FINAL
AVIAN PROTECTION PLAN
POWDER RIVER ENERGY CORPORATION

Submitted to:

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Prepared by:

EDM International, Inc.

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List of Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BFD	Bird Flight Diverter
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
ER	Environmental Report
ESA	Endangered Species Act
EWT	Endangered Wildlife Trust
FWP	Fish, Wildlife & Parks (Montana)
GAP	Gap Analysis Program
GFD	Game and Fish Department (Wyoming)
GIS	Geographic Information System
kV	kilovolt
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NSP	Northern States Power
PRECorp	Powder River Energy Corporation
PVC	polyvinyl chloride
ROW	right-of-way
ROWs	rights-of-way
RUS	Rural Utilities Service
SFD	Swan Flight Diverter
SVD	Spiral Vibration Damper
T/E	threatened or endangered
U.S.	United States
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet

1.0 INTRODUCTION

Powder River Energy Corporation (PRECorp) is a member-owned electric cooperative serving more than 12,000 customers in a 16,200 square mile area in northeastern Wyoming and a small portion of south-east Montana. PRECorp operates over 10,000 miles of distribution lines servicing Campbell, Crook, Johnson, Sheridan, and Weston counties in Wyoming, and Bighorn, Powder River, and Rosebud counties in Montana. PRECorp is a member of the Wyoming Rural Electric Association, the National Rural Electric Cooperative Association, and also is a member of a nationwide consortium of Touchstone Energy Cooperatives.

PRECorp is proactively working toward protecting bird species on its system. In support of this objective, PRECorp developed its first Avian Protection Plan (APP) in 2005 to minimize potential electrocution hazards for birds on its existing power grid in accordance with the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and Endangered Species Act (ESA). In 2008 PRECorp developed a Sage-Grouse Protection Plan (PRECorp 2008). PRECorp also participates on the Wyoming Governor's Sage-Grouse Implementation Team. As new information and recommendations emerge, PRECorp will incorporate these and revise its existing Sage-Grouse Protection Plan.

In 2005, the Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (USFWS) developed Avian Protection Plan Guidelines to assist utilities in creating an APP that will best fit its needs while furthering the conservation of avian species. An APP is a utility-specific document that delineates a program designed to reduce the avian risks resulting from avian interactions with electric facilities (APLIC and USFWS 2005). As an ongoing commitment to protect bird species, PRECorp is updating and expanding its existing APP to adhere to the APLIC and USFWS Guidelines. The APP incorporates the following key elements:

- Corporate Policy
- Training
- Permit Compliance
- Construction Standards
- Nest Management
- Avian Reporting System
- Risk Assessment Methodology
- Mortality Reduction Measures
- Avian Enhancement Options
- Quality Control
- Public Awareness
- Key Resources

As part of PRECorp's 2005 APP, EDM International, Inc. (EDM) examined a sample of distribution structures and identified pole configurations that presented risks to perching raptors and other large birds within PRECorp's service territory. The field examinations documented at-risk structures based on specific electrical configurations relative to pole location, habitat type, topography, and bird use. Field results were compiled to identify retrofitting options and to develop a prioritization list for PRECorp, in order to provide short-term and long-term plans for bird protection. This approach allows PRECorp to pursue the retrofitting procedures according to their long-term maintenance program. The initial APP also identified areas of potential future outages, thereby increasing the

electrical reliability of the system.An effective avian protection program requires three key components (Figure 1-1). The first component requires avian-friendly construction standards to minimize risks to birds on newly constructed facilities. Another component is a proactive program to identify and correct problems before they occur through a risk assessment. Finally, a reactive component is required to respond effectively to existing problems.

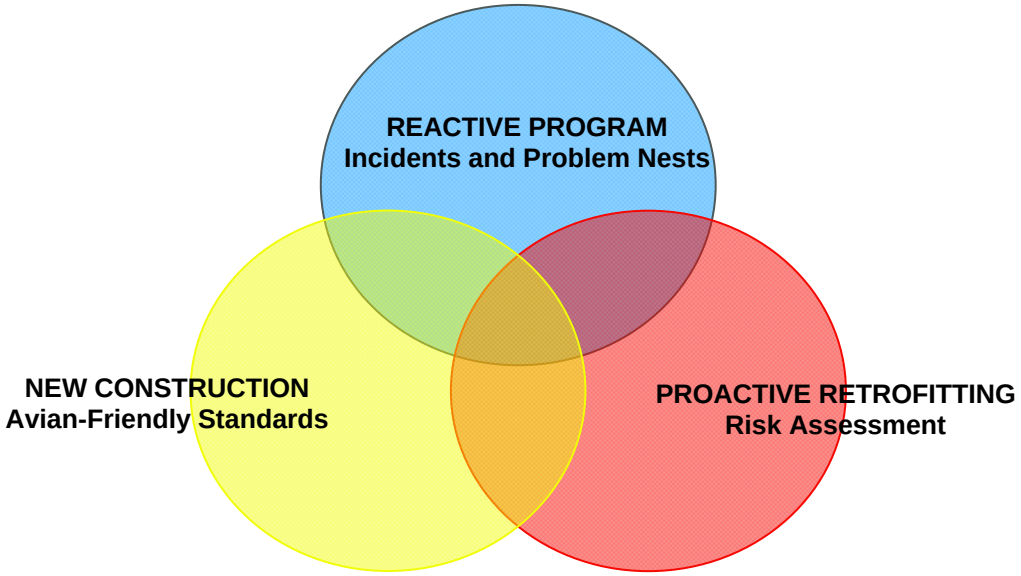

Figure 1-1 Primary Components of an Avian Protection Plan

This APP is designed to provide a single resource for power line activities relating to avian protection for PRECorp's management and field personnel. This document addresses avian protection issues, the regulatory context for avian protection, regulatory compliance procedures, training programs in avian protection, and various avian protection strategies.

For programmatic questions regarding the APP, please contact:

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Other key PRECorp contact personnel related to implementation of this APP are included in Appendix A.

2.0 CORPORATE POLICY

PRECorp's Mission Statement describes the company's core purpose and focus:

> *Powder River Energy Corporation, an electric cooperative, will deliver high quality, low cost service to its member-owners while embracing its cooperative principles and values.*

PRECorp developed the following policies to ensure correct implementation of its APP and to facilitate internal communication among PRECorp's personnel.

- PRECorp will comply with relevant safety and environmental laws and regulations to aid in protecting the health and safety of employees, the public, and wildlife.

- PRECorp will implement this APP to reduce the risk of injury or mortality to raptors and other migratory birds from interactions with company-operated power lines.

- PRECorp will continually consider new technologies, systems, and methods of organization that enhance its ability to achieve these business, safety, and environmental objectives.

- PRECorp will periodically review its goals to ensure the needs of its employees and the public are addressed.

- PRECorp will continue to commit resources to balance its goal of providing reliable electrical service in a cost-effective manner with the regulatory requirements protecting avian species (as well as the need to obtain and comply with the necessary permits), monitor incidents of avian mortality, and make reasonable efforts to construct and alter infrastructure to reduce the incidence of avian mortality.

PRECorp is a Rural Utilities Service (RUS) member. RUS financing of project proposals constitutes a "federal action," which in accordance with the National Environmental Policy Act (NEPA) requires RUS to consider the environmental effects of its action on the human environment prior to taking that action. Accordingly, PRECorp works closely with RUS to integrate environmental compliance, including raptor protection into environmental review documents prepared as part of its NEPA compliance.

Regulatory compliance will be enhanced and the risk to birds reduced by the proactive steps of this APP, further demonstrating PRECorp's commitment to protecting raptors and other migratory birds.

3.0 REGULATORY CONTEXT

3.1 Federal Requirements

The three main federal laws protecting birds are:

(1) Endangered Species Act (ESA)
(2) Migratory Bird Treaty Act (MBTA)
(3) Bald and Golden Eagle Protection Act (BGEPA)

When protected species are injured or killed by any unauthorized human activity, the penalties of the applicable laws may be enforced at the discretion of the USFWS. PRECorp's Wyoming and Montana operations are located in the USFWS Region 6 (headquartered in Denver) (Figure 3-1). Refer to Appendix B for specific agency contact details.

Figure 3-1 PRECorp Operates in USFWS Region 6

PRECorp is proactively working with federal and state agencies to minimize avian mortality and injury by updating and expanding its APP. It is important for PRECorp's personnel to be aware of and comply with these laws and applicable permit conditions, including reporting fatalities of a bird species protected under the MBTA, ESA, or BGEPA to PRECorp's APP Coordinator. The APP Coordinator's office will coordinate directly with the USFWS (see Chapter 8.0, Management Procedures). Each of these federal laws is discussed in detail below.

3.1.1 Endangered Species Act (ESA)

Special protection is given to threatened or endangered (T/E) species under the ESA. See Section 6.1.2, Federally and State-Listed Species, for a complete list of federally protected bird species found in the PRECorp service territory.

This law protects fish, wildlife, and plants that are federally listed as endangered or threatened. The ESA makes it illegal to import, export, take, transport, sell, purchase, or receive in interstate or foreign commerce any living or dead species listed as endangered or threatened. "Take" under the ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct with a listed species. Violations may include significant habitat modification or degradation that impairs essential behavioral patterns such as breeding, feeding, or sheltering and results in wildlife death or injury.

Maximum penalties (misdemeanor) for violations include fines up to $200,000 per organization and up to 1 year of imprisonment. Vehicles and equipment also can be confiscated.

In the 1982 amendments to the ESA, Congress established a mechanism under Section 10a(1)(B) authorizing the USFWS to issue a permit for the "incidental take" of federally listed species. This incidental take authorization allows the permit holder to proceed with an activity that is legal in all other respects, but results in the "incidental" taking of a listed species. The ESA defines "incidental take" as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

3.1.2 Migratory Bird Treaty Act (MBTA)

The MBTA protects the majority of birds in the U.S., with the exception of non-native species (e.g., house sparrow, European starling, rock pigeon, monk parakeet, Eurasian collared-dove) and non-migratory species (e.g., game birds including wild turkey, grouse, and quail). The purpose of the MBTA is to afford protection to migratory birds, their parts, nests, and eggs. The list of protected birds is broad. See 50 Code of Federal Regulations (CFR) § 10.13 for a full list of migratory species (http://edocket.access.gpo.gov/cfr_2003/octqtr/pdf/50cfr10.13.pdf).

The purpose of the MBTA is to protect migratory birds, their parts, nests, and eggs. The MBTA states that, unless permitted by regulation, it is unlawful to "pursue, hunt, take,

capture, kill, possess, sell, barter, purchase, ship, export, or import any migratory birds alive or dead, or any part, nests, eggs, or products thereof."

Culpability under the MBTA is strict liability, which means no degree of knowledge of the law has to be proven during prosecution under this law. Migratory bird electrocutions and collisions violate the misdemeanor provisions of the MBTA. For misdemeanors, the penalties include fines up to $15,000 per organization and up to 6 months imprisonment.

3.1.3 Bald and Golden Eagle Protection Act (BGEPA)

Bald and golden eagles, their eggs, and their nests receive additional protection under the BGEPA (16 U.S.C. 668-668d, 54 Stat. 250 and Amendments). The BGEPA states "no person shall take, possess, sell, purchase, barter, offer for sale, transport, export, or import any bald or golden eagle alive or dead, or any part, nests or eggs, thereof without a valid permit to do so."

The BGEPA definition of the term "take" is to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The USFWS published a final rule in the Federal Register (FR 31132 Volume 72, No. 107 June 5, 2007) defining the term "disturb" to mean "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

The USFWS published Final Rules (FR 46836 Volume 74, No. 175) on September 11, 2009, authorizing the issuance of permits to "take" bald eagles and golden eagles on a limited basis. Section § 22.26 governs the issuance of permits to take bald eagles and golden eagles where the take is associated with, but not the purpose of, an activity, and the take cannot practicably be avoided. Most take authorized under this section will be in the form of disturbance, and the USFWS will only authorize take of bald or golden eagles if it can be determined that the take (1) is compatible with the preservation of the bald eagle and the golden eagle and (2) cannot practicably be avoided. Section § 22.27 establishes the issuance of permits for removing eagle nests where (1) necessary to alleviate a safety emergency to people or eagles, (2) necessary to ensure public health and safety, (3) the nest prevents the use of a human-engineered structure, or (4) the activity or mitigation for the activity will provide a net benefit to eagles. Applications for either individual (i.e., one-time) or programmatic (i.e., recurring) permits to take eagles are discussed in Chapter 7.0, Permits.

