surveys are recommended to determine if burrows are occupied.

SUMMARY

This addendum serves to describe additional field work and results from a 200-acre parcel and the 6-acre Wildhorse Creek switchyard area that were added to the project area; raptor nest searches along the perimeter of the project boundary, on the 200-acre parcel, and on the switchyard; the evaluation of a purported golden eagle nest; and a visit to the small prairie dog colony along the transmission line. The 200 acres was mapped as grassland and shelterbelt habitat and the 6-acre switchyard was mapped as CRP land. Ten new raptor nests within the project boundary and a 0.5 mile buffer have been added to the mapping as a result of the perimeter nest search. These include six nests in one shelterbelt, two nests in another shelterbelt (with an additional three nests not counted because they were outside the 0.5 mile buffer), a single nest near turbine 53, and a Swainson's hawk nest by a purported golden eagle nest. The golden eagle nest was found to be collapsed and on the ground, no eagles currently nest in the project area. No raptor nests were found on the 6-acre switchyard. Burrowing owls were present at the prairie dog colony along the transmission line; additional GPS readings were collected to define a polygon around the colony.



ENVIRON

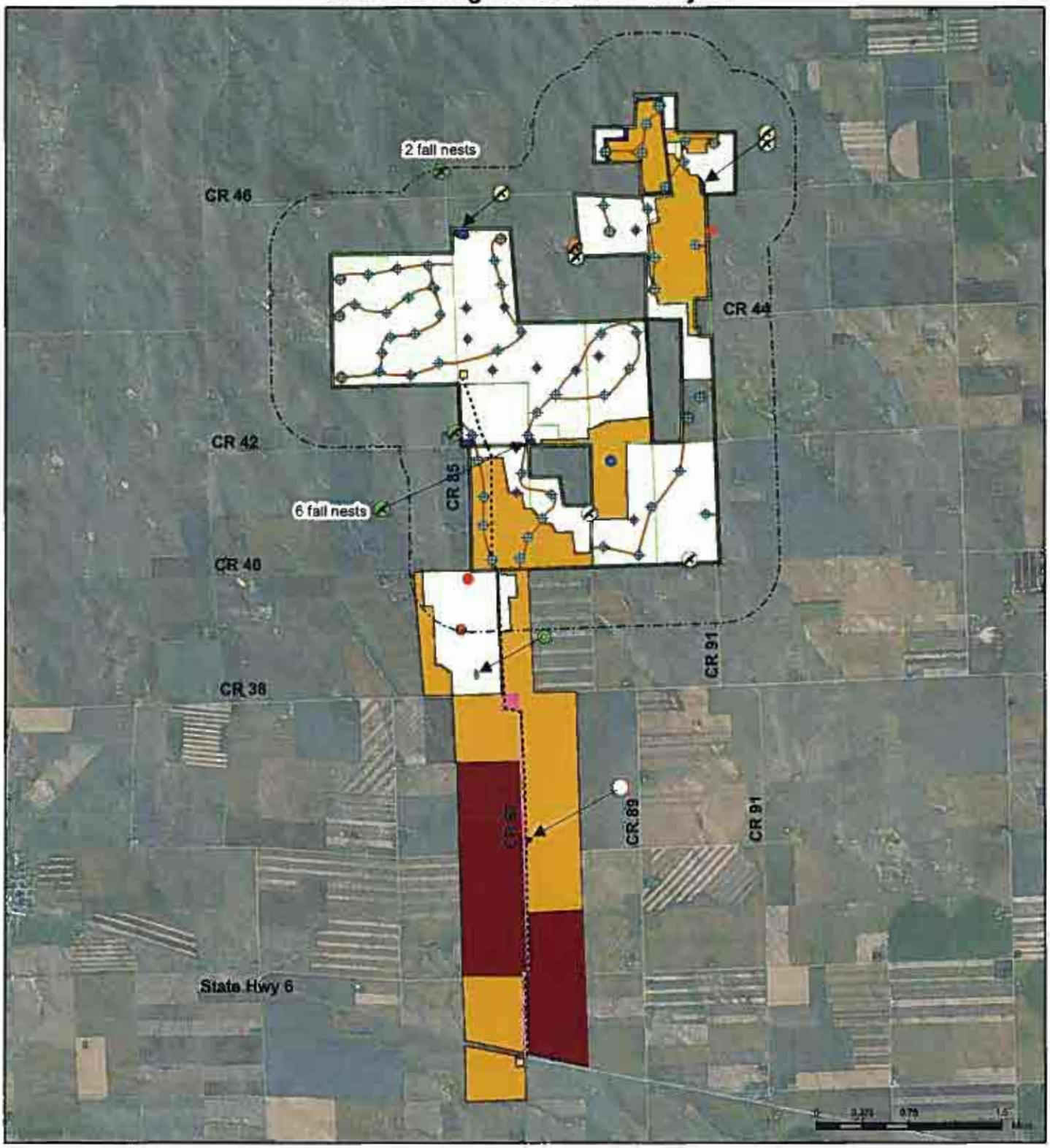
SITE LOCATION MAP
FLEMING WIND PROJECT

Figure
1

Drafter: APR | Date: 12/14/07 | Contract Number: | Approved: | Revised:

R:\Client Project Files\Fleming Wind Project\Figures\fig-1. Site Location Map (2).dwg

Figure 2. Raptor Nest Locations and Habitat Mapping Addendum
Colorado Highlands Wind Project



ENVIRON

Walsh

Wind Turbine
Optional Wind Turbine
Transmission Line
Roads
Project Boundary
0.5 Mile Project Boundary Buffer
Land Ownership
Substation
Transmission Line Easement

Active Raptor Nest
Inactive Raptor Nest
Fall Raptor Nest
Collapsed Golden Eagle Nest
Great horned owl roost
Prairie dogs and burrowing owl group
Greater Prairie Chicken Lek

Habitat Types
Playa
Agricultural
CRP Lands
Grassland
Shelterbelt

N
W
E
S

Datum: WGS 1984
Projection: UTM Zone 13N

PHOTOGRAPHS

Photograph 1: Collapsed golden eagle nest that fell from an adjacent tree. Residents had mentioned observing golden eagles in the past but this nest site is no longer in use.

Photograph 2: The active Swainson's nest located next to the collapsed golden eagle nest. This nest was active.

Photograph 3: Three burrowing owls on the prairie dog colony near the transmission line.

Photograph 4: Burrowing owl on the utility line over the prairie dog colony.

Photograph 5: CRP planted grasses in 6-acre Wildhorse Creek switchyard area.