Culpability for BGEPA violations is knowingly or with wanton disregard for the consequences of their act. Maximum civil penalties for a First Offense – Class A Misdemeanor violation of the BGEPA include fines up to $200,000 per organization and up to 2 years of imprisonment. The maximum criminal penalties for a Second Offense – Class E Felony violation of the BGEPA includes fines up to $500,000 per organization

and up to 2 years imprisonment. Vehicles and equipment also can be forfeited for violations.

3.2 State Requirements

States typically have statutes and regulations that broadly protect all native wildlife species. Fish and wildlife in Wyoming are protected under Wyoming Statutes, Title 23, and in Montana under Montana Statutes, Title 87. In addition to protecting federally listed species within their borders, many states maintain a list for state-listed T/E species. See Section 6.1.2, Federally and State-Listed Species, for a complete list of state-protected bird species found in the PRECorp service territory. Note: although game birds such as the greater sage-grouse and ring-necked pheasant are not protected under the MBTA, they are legally protected by state wildlife laws in Montana and Wyoming.

3.3 Enforcement

Under the ESA, sections 7 and 10 have provisions to allow for the “take” of an individual that is incidental to an otherwise lawful and permitted activity. Take encompasses direct mortality, harming (i.e., injury), and harassing. Likewise, the BGEPA has a process for issuing eagle take permits. The MBTA, however, does not have an "incidental take" provision as part of the permitting process. Therefore, fatalities of birds protected under the MBTA may be considered a take and could result in prosecution.

According to the *Avian Protection Plan Guidelines* (APLIC and USFWS 2005), a company implementing an APP will greatly reduce avian fatality risks, as well as its own risk of enforcement under the MBTA. While the MBTA has no provision for allowing unauthorized take, the USFWS realizes some birds may be killed even if all reasonable measures are taken to protect them. The USFWS 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. Unless a take is authorized, 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, companies, or agencies that take migratory birds without regard for their actions and the law, especially when conservation measures have been developed but are not properly implemented or without following an agreement to avoid take.

3.4 U.S. Department of Agriculture (USDA) Rural Utilities Service Guidelines

PRECorp is a RUS member utility. RUS provides environmental and engineering guidance to its members and requires an Environmental Report (ER) when its borrowers prepare a new Construction Work Plan. The ER lists future construction

projects to be completed by the utility and identifies potential environmental impacts and appropriate mitigating measures, including raptor protection.

In accordance with 7 CFR 1724.52, RUS electric cooperatives are permitted to use structures designed for raptor protection that are in accordance with APLIC's *Suggested Practices for Avian Protection on Power Lines* (2006). Such structures must be in accordance with the National Electrical Safety Code (NESC), unless a specific waiver has been granted. Any deviation from the RUS construction standards for the purpose of raptor protection, which is not in accordance with APLIC's *Suggested Practices* (2006), must be approved by RUS prior to construction. RUS advocates the following measures to curtail raptor electrocutions on distribution poles:

- A minimum of 60-inch horizontal separation of conductors.
- The use of covered/insulated coverings over bare conductors.
- The use of insulated transformer covers and covered/insulated jumpers on equipment poles.

The use of armless construction or undergrounding lines when the above are not feasible is an available alternative. While the aesthetic appeal of underground is clear, the installation and use of underground power cables raises unique engineering issues. These engineering issues, many of which are complex and difficult to analyze, have the potential to create long-term and continuing impacts on the reliability and service life of the utility's distribution system and the user's attached equipment (Baccari 2006).

Additionally, RUS states underground line installation is an economic decision that must be studied and justified by the cooperative. The use of armless construction is discouraged because it may be more unreliable and costly than RUS' preferred standard crossarm construction. RUS will consider the use of armless construction on a case-by-case basis. Questions regarding RUS policy toward raptor protection should be directed to Mr. Dennis Rankin, Environmental Protection Specialist, Engineering and Environmental Staff at (202) 720-1953 or email: drankin@rus.usda.gov.

3.5 RUS Items of Engineering Interest

RUS annually publishes a *Summary of Items of Engineering Interest* for its utility members. These summaries often contain both engineering and environmental information useful to cooperatives. Listed below are electrocution topics contained in its most recent documents:

August 1996 Summary of Items of Engineering Interest
- *Raptor Electrocution on Electric Utility Distribution Overhead Structures*
- *Insulated Distribution Transformer Covers*

August 1998 Summary of Items of Engineering Interest
- *Raptor Protection Video*
- *Raptor Electrocution/Collision Prevention Information*

August 2000 Summary of Items of Engineering Interest

- *Summary: The State of the Art in Raptor Protection – A Historical Perspective*
- *Migratory Bird Treaty Act Enforcement*
- *Raptor Electrocution/Collision Workshops*
- *"Raptors at Risk" Video*

August 2001 Summary of Items of Engineering Interest

- *Raptor Protection Using Steel Poles*

August 2002 Summary of Items of Engineering Interest

- *RUS Raptor Protection Guide Drawings*
- *Raptor Electrocution/Collision Prevention Information*
- *U.S. Fish and Wildlife Service Memorandums of Understanding*
- *Avian Power Line Interaction Committee*

August 2003 Summary of Items of Engineering Interest

- *Narrow Profile Construction Assemblies*
- *USFWS National Wind Turbine Guidance*
- *Avian Protection Plans*

September 2005 Summary of Items of Engineering Interest

- *New Mexico Avian Protection Working Group*
- *RUS APLIC Membership*
- *Avian Power Line Interaction Committee*
- *New Avian Protection Plan Guidelines*
- *RUS Raptor Protection Guide Drawings*
- *Raptor Protection Mitigation Website*

September 2006 Summary of Items of Engineering Interest

- *Raptor Electrocution/Collision Prevention Information*
- *IEEE Wildlife Protective Device Testing Guide*

Appendix C contains pertinent current excerpts pertaining to raptor safety from these summaries.

4.0 AVIAN INTERACTIONS WITH POWER LINES

Rural electrification of the U.S. began in the late 1800s and expanded rapidly. As wires began to span rural areas, avian collisions and electrocutions began to occur. Collisions with rural telegraph wires were first documented in 1876 (Coues 1876).

North American electric utilities focused on raptor electrocutions during the winter of 1970-1971 when numerous eagle deaths resulting from poisoning (n=30+), shooting from aircraft (n=800+), and electrocution or shooting along power lines (n=300+) were recorded in Wyoming and Colorado (Olendorff et al. 1981). The following year, the U.S. Rural Electrification Administration published Bulletin 61-10 to reduce raptor electrocutions, and several electric companies began testing safer power line designs (Olendorff et al. 1981). The new pole-top designs formed the foundation for the first definitive work on raptor electrocutions: *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC 1996). This document was first published in 1975 and revised in 1981, 1996, and 2006. During 1989, nine major electric utilities joined to form APLIC to further study electrocutions and bird collisions (Lewis 1997).

4.1 Electrocutions

Power lines situated in areas with low vegetation and flat terrain are particularly attractive to raptors because they provide structures from which to hunt and roost (Boeker 1972; Benson 1981). Eagles and buteos (soaring hawks) actively use pole structures, particularly in areas where prey is abundant and few other perch sites exist (Olendorff et al. 1981). Pole perches give raptors a wide range of vision and greater attack speed when hunting. Additionally, poles provide a place for raptors to broadcast territory boundaries and find either sun or shade (Colson and Associates 1995). Twelve North American raptor species have been documented nesting on utility structures (Blue 1996); ospreys frequently nest on such structures (Nelson and Nelson 1976; Blue 1996). Smith (1985) observed that eagles and hawks often perch on outer and upper utility tower sections during the day and roost on inner and lower sections during the night.

Some raptors, such as the red-tailed hawk actively seek power line corridors (Ansell and Smith 1980). Although any North American raptor may perch on a utility structure, some rarely do. For example, forest dwelling accipiters such as the Cooper's hawk and sharp-shinned hawk rarely perch on power poles, as they prefer the seclusion and shelter of trees (Olendorff et al. 1981).

Historically, the raptor most commonly electrocuted in North America is the golden eagle (Photo 4-1). In general, golden eagles are electrocuted more frequently than bald eagles, and golden eagle juveniles are more frequently electrocuted than adults (Benson 1981). The hawk and owl species most commonly electrocuted in North America are the red-tailed hawk and great horned owl, respectively (Harness 1997).

Photo 4-1 Golden Eagle Landing on Tangent Structure

Numerous factors contribute to electrocution potential including bird size, conductor separation, precipitation, wind direction, season, and bird age. Bird dimensions are particularly important when considering bird protection.

Table 4-1 provides average bird sizes and weights for species more commonly associated with electrocutions. APLIC recommends a minimum of 60-inch spacing between phases and phase-to-ground to minimize eagle electrocutions (APLIC 2006).

As noted in Table 4-1, a large female eagle may have an 80-inch wingspan; however, the 60-inch spacing was selected based on the fleshy wrist-to-wrist distance (up to 42 inches between wrists). Since immature eagles are most vulnerable to electrocution when they begin or terminate a flight, the distribution line-spacing recommendations were developed specifically to minimize electrocutions of these younger birds. APLIC (2006) recommends 40-inch spacing in areas occupied by raptors other than eagles. Figure 4-1 provides a graphical representation of raptor dimensions and recommended clearances relative to electric distribution structures. The birds in Table 4-1 are arranged by wingspan, from largest to smallest.

Inclement weather is another major contributing factor to eagle electrocutions (Benson 1981). Raptors with wet feathers are more vulnerable to electrocution above 5kV (Nelson 1979; Olendorff et al. 1981) and wet birds may have greater difficulty navigating around energized conductors when flying to and from poles. Dry feathers are almost as good an insulator as air (Nelson 1979), but dry birds contacting live wires with their beak and foot can still be killed at voltages below 5kV (Olendorff et al. 1981).

Table 4-1 Average Size and Weight of Bird Species of Concern in PRECorp's Service Territory

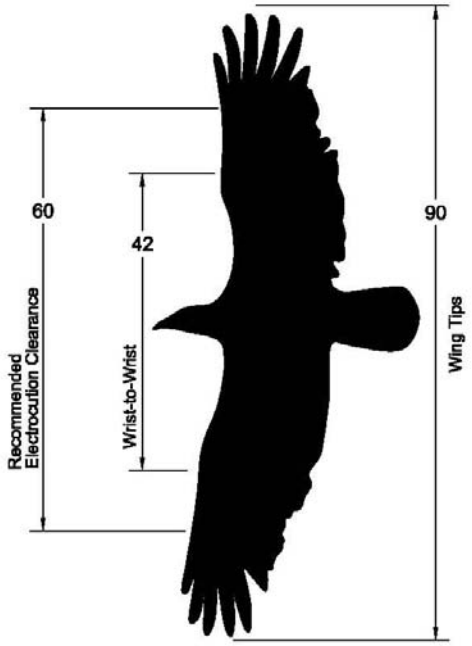
Species	Wingspan (Inches)	Wrist-to-Wrist (Inches)	Weight (Pounds)
Bald Eagle	80	31–34	9.5
Golden Eagle	79	31–42	10
Turkey Vulture	67	23–24	4.0
Osprey	63	—[a]	3.5
Ferruginous Hawk	56	22	3.5
Rough-Legged Hawk	53	—[a]	2.2
Common Raven	53	—[a]	2.6
Swainson's Hawk	51	16–23	1.9
Great Horned Owl	50	17–25	5.5
Red-Tailed Hawk	49	14–23	2.4
Barn Owl	42	15–20	1.0
Peregrine Falcon	41	13–20	1.6
Prairie Falcon	40	16	1.6
American Crow	39	—[a]	1.0

Adapted from Wheeler and Clark 1995; Terres 1991; APLIC 2006; Sibley 2000
[a] Information not available

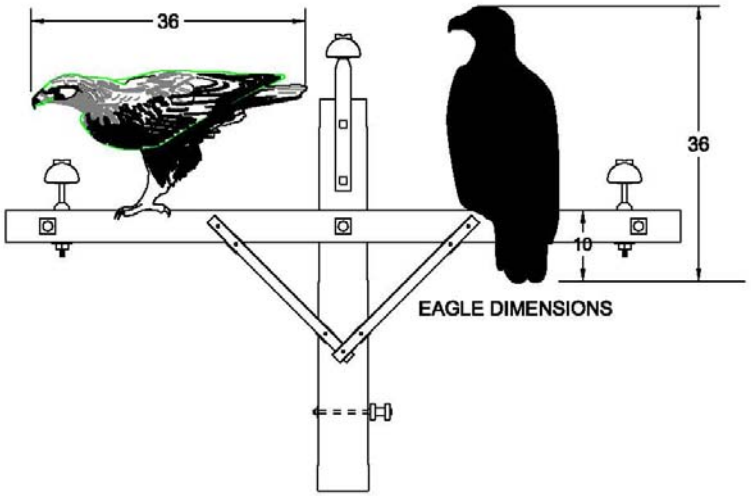
Wind direction relative to utility crossarm orientation affects the probability of electrocution (Boeker 1972; Nelson and Nelson 1976; Nelson 1977; Benson 1981). Crossarms mounted perpendicular to the wind allows raptors to soar away from the structure and attached wires. Raptors taking off from crossarms mounted parallel to prevailing winds can more easily be blown into energized conductors. Wind orientation presumably places inexperienced fledgling birds at greater risk than the adults.

Raptor electrocutions often fluctuate seasonally. Increased seasonal precipitation or storm events may increase the electrocution risk. In the winter, power line poles are valuable sit-and-wait hunting sites, allowing raptors to seek prey without expending energy hunting in flight (Benson 1981). During the spring, raptors may increase their exposure to electrocution by utilizing pole structures as nesting sites. Seasonal fluctuations of prey abundance also may influence the number of raptors electrocuted in a particular area (Olendorff et al. 1981; Benson 1981).

Age is a significant factor in eagle electrocutions. Adults feed the immature eagles during the first few months after fledging. During this period, the young eagles gain flight experience by short perch-to-perch flights. As these birds begin to hunt for themselves, they generally still rely on stationary perches. The young eagles are inexperienced in takeoffs and landings and less adept at maneuvering than adults (Nelson and Nelson 1976; Nelson 1979a, 1979b). Short flights from perch-to-perch, hunting from the perch and takeoff and landing experience all place young eagles at a high risk for electrocution (Olendorff 1993).



EAGLE DIMENSIONS



EAGLE DIMENSIONS

RAPTOR CLEARANCES

1. 60 Inches Horizontal - accomodates the wrist-to-wrist dimension of an eagle.
2. 40 Inches Vertical - accomodates a perching eagle.

Figure 4-1 Size and Recommended Clearances for Eagles and Hawks

4.2 Collisions

Birds face collision threats from many sources such as power lines, television towers, communication towers and related wires, wire fences, wind turbines, cars, aircraft, and trains. Although birds often exist near power lines without significant collision risks, problems emerge in localized areas where certain risks occur.

A number of factors contribute to species vulnerability to collision with overhead wires including bird size, maneuverability, and flight behavior; habitat use near power lines; and utility structure type and location. The timing and duration of inclement weather and low-light conditions also affect bird collision rates (APLIC 1994).

Bird size, maneuverability, and flight behavior, are particularly important in evaluating a species' vulnerability to colliding with power lines. Large, heavy-bodied birds such as herons, cranes, swans, and pelicans are some of the more commonly reported casualties of transmission line collisions because of their large wingspans, heavy body mass, and resultant lack of agility (Photo 4-2). Although relatively small and highly maneuverable, many species of ducks are vulnerable to collision because of their high flight speed at low altitudes. Birds flying in flocks are less maneuverable than individual birds; therefore, waterfowl, cranes, pelicans, and other flocking species have an added collision risk. Finally, the less-controlled flight of juvenile or immature birds is more likely to result in collision than the flight of an adult (APLIC 1994).

Photo 4-2 Sandhill Cranes Flying Over a Marked Power Line

Generally, raptors are infrequently involved in collisions although they spend extensive time in the air relative to ground-dwelling species. Some raptor species, however, are more susceptible to collision. For example, peregrine falcons are more vulnerable to collision because they attain high speeds when pursuing prey near the ground (Olendorff and Lehman 1986). Such collisions usually occur with distribution lines employing small conductors. Collisions with the larger, more visible transmission conductors are less documented.

The probability of collision also is influenced by bird habitat use near power lines; the proximity of power lines to locations where birds are landing and taking off can be critical (Stehn and Wassenich 2005). In general, ecologically sensitive areas such as wetlands, lakes, and rivers, where birds congregate to nest, feed, roost, migrate, or winter should be avoided, if possible. Intermittent wetlands are less obvious habitats that should be avoided, if possible. A power line located between a feeding area and a roosting site can be problematic, especially when only a short distance separates them,

resulting in birds making short flights at the critical height. Birds crossing power lines at low altitudes several times a day are more susceptible to collision.

Structure type and location also are important factors to consider when determining collision likelihood. Conductors placed in a horizontal, rather than vertical, configuration decreases the number of wires a bird has to avoid and, therefore, the risk of collision. The use of overhead static wires, however, increases the likelihood of collision. On transmission structures, birds most frequently collide with these overhead static wires, which are smaller and more difficult to see (Pandey et al. 2007). The physical location of lines can affect the incidence of collision. For example, as shown in Figure 4-2, trees and topographic features (e.g., rock outcroppings) can provide natural barriers to shield power lines from birds in flight (APLIC 1994).

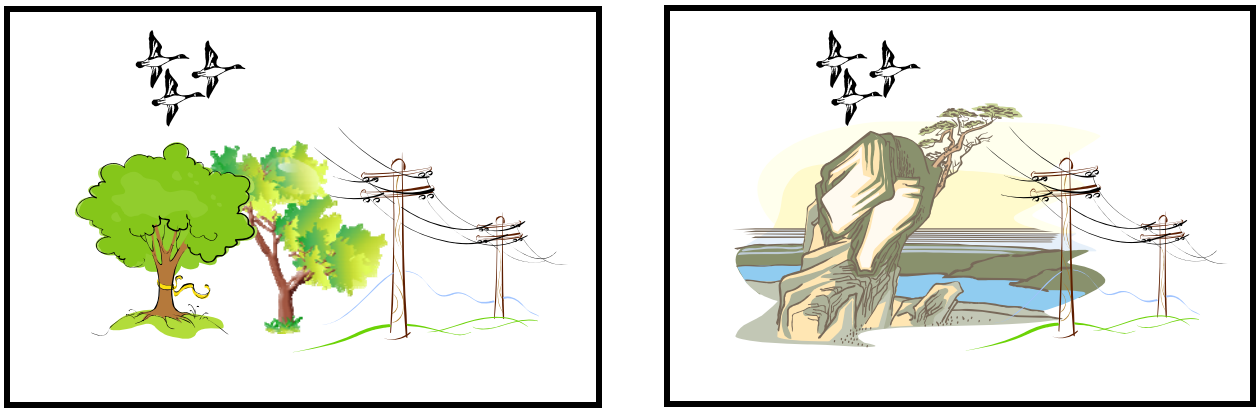


Figure 4-2 Vegetation and Topography Creating a Flight Barrier to a Power Line

4.3 Nesting

Although power lines can pose an electrocution hazard to birds, they also provide nesting habitat, with many birds using power poles for nesting. A nest is any readily identifiable structure built, maintained, or occupied for incubating and rearing of birds.

Photo 4-3 Black-Billed Magpie Nest on Three-Phase Transformer

Unfortunately, nests are sometimes located in areas that compromise electrical clearances (Photo 4-3). In such situations, nests must either be removed or relocated. All migratory birds and their active nests are legally protected under the MBTA. For nest management, it is important to determine which species built the nest and whether the nest is active. A nest is considered active when a bird is incubating eggs, raising young, or sitting on a nest prior to laying eggs.

5.0 SPECIES SUSCEPTIBLE TO UTILITY INTERACTIONS

A diversity of terrestrial and water bird species occurs in PRECorp's service territory. Resident and migratory species considered most susceptible to interactions with power lines at PRECorp are listed in Table 5-1. These bird species are arranged in taxonomic order (proceeding from those thought to be most primitive to those thought to be most highly evolved). Each species is described further in a species summary that provides the following information:

- Federal and state regulatory status
- Risk factors (e.g., electrocution, collision, nesting)
- Distribution
- Habitat
- Diet
- Seasonal occurrence in the PRECorp area

Although a number of bird species move through PRECorp's service territory, species described in this chapter are limited to those birds that either commonly occur or have been directly documented in the area. In addition, some raptor species known to occur in the area are not described in this chapter because the risk of electrocution is relatively low. For example, smaller species such as the American kestrel typically are not susceptible to electrocution due to their size. Larger raptors such as the Cooper's hawk occur throughout the region; however, this species is typically a forest dweller and does not regularly use distribution poles for perching.

Both the number and diversity of bird species in the PRECorp area vary seasonally. Although birds are present throughout the year, some species are more prevalent during the breeding season (i.e., spring/summer), some occupy this area during the winter, and others pass through only during spring and fall migration. The species summaries describe the general patterns of these seasonal occurrences on a regional basis. In addition, seasonal migration patterns are dynamic and often vary on a yearly basis due to changes in weather patterns and prey populations; therefore, the data presented in this report should be used as a general guideline.

This background information, used in conjunction with the high-risk structure configurations identified and discussed in this APP, will aid in preventing electrocution of these and other birds on PRECorp's system.

Gap Analysis Program (GAP)-predicted distributions are created using a Geographic Information System (GIS) modeling process that combines species habitat association rules with species geographic range. The output layers are intended to provide more accurate information about the current distribution of species within their general ranges than is generally available from published range maps. This is because range maps do not include information on the ecological conditions that favor the presence of the species and typically include areas of unsuitable habitat within the species' ranges. In contrast with maps that show only locations with known observations, however, GAP-

predicted distributions also include areas where species have not been observed, but could occur based on known habitat preferences.

Distribution maps based on favorable habitat are available through the Wyoming Gap Analysis Project. The raw GIS data are available at: http://piney.wygisc.uwyo.edu/data/biologic/vert_dist.zip. Maps for those species most susceptible to electrocution and collision are presented in Appendix D.

Table 5-1 Species Susceptible to Electrocution or Collision Risks in PRECorp's Service Territory

Common Name	Scientific Name	Typical Risk[1]
American White Pelican	*Pelecanus erythrorhynchos*	C
Great Blue Heron	*Ardea herodias*	C, E
Turkey Vulture	*Cathartes aura*	E
Osprey	*Pandion haliaetus*	E, N
Bald Eagle	*Haliaeetus leucocephalus*	C, E
Swainson's Hawk	*Buteo swainsoni*	E, N
Red-Tailed Hawk	*Buteo jamaicensis*	E, N
Ferruginous Hawk	*Buteo regalis*	E, N
Rough-Legged Hawk	*Buteo lagopus*	E
Golden Eagle	*Aquila chrysaetos*	C, E, N
Peregrine Falcon	*Falco peregrinus anatum*	C, E
Prairie Falcon	*Falco mexicanus*	C, E
Sandhill Crane	*Grus canadensis*	C
Barn Owl	*Tyto alba*	C, E
Great Horned Owl	*Bubo virginianus*	E, N
Black-Billed Magpie	*Pica hudsonia*	E, N
American Crow	*Corvus brachyrhynchos*	E, N
Common Raven	*Corvus corax*	E, N

[1]Typical Risk: C=Collision, E=Electrocution, N=Nesting

5.1 American White Pelican

Status ☒ **MBTA** ☐ **Federally Endangered** ☐ **State Endangered**
☐ **BGEPA** ☐ **Federally Threatened** ☐ **State Threatened**
☐ **ESA** ☒ **State Species of Special Concern (MT, WY)**

Issues ☐ **Electrocution**
☒ **Collision**
☐ **Nesting**

Distribution

The American white pelican (Photo 5-1) is a common migrant to the intermountain west and breeds in scattered locations from Wisconsin, westward to northern California. American white pelicans winter in California and Mexico, along the Gulf Coast, and in Florida (Knopf and Evans 2004).

Photo 5-1 American White Pelican

Habitat and Food Sources

The American white pelican primarily breeds on isolated islands in freshwater lakes and forages on inland marshes, lakes, or rivers. During migration, pelicans stop at foraging and loafing areas similar to those used during the breeding season. In winter, this species favors shallow coastal bays, inlets, and estuaries with forage fish, exposed loafing sites, and minimum January temperatures above 39°F. When inland, this species overwinters below dams or on large rivers where moving water prevents the surface from freezing.

This species mostly feeds on fish, but also consumes crayfish and aquatic amphibians. It feeds cooperatively in groups, scooping up fish while swimming. The American white pelican does not dive from the air into the water, as seen with brown pelicans (Knopf and Evans 2004).

Seasonal Occurrence

The American white pelican is a common summer resident, with breeding documented in several Wyoming and Montana locations (Wyoming Game and Fish Department [GFD] 2005).

5.2 Great Blue Heron

Status

- ☒ MBTA
- ☐ BGEPA
- ☐ ESA
- ☐ Federally Endangered
- ☐ Federally Threatened
- ☒ State Species of Special Concern (WY)
- ☐ State Endangered
- ☐ State Threatened

Issues

- ☒ Electrocution
- ☒ Collision
- ☐ Nesting

Distribution

The great blue heron (Photo 5-2) is the best-known and most widely distributed heron in North America, occurring from Alaska to northern South America (Terres 1991).

Photo 5-2 Great Blue Heron

Habitat and Food Sources

This species is typically associated with wet meadows, riparian corridors, suburban ponds, and reservoirs (Terres 1991). It typically nests near water sources and may nest in large colonies or "heronries." Nests are often built in large trees near water; however, they also may be constructed on the ground, along rocky ledges, and on man-made structures (Terres 1991).

The heron's diet is comprised of a variety of fish species, in addition to frogs, salamanders, lizards, snakes, shrimp, crabs, crayfish, grasshoppers, dragonflies, and many aquatic insects. Occasionally, this opportunistic feeder may prey on birds and small mammals (Terres 1991).

Seasonal Occurrence

Montana: The great blue heron occurs throughout the year along lakes, rivers, and wetland systems in western Montana, and during the summer in the eastern half of the state (Montana Fish, Wildlife & Parks [FWP] 2010a).

Wyoming: The great blue heron is a common summer resident throughout Wyoming (Wyoming Game and Fish Department [GFD] 2004).

5.3 Turkey Vulture

Status ☒ **MBTA** ☐ **Federally Endangered** ☐ **State Endangered**
☐ **BGEPA** ☐ **Federally Threatened** ☐ **State Threatened**
☐ **ESA** ☐ **State Species of Special Concern**

Issues ☒ **Electrocution**
☐ **Collision**
☐ **Nesting**

Distribution

Turkey vultures (Photo 5-3) are the most widely distributed vulture species in North America. Birds breed from southern Canada; throughout much of the U.S.; and south through Mexico, Central America, and South America (Kirk and Mossman 1998).

Photo 5-3 Turkey Vulture

Habitat and Food Sources

A variety of habitats are used for foraging, roosting, and breeding. Turkey vultures occur most frequently in open areas that provide adequate cliffs or large trees for nesting, roosting, and resting. Roost sites are often in undisturbed stands of large trees. Preferred breeding habitat includes isolated and undisturbed forested areas that provide rock crevices, logs, stumps, and abandoned buildings for nest sites. Foraging habitats include grasslands, agricultural land, and pasture, but areas of intensive row crops appear to be avoided (Kirk and Mossman 1998).

Turkey vultures have a well-developed sense of smell and are adept at detecting concealed carrion. They are almost exclusively scavengers and rarely take live prey. They primarily feed on mammals (wild and domestic) but also consume reptiles, amphibians, birds, fish, crustaceans, and sometimes plant material (Kirk and Mossman 1998).

Seasonal Occurrence

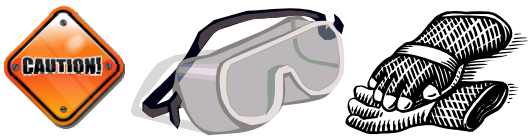
Montana: The turkey vulture is a summer resident in all but the north-central portion of the state (Montana FWP 2010b).

Wyoming: The turkey vulture is a common summer resident throughout most of the state (Wyoming GFD 2004).

5.4 Osprey

Status
- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues
- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**



Distribution

The osprey (Photo 5-4) occurs on most of the world's continents. It is commonly found along lakes, reservoirs, and seacoasts of the U.S., Alaska, and Canada. It generally follows water sources, seashores, and interior river valleys even during migration (Terres 1991).

Photo 5-4 Osprey

Habitat and Food Sources

Ospreys inhabit lakes, reservoirs, coasts, estuaries, and riparian corridors that offer adequate nesting sites. This fish-eating raptor will take advantage of most tall structures for nesting, including large living or dead trees, cliffs, channel markers, buoys, utility poles, and other man-made structures near or over water (Terres 1991). Ospreys typically forage for fish on the wing and commonly use prominent perch sites near water (Poole 1989).

Seasonal Occurrence

Montana: The osprey occurs throughout much of Montana during the summer, but is most common in the western portion of the state (Montana FWP 2010c).

Wyoming: Ospreys are common summer residents throughout much of Wyoming (Wyoming GFD 2004).

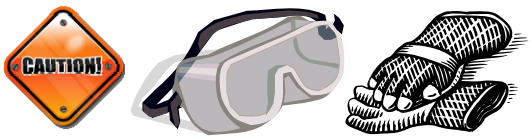
5.5 Bald Eagle

Status

- ☒ **MBTA**
- ☒ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☒ **State Species of Special Concern (MT, WY)**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☒ **Collision**
- ☐ **Nesting**



Distribution

The bald eagle (Photo 5-5) is widely distributed across Canada and the U.S. Some areas of North America have resident eagle populations, while other areas show seasonal shifts between breeding and wintering populations.

Photo 5-5 Bald Eagle

Habitat

Throughout the year, bald eagles frequent the coast, rivers, lakes, reservoirs, and terrestrial habitats adjacent to these water bodies. They also use semi-desert or upland desert shrub communities and grasslands, including areas that support prairie dog colonies (Andrews and Righter 1992).

During the breeding season, bald eagles occur most frequently in lowland and mid-elevation riparian zones, coniferous forest, and montane grasslands (Kingery 1998). Nests are typically located in multi-storied trees. Optimum nesting habitat includes proximity to open water that provides an adequate food source, large nest trees with sturdy branches at sufficient height, and stand heterogeneity. Bald eagles often use the same nest each year, supplementing with new nesting material or rebuilding the nest, if necessary (Grubb 1976; Anderson and Bruce 1980).

The major habitat components on wintering grounds include a food source and suitable trees for diurnal perching and night roosting. Food availability is likely the single most important factor influencing winter eagle distribution and abundance (Steenhof 1976). Wintering bald eagles may gather in large aggregations and share communal roosts, diurnal perches, and feeding areas. Perches are an essential element in bald eagles' selection of foraging areas, since perches are necessary for hunting and resting (Stalmaster and Newman 1979). Perch sites must be in open view of potential food sources and are generally within 160 feet of water (Vian 1971).

The bald eagle commonly feeds on fish, waterfowl, and carrion; however, bald eagles also will forage in upland habitats for terrestrial prey species. Deer and elk carcasses provide valuable food sources for wintering eagles.

Seasonal Occurrence

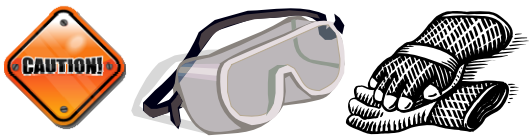
Montana: The bald eagle is a resident species in the forested, mountainous areas of Montana. Individuals from more northerly latitudes either winter in Montana or migrate through the state to more southerly locations (Montana FWP 2010d).

Wyoming: The bald eagle is an uncommon resident in Wyoming, although the number of nesting pairs in the state has increased from 20 in 1978 to over 100 in 2002 (Wyoming GFD 2005). The bald eagle population in Wyoming increases during winter as individuals arrive from their breeding areas farther north.

5.6 Swainson's Hawk

Status
- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☒ **State Species of Special Concern (WY)**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues
- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**



Distribution

Swainson's hawks (Photo 5-6) inhabit the Great Plains and desert shrublands of western North America from Canada to northern Mexico. They undertake one of the most remarkable migrations of any raptor species in North America when they vacate their breeding grounds and migrate in large flocks to Argentina.

Photo 5-6 Swainson's Hawk

Habitat and Food Sources

The Swainson's hawk is a bird of open country, frequenting grasslands and desert shrublands that are interspersed with trees. The species also occurs in agricultural areas. They nest in scattered or isolated trees and in riparian areas on the edge of more open country. These hawks are quite tolerant of humans and occasionally place their nests near human habitation.

Breeding birds forage primarily on small vertebrate species, particularly ground squirrels. Insects comprise the predominant portion of their diet during the non-breeding period (The Peregrine Fund 2009).

Seasonal Occurrence

Montana: The Swainson's hawk breeds throughout much of the state (Montana FWP 2010e).

Wyoming: The Swainson's hawk is a common summer resident and breeds throughout most of the state (Wyoming GFD 2004).

5.7 Red-Tailed Hawk

Status

- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**

Distribution

Red-tailed hawks (Photo 5-7) are the most common and widely distributed large raptor in North America. Except for the northern-most populations in Alaska and Canada, they are year-round residents in nearly every state, as well as in Mexico and Central America.

Photo 5-7 Red-Tailed Hawk

Habitat and Food Sources

Red-tailed hawks are generalists in their habitat preference. During the nesting season, red-tailed hawks may occur from sea level to 9,000 feet in elevation. They commonly occupy forested lands, open country with scattered trees, edge areas between different habitat types, agricultural lands, and riparian zones. Red-tailed hawks will use large trees, cliffs, and man-made structures for nesting, depending on the substrate and prey availability in nearby areas. This raptor is relatively tolerant of humans and often occurs on the periphery of human-dominated landscapes, such as rural subdivisions and agricultural areas.

This hawk typically prefers to nest in a tall tree with good aerial access. The red-tailed hawk nests in a wide range of habitats including spruce forests, aspen stands, wooded stream valleys, canyons, woodlots, and lower-elevational coniferous or deciduous woodlands. The availability of tall trees for nesting with foraging habitat nearby is important in many areas, but cliffs or other elevated locations also may be used for nesting. Winter habitats tend to be more open and include upland pastures, grasslands, and forests. In general, the basic habitat types are similar throughout the year.

Perch availability is important for red-tailed hawks, which generally hunt from a perch site. This raptor is an opportunistic forager, commonly preying on small and medium-sized mammals (e.g., rodents, rabbits), birds, and reptiles (including snakes).

Seasonal Occurrence

Montana: The red-tailed hawk occurs throughout the year in the western and southern portions of Montana and breeds in the northeastern two-thirds of the state (Montana FWP 2010f).

Wyoming: The red-tailed hawk is a common resident in Wyoming and breeds throughout the state (Wyoming GFD 2004).

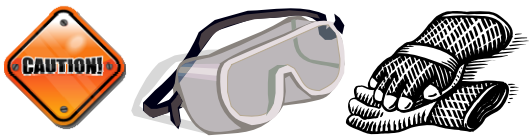
5.8 Ferruginous Hawk

Status

- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☒ **State Species of Special Concern (MT, WY)**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**



Distribution

Ferruginous hawks (Photo 5-8) inhabit the Great Plains and Intermountain West from southern Canada to central Mexico.

Photo 5-8 Ferruginous Hawk

Habitat and Food Sources

This large hawk is a bird of open country, inhabiting arid grasslands, semi-desert shrublands, and often the interface between piñon-juniper woodlands and sagebrush basins. They tend to occur in more unbroken or unfragmented landscapes and avoid heavily forested areas, steep canyons, and high elevations (Bechard and Schmutz 1995). They often nest in isolated trees or sparse tree groves; on windmills, cliffs, and rocky outcrops; and occasionally on the ground, particularly within rolling "badland" habitats. During winter, ferruginous hawks often utilize open farmland, grasslands, deserts, and other arid regions associated with rabbits, prairie dogs, or other major prey species.

Ferruginous hawks primarily prey on small mammals. West of the Continental Divide, rabbits, hares, and pocket gophers comprise the main food source, while east of the Continental Divide they primarily feed on ground squirrels and prairie dogs (Bechard and Schmutz 1995). In all areas, however, ferruginous hawks commonly prey upon prairie dogs.

Seasonal Occurrence

Montana: Ferruginous hawks breed in all but the northwest portion of Montana. These birds are entirely migratory. Fall migration begins in August and continues into early September (Montana FWP 2010g).

Wyoming: The ferruginous hawk is a common resident in Wyoming and breeds throughout most of the state (Wyoming GFD 2005). In the PRECorp service territory, ferruginous hawk nests are likely to be found in many of the drainages (McKee 2005).

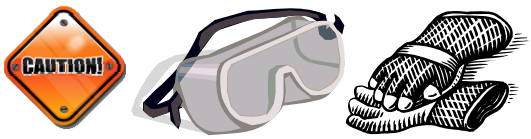
5.9 Rough-Legged Hawk

Status

- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☐ **Collision**
- ☐ **Nesting**



Distribution

The rough-legged hawk (Photo 5-9) breeds across northern Canada and Alaska. Only during the winter do they occur in the lower 48 states.

Photo 5-9 Rough-Legged Hawk

Habitat and Food Sources

In its winter range, the rough-legged hawk prefers open country at lower elevations. It typically occupies open grasslands, sagebrush flats and basins, agricultural land, wetlands, wet meadows, dunes, pasture, and river deltas. Rough-legged hawks often are observed perched along these open areas when foraging. Low rocks and shrubs may be used in the absence of higher sites, but power poles, lone buildings or other structures, fences, and lone trees or snags are all used as resting or hunting perches.

The rough-legged hawk's winter diet consists mainly of small mammals, but species composition reflects different taxa available in their winter range. Voles, mice, and (to a lesser extent) shrews comprise the majority of prey items taken in most areas (Bechard and Swem 2002). They also will opportunistically feed on a wide variety of carrion during the winter (Bechard and Swem 2002).

Seasonal Occurrence

Montana: The rough-legged hawk is a common winter resident throughout the state (Montana FWP 2010h).

Wyoming: The rough-legged hawk is a common winter resident throughout Wyoming (Wyoming GFD 2004).

5.10 Golden Eagle

Status

☒ **MBTA** ☐ **Federally Endangered** ☐ **State Endangered**
☒ **BGEPA** ☐ **Federally Threatened** ☐ **State Threatened**
☐ **ESA** ☐ **State Species of Special Concern**

Issues

☒ **Electrocution**
☒ **Collision**
☒ **Nesting (Transmission)**

Distribution

Golden eagles (Photo 5-10) primarily occur throughout western North America, from northern Alaska to the Central Plateau of Mexico. A smaller proportion of the population nests in eastern Canada and winters in the eastern U.S.

Photo 5-10 Golden Eagle

Habitat and Food Sources

Golden eagles are birds of open habitats and landscapes. Although open grasslands, sagebrush steppe, and broad valleys are the preferred habitats, golden eagles also can be found at higher elevations, along river corridors, and near conifer forests, particularly during migration. Arid, sloping valleys, benches or flatlands bisected by canyons, and gullies or rock outcrops are preferred over flat, featureless terrain.

Breeding habitat for golden eagles generally consists of lowland and upland desert shrub communities and grasslands, lowland bluffs and cliffs, desert and submontane shrub communities, piñon-juniper, and montane riparian woodlands (Behle 1981). Nests often are located on cliff faces and large rock outcrops, although birds also will use large, ponderosa pines to small junipers or even utility poles (Glinski 1998). Breeding pairs may alternate between nest sites each year. Winter habitats generally include arid, shrub-steppe country and are mostly similar in physical appearance to the summer areas.

Primary prey species for golden eagles consist of small and medium-sized mammals (e.g., ground squirrels, rabbits), but golden eagles also will feed on insects, snakes, birds, juvenile ungulates, and carrion. Although it is rare, this bird may take large, healthy mammals, hunting cooperatively in pairs (Terres 1991).

Seasonal Occurrence

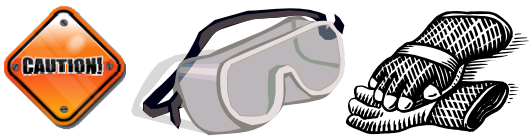
Montana: The golden eagle is a year-round resident and breeds throughout most of the state (Montana FWP 2010i).

Wyoming: The golden eagle is a common resident and breeds throughout the state (Wyoming GFD 2004).

5.11 Peregrine Falcon

Status
- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☒ **State Species of Special Concern (MT, WY)**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues
- ☒ **Electrocution**
- ☒ **Collision**
- ☐ **Nesting**



Distribution

The peregrine falcon (Photo 5-11) occurs worldwide in a wide variety of habitats including tundra, wetlands, deserts, maritime islands, continental forests, plains, and mountains. It is absent as a breeder only from the Amazon Basin, the Sahara Desert, most of the steppes of central and eastern Asia, and Antarctica (White et al. 2002).

Photo 5-11 Peregrine Falcon

Habitat and Food Sources

The peregrine falcon usually nests on cliff ledges and forages over adjacent coniferous and riparian forests. Migrants and winter residents mostly occur around reservoirs, rivers, and marshes, but also occur in grasslands, agricultural areas, and less often in other habitats (Andrews and Righter 1992).

This falcon's diet consists mostly of small to medium-sized birds, but occasionally mammals such as bats, voles, and ground squirrels (White et al. 2002).

Seasonal Occurrence

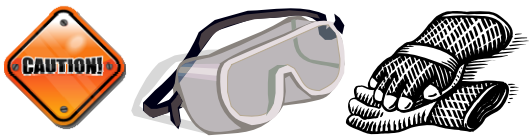
Montana: The peregrine falcon is a rare resident in the state and is found in scattered locations throughout most of Montana. This species breeds mostly in the western half of the state. Some individuals are year-round residents (Montana FWP 2010j).

Wyoming: As described for Montana, this species is a rare resident in Wyoming and is found in scattered locations throughout most of the state. The peregrine falcon breeds mostly in the western half of Wyoming, with some individuals remaining in the state throughout the year (Wyoming GFD 2005).

5.12 Prairie Falcon

Status
- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues
- ☒ **Electrocution**
- ☒ **Collision**
- ☐ **Nesting**



Distribution

The prairie falcon (Photo 5-12) occurs in western North America from central Mexico to central British Columbia (Steenhof 1998).

Photo 5-12 Prairie Falcon

Habitat and Food Sources

The prairie falcon inhabits arid, open plains and the shrub-steppe deserts of western North America where canyons, cliffs, or bluffs provide cover and nest sites (Steenhof 1998). Prairie falcons usually nest on cliff ledges, but occasionally elsewhere including trees, power poles, buildings, and steep sides of arroyos (New Mexico Avian Conservation Partners 2009).

Prairie falcons hunt birds and small mammals from perches or while in flight, swooping low over open country (Kingery 1998). Prairie falcons eat primarily ground squirrels, when available, and they also prey on grassland songbirds, such as horned larks and meadowlarks, particularly in winter.

Seasonal Occurrence

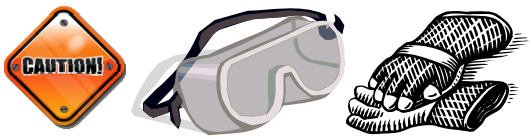
Montana: The prairie falcon occurs across much of Montana throughout the year (Montana FWP 2010k).

Wyoming: The prairie falcon is a common resident, breeding statewide (Wyoming GFD 2004).

5.13 Greater Sandhill Crane

Status
- ☒ MBTA
- ☐ BGEPA
- ☐ ESA
- ☐ Federally Endangered
- ☐ Federally Threatened
- ☒ State Species of Special Concern (WY)
- ☐ State Endangered
- ☐ State Threatened

Issues
- ☐ Electrocution
- ☒ Collision
- ☐ Nesting



Distribution

The greater sandhill crane (Photo 5-13) the largest of several subspecies of sandhill cranes, ranges from as far north as Alaska and the coast of the Arctic Ocean south into the Great Lakes region and westward across Idaho, Nevada, and Oregon. Populations also occur in northeastern Siberia, the southeastern U.S., and Cuba.

Photo 5-13 Sandhill Crane

Habitat and Food Sources

Greater sandhill cranes are typically found in bogs, fens, cattail marshes, sedge meadows, and other wetland types, as well as wetter open parklands, riparian areas, flooded meadows, and beaver ponds. In the more arid parts of its western breeding range, it is found in shallow wetlands and along rivers. In agricultural areas, it prefers nesting sites close to cultivated fields (U.S. Geological Survey 2006).

Greater sandhill cranes are omnivorous and feed on cultivated grains, roots, seeds, small mammals, frogs, toads, snakes, crayfish, insects, and eggs of other birds (Colorado DOW 2009b; Kingery 1998).

Seasonal Occurrence

The greater sandhill crane's migration route crosses Colorado, Utah, and Wyoming, with a major spring and fall staging area in Colorado's San Luis Valley.

Wyoming: Sandhill cranes can be found in the western two-thirds of Wyoming and Montana during the spring, summer, or fall. They are less common during the breeding season than during fall migration. Sandhill cranes are considered a common summer resident in Wyoming (Wyoming GFD 2005).

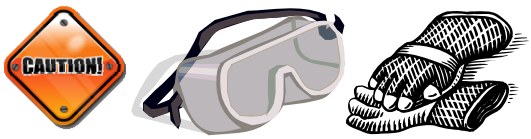
5.14 Barn Owl

Status

- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☒ **Collision**
- ☐ **Nesting**



Distribution

The barn owl (Photo 5-14) is widespread throughout the world, from wilderness to rural locations to urban parks and suburbs (Terres 1991).

Photo 5-14 Barn Owl

Habitat and Food Sources

In the Intermountain West, barn owls inhabit cliffs, dirt banks, buildings, and dead trees in riparian, agricultural, and grassland areas where rodents are plentiful (Andrews and Righter 1992; Sharpe et al. 2001).

The barn owl's diet is dominated by mice, rats, voles, gophers, and shrews. It also will take other prey including large insects, reptiles, and fish. The barn owl hunts following a favorite course or returning to favorite hunting areas. Although it will pounce on prey from a perch, it normally flies low to the ground (less than 10 feet for foraging). It possesses high auditory acuity and can catch prey in complete darkness. Although the barn owl is highly nocturnal it can be observed hunting in daylight (Owling.com 2001a).

Barn owls usually nest on ledges, crevices, or other sheltered areas of cliffs or human-made structures. They also nest in cavities in trees or snags, burrows, or culverts.

Seasonal Occurrence

Montana: The barn owl is considered a rare visitor to Montana. Although this species has been recorded in the state from January to October, these observations arise from different locations across different years and do not necessarily indicate near year-round presence. The occasional reports may suggest their presence may be a year-dependent dispersal or migration phenomenon (Montana FWP 2010l).

Wyoming: The barn owl is a summer resident known to breed regularly in southern portions of the state. This species abundance is unknown in Wyoming (Montana FWP 2010l; Wyoming GFD 2004).

5.15 Great Horned Owl

Status

- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues

- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**

Distribution

The great horned owl (Photo 5-15) is widespread throughout North America, from wilderness to rural locations to urban parks and suburbs (Terres 1991).

Photo 5-15 Great Horned Owl

Habitat and Food Sources

The great horned owl is very adaptable and probably has the most diverse habitat and climatic tolerance of any North American owl species. It inhabits virtually every type of terrain in North America from sea level to 11,000 feet in elevation. If there is a preferred habitat, it would include mature deciduous woods that border water, with scattered conifers for maximum roosting concealment and adjacent open habitats for hunting (Owling.com 2001b).

During the day, this nocturnal species often roosts in dense tops of conifers. Great horned owls forage from dusk until dawn; however, individual owls also will forage during the day (Terres 1991).

Great horned owls are highly territorial, and pairs defend their territories throughout the year. This species is the earliest nesting owl in North America. Great horned owls do not construct their own nest site, but customarily adopt the previous year's nest of other bird species such as red-tailed hawks, crows, or magpies. Hollow trees are occasionally selected as nest sites. In mountainous or rough terrain, particularly where few trees exist, great horned owls will nest on ledges and large, rocky depressions (Owling.com 2001b).

Small mammals compose the bulk of this owl species' diet. However, great horned owls will prey on almost any animal ranging in size from scorpions and grasshoppers to geese, skunks, and small pets.

Seasonal Occurrence

Montana: The great horned owl is a year-round resident and breeds throughout much of the state (Montana FWP 2010m).

Wyoming: The great horned owl is a common year-round resident and breeds statewide (Wyoming GFD 2004).

5.16 Black-Billed Magpie

Status
- ☒ **MBTA**
- ☐ **BGEPA**
- ☐ **ESA**
- ☐ **Federally Endangered**
- ☐ **Federally Threatened**
- ☐ **State Species of Special Concern**
- ☐ **State Endangered**
- ☐ **State Threatened**

Issues
- ☒ **Electrocution**
- ☐ **Collision**
- ☒ **Nesting**

Distribution

The black-billed magpie (Photo 5-16) ranges from south-central Canada south into northern Arizona and New Mexico and from eastern California to northwest Minnesota (Trost 1999).

Photo 5-16 Black-Billed Magpie

Habitat and Food Sources

Nesting habitat for the black-billed magpie includes thickets in riparian areas, often associated with open meadows, grasslands, or sagebrush for foraging. This habitat is often linear along streams, and clumped in distribution, which can lead to near-colonial nest aggregations. Outside of the breeding season, these birds are frequently numerous near livestock feedlots, barnyards, landfills, sewage lagoons, grain elevators, and other human-influenced habitats. Magpies also seek riparian thickets, at least for roosting (Trost 1999).

The black-billed magpie feeds on both animals and plants, typically consuming ground-dwelling invertebrates, grain, acorns, carrion, small mammals, and some birds (Trost 1999; Terres 1991).

Seasonal Occurrence

Montana: The black-billed magpie is a year-round resident statewide (Montana FWP 2010n).

Wyoming: The black-billed magpie is an abundant resident and breeds statewide (Wyoming GFD 2004).

5.17 American Crow

Status ☒ **MBTA** ☐ **Federally Endangered** ☐ **State Endangered**
☐ **BGEPA** ☐ **Federally Threatened** ☐ **State Threatened**
☐ **ESA** ☐ **State Species of Special Concern**

Issues ☒ **Electrocution**
☐ **Collision**
☒ **Nesting**

Distribution

American crows (Photo 5-17) are the most widespread crow species in North America. They breed throughout much of the continental U.S. and southern half of Canada. Northern populations in much of Canada are migratory and breeding birds retreat south during the winter.

Photo 5-17 American Crow

Habitat and Food Sources

A habitat generalist, the crow occupies a variety of habitats including urban, rural, riparian, agricultural, coastal, pasture, and woodland areas. They avoid large, dense forests and desert expanses. Their ability to adapt has facilitated large population increases in some areas, especially in cities. Crows can form immense winter roosting flocks of many tens of thousands of birds. Crows are opportunistic foragers and will eat nearly anything including invertebrates, amphibians, reptiles, small birds and mammals, birds' eggs, grain crops, seeds and fruits, carrion, and discarded human food (Verbeek and Caffrey 2002).

Seasonal Occurrence

Montana: The American crow occurs year round in all but the northeastern portion of the state, where it occurs only during the breeding season (Montana FWP 2010o).

Wyoming: The American crow is a common resident and breeds throughout much of the state (Wyoming GFD 2004).

5.18 Common Raven

Status ☒ **MBTA** ☐ **Federally Endangered** ☐ **State Endangered**
☐ **BGEPA** ☐ **Federally Threatened** ☐ **State Threatened**
☐ **ESA** ☐ **State Species of Special Concern**

Issues ☒ **Electrocution**
☐ **Collision**
☒ **Nesting**

Distribution

The common raven (Photo 5-18) is one of the most widespread naturally occurring birds in the world, typically a resident of Alaska south through California and east to New Mexico. It is also a resident of Canada from Alaska east through southern Ontario.

Photo 5-18 Common Raven

Habitat and Food Sources

The common raven occupies a broad range of habitats from boreal, conifer, and deciduous forests; prairies and grasslands; isolated settlements, towns and cities; and deserts. It prefers heavily contoured landscaping (e.g., cliffs) for the thermals, which it uses for foraging. For nesting it also will utilize areas with cliffs, trees, or human structures (Boarman and Heinrich 1999).

Ravens are commonly associated with carrion, but are not limited to scavenging. The common raven also is an opportunistic feeder, often foraging on eggs, insects, garbage, carrion, birds, rodents, frogs, lizards, snakes, nuts, grains, fruit, and other plant matter (Knight and Call 1980; Heinrich 1989).

Seasonal Occurrence

Montana: The common raven is a year-round resident in western Montana (Montana FWP 2010p).

Wyoming: The common raven is a common resident in Wyoming and breeds throughout all but the northeastern portion of the state (Wyoming GFD 2004).

6.0 SPECIES PROTECTION

The purpose of this chapter is to provide a detailed overview of federal and state requirements for eagles, T/E species, migratory birds, game birds, and non-native species. Each of the following sections includes detailed references to Chapter 7.0, Permits, and Chapter 8.0, Management Procedures. Following these guidelines will help ensure that a project is not delayed due to failure by PRECorp's personnel to comply with such requirements. A field brochure with a synopsis of these guidelines is included in Appendix E.

6.1 Protected Species

Federal law protects most birds and their nests. Birds fall into one or more species types with differing protection and permitting requirements. Table 6-1 presents a breakdown of the protection afforded to different birds.

Table 6-1 Protected Status for Birds

Protection	Eagles	Federally Listed Birds	State-Listed Birds	Migratory Birds (Native Species)	Game Birds	Non-Native Species
MBTA	O	O	O	O		
ESA		O	*			
BGEPA	O					
State Regulations	O	O	O	O	O	
No Protection						O

MBTA=Migratory Bird Treaty Act; ESA=Endangered Species Act; BGEPA=Bald and Golden Eagle Protection Act
*State-Listed Species may also be covered by the ESA.

The following provides a brief description of commonly encountered birds in the PRECorp service territory and their level of protection, as identified in Table 6-1.

6.1.1 Eagles

Bald and golden eagles are protected by federal (and state) laws including the federal BGEPA and MBTA, which are discussed in Chapter 3.0, Regulatory Context. Both inactive and active eagle nests are protected, and it is a violation to disturb or harass eagles. To facilitate the use of this APP, cross references to the applicable permits, procedures, and APP sections for bald and golden eagles follow.

- **Injured Eagle:** PRECorp discourages its employees from handling any injured birds, but particularly raptors (e.g., hawks, owls, eagles, falcons). Corporate safety and regulatory procedures are outlined in Section 8.1, Injured Birds, in the event an injured eagle is found on or near a PRECorp facility. It is important the USFWS is contacted, as well as the rehabilitator, if an eagle is reported injured.

  - **Section 8.1, Injured Birds**

- **Eagle Carcass:** Eagle carcasses may not be disposed of without a federal Special Purpose Salvage Permit. Even with a permit, USFWS notification and coordination is required. In addition to the federal permit, Montana FWP requires a Terrestrial Scientific Collector's Permit for activities covered under the federal bird permits. In Wyoming, the Wyoming GFD requires a Chapter 33 Permit for disposal of an eagle carcass.

  - **Section 7.1.1, Special Purpose Salvage Permit**
  - **Section 7.2, Wyoming Permit**
  - **Section 7.3, Montana Permit**
  - **Section 8.2.6.1, Eagles**
  - **Reporting – Section 8.2, Carcass Management**

- **Eagle Nest and Roost - Disturbance:** The *National Bald Eagle Management Guidelines* (USFWS 2007) outline USFWS recommendations for avoiding disturbance to bald eagles from new or intermittent activities proposed near eagle nests. Power line construction is considered a Category A activity, as outlined in these National Guidelines and discussed in Section 8.3.2.1, Eagles. The PRECorp APP Coordinator's office will coordinate with the USFWS and other appropriate federal and state agencies if any activity is planned within 0.5 mile of a known eagle nest or, in the case of bald eagles, within 0.5 mile of a communal roosting site.

  - **Section 8.3.2.1, Eagles**
  - **Reporting – Section 8.3 Nest Management**

- **Eagle Nest Removal, Relocation, or Destruction:** Special permits and coordination with the USFWS and either the Wyoming GFD or Montana FWP are required for any activities potentially affecting eagles, including project construction, project operation, and right-of-way (ROW) maintenance. Both active and inactive eagle nests are protected and may not be disturbed without first obtaining an Eagle Nest Take Permit from the USFWS and a state permit. However, these permits are highly specific, of short duration, and handled on a case-by-case basis. Typically, both the federal and state agencies will only authorize the removal or relocation of an active eagle nest under emergency conditions (i.e., threat to human health or safety).

  - **Section 7.1.5, Eagle Nest Take Permit**
  - **Section 7.2, Wyoming Permit**
  - **Section 7.3, Montana Permit**
  - **Section 8.3.3.1, Eagles**
  - **Reporting – Section 8.3, Nest Management**

It is easy to discern the difference between adult bald and golden eagles because bald eagles have a distinctive white head and tail (Photo 6-1 and Photo 6-2, respectively).

Photo 6-1 Adult Bald Eagle

Photo 6-2 Adult Golden Eagle

However, this distinction is not apparent in immature birds. Bald eagles take 5 years to reach maturity; immature bald eagles do not have white heads or tails and often resemble golden eagles. Note the immature bald eagle shown in Photo 6-3 lacks the yellow beak and eyes of an adult bird.

Photo 6-3 Immature Bald Eagle Lacking Adult Coloration

6.1.2 Federally and State-Listed Species

Table 6-2 identifies species in the PRECorp service territory that are federally listed as threatened or endangered by the USFWS and state-listed in Wyoming or Montana. Although it is important that PRECorp is familiar with these federally and state-listed species, particularly for planning purposes, none of these species is prone to electrocution on power lines.

Table 6-2 Federally and State-Listed Bird Species

Species	Federal[1]	WY[2]	MT[3]
Interior Least Tern	E	E	E
Whooping Crane	E	E	E
Piping Plover	T	E	T

[1]CFR (2009); USFWS (2009)
[2]Wyoming GFD (2009)
[3]Montana FWP (2009)
E=Endangered; T=Threatened

As discussed in Chapter 3.0, Regulatory Context, it is a violation of the ESA to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any animal species listed under this Act. These violations can include any action that would significantly disrupt

normal behavioral patterns such as breeding, feeding, or sheltering (50 CFR 17.3). Additionally, the ESA may protect certain habitat types, depending on the species, which could impact vegetation management along utility rights-of-way (ROWs). To facilitate the use of this APP, cross references to the applicable permits, procedures, and APP sections for T/E species follow.

- **Injured T/E Species:** PRECorp discourages its employees from handling any injured birds. Corporate safety and regulatory procedures are outlined in Section 8.1, Injured Birds, in the event a T/E species is found on or near a PRECorp facility. It is important the USFWS is contacted, as well as the rehabilitator, if a listed species is reported injured.

  - **Section 8.1, Injured Birds**

- **T/E Carcass:** Carcasses of T/E species may not be disposed of without a Special Purpose Salvage Permit. It is important to note that USFWS notification and coordination is required even with a permit. In addition to the federal permit, Montana FWP requires a Terrestrial Scientific Collector's Permit and the Wyoming GFD requires a Chapter 33 Permit for disposal of the carcass of a T/E species.

  - **Section 7.1.1, Special Purpose Salvage Permit**
  - **Section 7.2, Wyoming Permit**
  - **Section 7.3, Montana Permit**
  - **Section 8.2.6.2, Federally and State-Listed Species**
  - **Reporting – Section 8.2, Carcass Management**

- **T/E Nest Removal, Relocation, or Destruction:** A special permit under the ESA is required to relocate the nest of a federally listed species. This permit is a Section 10(a)(1)(A) Recovery Permit – Scientific Purposes and Enhancement of Propagation or Survival Permit (Recovery Permit). Nests of state-listed species also are protected under Montana and Wyoming laws and regulations. Montana FWP requires a Terrestrial Scientific Collector's Permit, and the Wyoming GFD requires a Chapter 33 Permit to remove an active nest of any federally or state-listed species.

  Relocation or removal of a federally or state-listed species nest is a special case and requires close coordination with and mandatory requirements through the USFWS' Endangered Species Office, and either the Wyoming GFD, or Montana FWP. However, it is unlikely PRECorp would require these applicable federal or state permits, since none of the federally or state-listed species listed in Table 6-2 for the PRECorp service territory nests on utility structures.

  - **Section 7.1.4, Recovery Permit**
  - **Section 7.2, Wyoming Permit**
  - **Section 7.3, Montana Permit**

- **Section 8.2.6.2, Federally and State-Listed Species**
- **Section 8.3.3.2, Federally and State-Listed Species**
- **Reporting – Section 8.3, Nest Management**

6.1.3 Migratory Birds

Migratory birds are protected under the MBTA, which is discussed in Chapter 3.0, Regulatory Context. A variety of federal and state permits exist that pertain to the protection of migratory birds, encompassing the majority of the bird species occurring in the PRECorp service territory. To facilitate the use of this APP, cross references to the applicable permits, procedures, and APP sections for migratory birds follow.

- **Injured Migratory Bird:** PRECorp discourages its employees from handling any injured birds, but particularly raptors and large wading birds (e.g., egrets, herons). A number of corporate safety and federal and state regulatory procedures are outlined in Section 8.1, Injured Birds, in the event an injured migratory bird is found on or near a PRECorp facility.

  - **Section 8.1, Injured Birds**

- **Migratory Bird Carcass:** Carcasses of migratory species may not be disposed of without a Special Purpose Salvage Permit. In addition to the federal permit, a state permit is required for disposal of the carcass of a migratory species.

  - **Section 7.1.1, Special Purpose Salvage Permit**
  - **Section 7.2, Wyoming Permit**
  - **Section 7.3, Montana Permit**
  - **Section 8.2.6.3, Migratory Birds**
  - **Reporting – Section 8.2, Carcass Management**

- **Migratory Bird Nest Removal, Relocation, or Destruction:** Most nests encountered on the PRECorp system will be those of migratory species, which are protected under the MBTA. Only active nests of migratory birds are protected by federal law. If the nest is inactive (i.e., no eggs or young present), it may be removed without a federal or state permit.

  For nest relocations, it is important to note that a federal Special Purpose Relocate Permit is required to relocate a nest even if it is inactive. No state permit is required to relocate an inactive nest.

  A Depredation Permit is required to remove or destroy an active nest. A Montana Terrestrial Scientific Collector's Permit and a Wyoming Chapter 33 Permit is also required to remove any active migratory bird nest. Typically, both the federal and state agencies will only authorize the removal of an active migratory bird nest under emergency conditions (i.e., threat to human health or safety).

- **Section 7.1.2, Special Purpose Relocate Permit**
- **Section 7.1.3, Depredation Permit**
- **Section 7.2, Wyoming Permit**
- **Section 7.3, Montana Permit**
- **Section 8.3.3.3, Migratory Birds**
- **Reporting – Section 8.3, Nest Management**

6.1.4 Game Birds

The provisions of the MBTA do not pertain to non-migratory game birds such as grouse, prairie-chickens, quail, wild turkey, and ring-necked pheasant; however, these species are protected under state laws. Although removing the nest of a game bird is not likely to occur on the PRECorp system, Montana and Wyoming require a state permit to remove or relocate an active game bird nest. A state permit also is required to dispose of a game bird carcass.

- **Section 7.2, Wyoming Permit**
- **Section 7.3, Montana Permit**

6.2 Non-Native Species

The MBTA provides legal protection for most birds and their nests in the U.S. (see 50 CFR Part 10.13 for a list of applicable species). However, the MBTA does not protect introduced species, such as the house sparrow, European starling, rock pigeon (formerly rock dove or common pigeon), Eurasian collared-dove, and monk parakeet. Refer to Federal Register 12710, Volume 70, No. 49 for a complete list of non-native, human-introduced bird species not covered under the MBTA. This section describes those non-native species most likely encountered in the PRECorp system.

The European starling is a medium-sized, black songbird with short, triangular wings, speckled plumage, and a short tail (Photo 6-4). The adult in breeding plumage has a distinctive yellow bill and speckled black plumage with purple-green iridescence. Starlings are cavity nesters and will nest in substations.

Photo 6-4 European Starling

The house (or English) sparrow is a medium-sized, stocky sparrow with black-streaked brown upperparts and pale gray underparts (Photo 6-5). These sparrows are cavity nesters; since they are small birds, they will nest in places too small for larger birds like starlings. Although the house sparrow is not protected under the MBTA, there are more than 30 native sparrow species that are protected by federal and state laws, so care should be taken to properly identify the bird species involved.

Photo 6-5 House Sparrow

Rock pigeons, or feral city pigeons, are large, chunky doves (Photo 6-6). They have variable plumage (some can be entirely chestnut, white, black, or anything in between). Rock pigeons nest on a variety of covered, flat surfaces, including ledges and beams in substations and buildings.

Photo 6-6 Rock Pigeon

The monk parakeet (Photo 6-7) (also known as the Quaker parrot) is a new addition to the list of non-native nuisance birds in the U.S. Monk parakeets are from the temperate zones in South America and have flourished as far north as New York and Chicago. To date in the U.S., monk parakeets number in the thousands, with the population expected to double every 4 to 5 years. Like the other four exotic bird species discussed, monk parakeets have easily adapted to urban areas and human-related activities. This green and gray parakeet constructs large dome-shaped nests of woven sticks, often on utility structures (Photo 6-8), and commonly nest in substations.

Photo 6-7 Monk Parakeet

Photo 6-8 Monk Parakeet Nest

The Eurasian collared-dove (Photo 6-10) is thought to originate in and around India before spreading to Europe and more recently across much of North America, the extent and impact of which is yet unknown. This dove is slightly larger than the native mourning dove (Photo 6-9), is sandy color with a darker back and a blue-gray wing patch. It has white-tipped tail feathers and a black half-collar on the back of its neck from which it gets its name. The short legs are red and its beak is black. The Eurasian collared-dove builds nests made of twigs, stems, roots, and grasses. It is often found in open habitats within suburban and agricultural areas, and may use trees, poles, and overhead wires for nesting, roosting, and territorial defense.

Photo 6-10 Eurasian Collared-Dove

Photo 6-9 Larger Eurasian Collared-Dove in Comparison with Smaller Native Mourning Dove

7.0 PERMITS

7.1 Permits Relating to Avian Interactions with Utility Structures

The following is an overview of USFWS and state permits to address avian interactions with power lines. PRECorp has the following permits: Special Purpose Salvage Permit that expires 03/31/2009 (verbally extended by USFWS); and Wyoming Chapter 33 Permit that expires 12/31/2010. The APP Coordinator's office or approved environmental contractor is responsible for seeking the various permits. Federal permit applications are available online at www.fws.gov/permits/applicationmain.shtml, state permit applications are available online at http://gf.state.wy.us/admin/Regs/index.asp (WY) and http://fwp.mt.gov/doingBusiness/licenses/scientificWildlife.html (MT). Each permit application form is included in Appendix F. The general activities allowed for each type of permit are listed in Table 7-1. For additional guidance on nesting issues, refer to the USFWS Nest Destruction Policy in Appendix G.

7.1.1 Special Purpose Salvage Permit (MBTA)

Issue: If a carcass of a migratory bird, T/E species, or eagle is discovered, a Special Purpose Salvage Permit is required to dispose of it. USFWS Region 6 states that disposal of a carcass implies possession; therefore, a salvage permit is needed because a bird carcass may not be possessed without a permit. Without a permit, all bird carcasses must be left on site.

A Special Purpose Salvage Permit authorizes a company to pick up dead birds, abandoned nests, nonviable eggs, and their parts. However, all salvaged birds must be transferred to a designated holding facility. Each bird must be tagged with the following information:

- Date and location the specimen was salvaged.
- PRECorp employee number..
- Permit number under which the specimen was salvaged.

Most utilities that maintain a Special Purpose Salvage Permit store collected carcasses in a designated freezer. All birds salvaged must be deposited at a designated state or federal repository within 6 months of acquisition. Accurate records of operations on a calendar-year basis must be maintained. Records must include the species salvaged, date salvaged, city or county and state where the bird was salvaged, and final disposition of the specimen.

By accepting a Special Purpose Salvage Permit, the USFWS is authorized to enter the premises at any reasonable hour to inspect the wildlife, books, and records. An annual report form from the Regional Migratory Bird Permit Office must be completed. Reports can be found at http://www.fws.gov/migratorybirds/mbpermits.html. This report must be

completed and submitted to the USFWS by January 31 annually. A Special Purpose Salvage Permit is effective for 3 years and may be renewed.

Table 7-1 Actions Allowed for Each Type of State and Federal Permit

Actions Allowed for Each Permit Type	*Special Purpose SALVAGE Permit*	*Special Purpose RELOCATE Permit*	*DEPREDATION Permit*	*RECOVERY Permit (ESA)*	*EAGLE NEST TAKE Permit*	*WY Permit*	*MT Permit*	*No Federal Permit Required*
Dispose of a Bird Carcass:								
Migratory Bird	✓					✓	✓	
Game Bird						✓	✓	×
Non-Native Bird								×
T/E Species	✓					✓	✓	
Eagle	✓					✓	✓	
Remove a Bird Nest (Inactive):						✓	✓	
Migratory Bird								×
Game Bird								×
Non-Native Bird								×
T/E Species				☑		✓	✓	
Eagle					☑	✓	✓	
Remove a Bird Nest (Active):						✓	✓	
Migratory Bird			☑			✓	✓	
Game Bird						✓	✓	×
Non-Native Bird								×
T/E Species				☑		✓	✓	
Eagle					☑	✓	✓	
Relocate a Bird Nest:								
Migratory Bird		☑				✓	✓	
Game Bird						✓	✓	×
Non-Native Bird								×
T/E Species				☑		✓	✓	
Eagle					☑	✓	✓	
Transport or Euthanize Severely Injured Birds:								
All Species								×

✓ - APP Coordinator's office responsible for obtaining permits.
☑ - Approved environmental contractor responsible for obtaining permits.

Montana requires a Terrestrial Scientific Collector's Permit and Wyoming requires a Chapter 33 Permit to salvage a carcass (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit). The federal permit is not valid unless personnel also are in compliance with state requirements.

7.1.2 Special Purpose Relocate Permit (MBTA)

Issue: If an active or inactive migratory bird nest needs to be relocated, a Special Purpose Relocate Permit is needed.

A Special Purpose Relocate Permit is required to relocate either active or inactive nests belonging to migratory species. As discussed in Chapter 6.0, Species Protection, the majority of bird species occurring in the PRECorp service territory are protected. Exceptions include the five introduced species discussed in Section 6.2, Non-Native Species, and non-migratory game birds discussed in Section 6.1.4, Game Birds. The nesting season varies by species and geographic area, but most birds nest between February 1 and August 31.

The Special Purpose Relocate Permit is not to be used to remove active nests of migratory species. Destruction of an active nest is handled on a case-by-case basis by applying for a USFWS Depredation Permit (see Section 7.1.3, Depredation Permit).

Eagles and T/E species and their nests receive additional protection under the BGEPA, ESA, and state regulations; therefore, their active and inactive nests may not be impacted without the appropriate permit(s) (see Section 7.1.4, Recovery Permit; Section 7.1.5, Eagle Nest Take Permit; Section 7.2, Wyoming Permit; and Section 7.3, Montana Permit).

The Special Purpose Relocate Permit is effective for 1 year and requires submittal of an annual report listing the actions taken. The permit may be renewed annually. Personnel must carry a copy of this permit when engaging in permitted activities. The permittee must maintain records and file reports in accordance with the permit requirements. Recordkeeping must include the date and location of each nest relocated, species, name of the person who removed the nest, and permit number under which the specimen was removed. An annual report form must be completed and submitted to the USFWS by January 31 of each year. If needed, an approved environmental contractor will obtain Special Purpose Relocate Permits on behalf of PRECorp.

Montana requires a Terrestrial Scientific Collector's Permit and Wyoming requires a Chapter 33 Permit to relocate a nest (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit). The federal permit is not valid unless personnel also are in compliance with state requirements.

7.1.3 Depredation Permit (MBTA)

Issue: If an active migratory bird nest needs to be removed, the preferred action is to relocate the nest after acquiring a Special Purpose Relocate Permit. If an active nest needs to be removed and it is not possible to relocate the nest, a Depredation Permit is required.

A Depredation Permit is required to remove (i.e., destroy) active nests belonging to species protected by the MBTA. As discussed in Chapter 6.0, Species Protection, the majority of bird species occurring in the PRECorp service territory are protected. Exceptions include the five introduced species discussed in Section 6.2, Non-Native Species, and non-migratory game birds discussed in Section 6.1.4, Game Birds. The nesting season varies by species and geographic area, but most birds nest between February 1 and August 31.

The Depredation Permit is not to be used to relocate nests of migratory species. Relocation of a nest is handled by applying for a USFWS Special Purpose Relocate Permit, as described in Section 7.1.2.

A Depredation Permit authorizes certain management and control activities necessary to provide for human health and safety, protect personal property, or allow resolution of other injury to people or property. A Depredation Permit is intended to provide short-term relief from migratory bird depredation until long-term measures can be implemented to reduce or eliminate the problem. Orphaned young and eggs must be turned over to a federally licensed wildlife rehabilitator.

A Depredation Permit can be obtained only on a case-by-case basis. After the initial permit is obtained, it may be amended. Except in emergency situations (i.e., threat to human health or safety) the Depredation Permit must be amended prior to each removal. The permit is effective for 1 year and requires an annual report listing the actions taken. The permit may be renewed each year. Personnel must carry a copy of this permit when engaging in permitted activities. It is important to note that eagles and T/E species receive additional protection and, in these cases, both active *and* inactive nests are protected; therefore, a Depredation Permit is not the appropriate permit for eagles or federally listed species.

The permittee must maintain records and file reports in accordance with the permit requirements. Recordkeeping must include the date and location of each nest removed, species, name of the person who removed the nest, and permit number under which the specimen was removed. An annual report form must be submitted to the USFWS by January 31 of each year. If needed, an approved environmental contractor will obtain Depredation Permits on behalf of PRECorp.

This permit should be used as a last resort to manage problem nests. When possible, a migratory bird nest that may become a human health or safety concern should be removed (destroyed) outside the active nesting season, per the USFWS Nest

Destruction Policy (refer to Appendix G) or relocated as discussed in Section 7.1.2, Special Purpose Relocate Permit.

Montana requires a Terrestrial Scientific Collector's Permit and Wyoming requires a Chapter 33 Permit to remove active migratory bird nests (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit). The federal permit is not valid unless personnel also are in compliance with state requirements.

7.1.4 Recovery Permit (ESA)

Issue: If a company encounters a T/E species nest that needs to be removed or relocated, a special permit under the ESA is required: a Section 10(a)(1)(A) Recovery Permit - Scientific Purposes and Enhancement of Propagation or Survival Permit (Recovery Permit).

A Recovery Permit is required to remove or relocate nests belonging to species protected by the federal ESA. Removal or relocation of a federally listed T/E species' nest is a special case and requires close coordination with both federal and state agencies. Established and mandatory requirements apply to this permit application through the USFWS' Endangered Species Office and the appropriate state office. This permit follows the same guidelines as the previously described Special Purpose Relocate Permit in Section 7.1.2.

7.1.5 Eagle Nest Take Permit (BGEPA)

Issue: If a company needs to disturb, relocate, or remove a golden eagle or bald eagle nest or if company operations will result in the take of an eagle, an Eagle Nest Take Permit is required. The permittee must comply with any mitigation measures determined by the USFWS.

Disturbance: The USFWS regulations set forth in section § 22.26 govern the issuance of permits to take bald eagles and golden eagles, where the taking is associated with (but not the purpose of) the activity, and cannot practicably be avoided. Most take authorized under this section is in the form of disturbance; however, permits may authorize non-purposeful take that may result in eagle mortality.

Nesting: The USFWS regulations set forth in section § 22.27 establish the issuance of permits for removing eagle nests where (1) it is necessary to alleviate a safety emergency to people or eagles, (2) it is necessary to ensure public health and safety, (3) the nest prevents the use of a human-engineered structure, or (4) the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests may be taken except in the case of safety emergencies. Inactive nests are defined by the continuous absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days leading up to the time of take.

The removal or relocation of a golden eagle or bald eagle nest is addressed on a case-by-case basis and requires close coordination with the federal USFWS and either Montana FWP or the Wyoming GFD. The USFWS will only authorize take of bald or golden eagles if it can be determined that the take (1) is compatible with the preservation of the bald eagle and the golden eagle and (2) cannot practicably be avoided. If needed, an approved environmental contractor will obtain Eagle Nest Take Permits on behalf of PRECorp.

Individual or Programmatic Permits: The eagle regulations allow applications for either individual or programmatic permits to "take" eagles. Individual take is defined as a one-time occurrence. Programmatic take is defined as "take that (1) is recurring but not caused solely by indirect effects and (2) occurring over the long term and/or in location or locations that cannot be specifically identified. A programmatic take permit would only be issued when an applicant has developed comprehensive measures to reduce take to the degree practicable and would be valid for 5 years

Authorization of a programmatic permit is applicable to industries, such as electric utilities, that currently take eagles in the course of otherwise lawful activities on an ongoing, operational basis, but also can work with the USFWS to develop and implement additional, exceptionally comprehensive measures to reduce take to the level where it is essentially unavoidable. The USFWS cites the example of an appropriate use of a programmatic permit to take eagles: "Utilities that kill eagles through collisions and electrocutions from contact with power lines."

Both advantages and disadvantages exist for the programmatic permit process. Advantages include the reduction in liability and application of take thresholds. Disadvantages include the fact that the process is more complex and would *not* indemnify a utility from taking non-eagle species such as hawks and owls. Records relating to the activities conducted under this permit must be maintained for a minimum of 5 years.

The federal permit is not valid unless it is also in compliance with state requirements. Montana requires the Terrestrial Scientific Collector's Permit to accompany activities covered under federal bird permits. Wyoming requires a Chapter 33 Permit to remove an eagle nest.

7.2 Wyoming Game and Fish Department Permit

The Wyoming GFD requires a Chapter 33 Permit for activities covered under the federal bird permits. Only one Chapter 33 Permit is needed for all held federal permits (i.e., a separate Chapter 33 Permit is not required for each federal permit). However, a Chapter 33 Permit must be amended to match any modifications made to a federal permit. Personnel must carry a copy of this permit when removing/relocating a nest or possessing a native bird carcass in Wyoming.

If a carcass is salvaged under a federal Special Purpose Salvage Permit, the carcass must be disposed of per the stipulations in the federal permit. At the USFWS' request, a carcass may be transferred to the Wyoming GFD if the local wildlife officer is willing to store and transfer the carcasses to the USFWS.

Neither the USFWS nor the Wyoming GFD requires a permit to remove an inactive migratory bird nest

To receive consideration for the Chapter 33 Permit, PRECorp must submit a permit application to the Wyoming GFD. The application form is available online at http://gf.state.wy.us/admin/Regs/index.asp and should be submitted to:

Wyoming Game and Fish Department
5400 Bishop Blvd.
Cheyenne, Wyoming 82006

Copies of any required federal permits for the take or possession of wildlife, if applicable, must accompany the state's permit application. The permit is valid until the end of a calendar year. Parallel to the federal process, a report of activities conducted under the permit is due to the Wyoming GFD by January 31.

7.3 Montana Fish, Wildlife & Parks Permit

Montana FWP requires a Terrestrial Scientific Collector's Permit for activities covered under the federal bird permits. Only one state permit is needed for all held federal permits (i.e., a separate state permit is not required for each federal permit). However, a state permit must be amended to match any modifications made to a federal permit. Personnel must carry a copy of this permit when removing/relocating a nest or possessing a native bird carcass in Montana.

If a carcass is salvaged under a federal Special Purpose Salvage Permit, the carcass must be disposed of per the stipulations in the federal permit. At the USFWS' request, a carcass may be transferred to Montana FWP if the local wildlife officer is willing to store and transfer the carcasses to the USFWS.

To receive consideration for the state permit, PRECorp must submit a permit application to Montana FWP. The application and reporting form are available from the state office and online at: http://fwp.mt.gov/doingBusiness/licenses/scientificWildlife.html. All correspondence should be submitted to:

Montana Fish, Wildlife & Parks
Attn: Wildlife Bureau
Terrestrial Scientific Collector's Permits
PO Box 200701
Helena, MT 59620

Copies of any required federal permits for the take or possession of wildlife, if applicable, must accompany the state's permit application. Permits will expire at the end of the year on December 31 (or on project-end dates, when appropriate) and will not be issued for longer than 3-year time periods. Parallel to the federal process, a report of activities conducted under the permit is due to the Montana FWP by December 31.

7.4 Permittee Responsibility

Activities involving possession of bird carcasses, potential disturbance of birds, or removal of nests must follow the guidelines and procedures in this section. All employees must be responsible for knowing and complying with this APP. PRECorp is responsible for contractor activities that impact birds.

The APP Coordinator's office is responsible for contacting the USFWS, Montana FWP, and the Wyoming GFD to obtain necessary permits or guidance.

Refer to Appendix A for approved list of environmental contractors that are authorized by PRECorp to assist with permits.

Any contact with a federal or state wildlife officer should be handled as a regulatory inspection, and employees must follow their department's applicable procedure.

8.0 MANAGEMENT PROCEDURES

The following management procedures are intended for PRECorp's field personnel and the APP Coordinator. The APP Coordinator's office is the main contact point for field personnel encountering birds and their nests. These procedures are designed to provide detailed information about how to address avian issues. The laws driving these procedures are discussed in Section 6.1, Protected Species. A discussion on obtaining permits is provided in Chapter 7.0, Permits.

8.1 Injured Birds

Field personnel are instructed to contact the APP Coordinator's office if an injured bird is encountered. The APP Coordinator's office will contact the appropriate Wyoming GFD or Montana FWP office or a federally licensed and trained rehabilitator. If the APP Coordinator's office cannot be reached, field personnel should contact one of the following agencies:

Wyoming Contacts:	***Montana Contacts:***
Wyoming Game and Fish Department 307-777-4600 ♦ http://gf.state.wy.us/ Irah Leonetti Game Warden (Gillette) 307-687-7157 Sheridan Regional Office 307-672-7418 ***Bird Rehabilitator:*** Diane Lambert Northeastern Wyoming Raptor Center Gillette, WY 307-689-6483	Montana, Fish, Wildlife & Parks 406-444-4039 ♦ http://fwp.mt.gov/ Harold Guse Game Warden Captain (Billings) 406-247-2940 ***Bird Rehabilitator:*** Montana Raptor Conservation Center Bozeman, MT 406-585-1211

Other key contact personnel, including wildlife rehabilitators, are included in Appendix B.

PRECorp discourages its employees from handling any injured birds, but particularly raptors (e.g., hawks, owls, eagles, falcons) and large wading birds (e.g., egrets, herons). These species have powerful and potentially dangerous defenses such as sharp talons and/or beaks that can cause eye injuries or other serious harm to employees. Wild birds are unpredictable and will aggressively defend themselves. Even a seriously injured bird may be dangerous.

While awaiting professional assistance, the employee may cover the bird (or at least its head) with a loosely woven cloth. This minimizes stress on the bird while still allowing it to breathe. This should be done on large species only if the employee is wearing eye protection and can cover the bird while maintaining a safe distance from the animal. If the bird is injured at a PRECorp facility, a Bird Incident/Mitigation Report Form (Appendix H) must be completed and submitted to the APP Coordinator's office within 48 hours of discovery of the injured bird. If this is not possible, the APP Coordinator's office must be called within 24 hours and the form submitted the following work day.

8.2 Carcass Management

PRECorp discourages its employees from handling carcasses. Employees may not take possession of any bird (alive or dead), portion of a bird, egg, or portion of an egg without first contacting the APP Coordinator's office for guidance on proper procedures (see Figure 8-1 and Section 8.2.3, Carcass Disposal). The following guidelines apply in *all* bird mortality situations.

8.2.1 Carcass Discovery

When a bird carcass is found at a PRECorp facility, field personnel will contact the APP Coordinator's office with species information and bird location. Field personnel will follow up by completing a PRECorp Bird Incident/Mitigation Report Form (Appendix H) for submittal to the PRECorp APP Coordinator's office. When possible, field personnel should take photos with enough detail to aid in identifying the bird species. If photos of the carcass are not possible and the bird species is unknown, an overall description of the bird size and appearance should be included. If the bird has a leg band, the band number must be recorded on the Bird Incident/Mitigation Report Form.

Photo 8-1 Carcass Removal from Electrical Equipment

This form must be submitted to the APP Coordinator's office within 48 hours of discovery. If this is not possible, the APP Coordinator's office must be called within 24 hours and the form submitted the following work day. If a carcass is tangled up in electrical equipment, field personnel may knock it free (Photo 8-1). PRECorp encourages its field personnel to take photos of tangled carcasses prior to dislodging them.

Dead or Injured Bird on PRECorp Property or Facilities

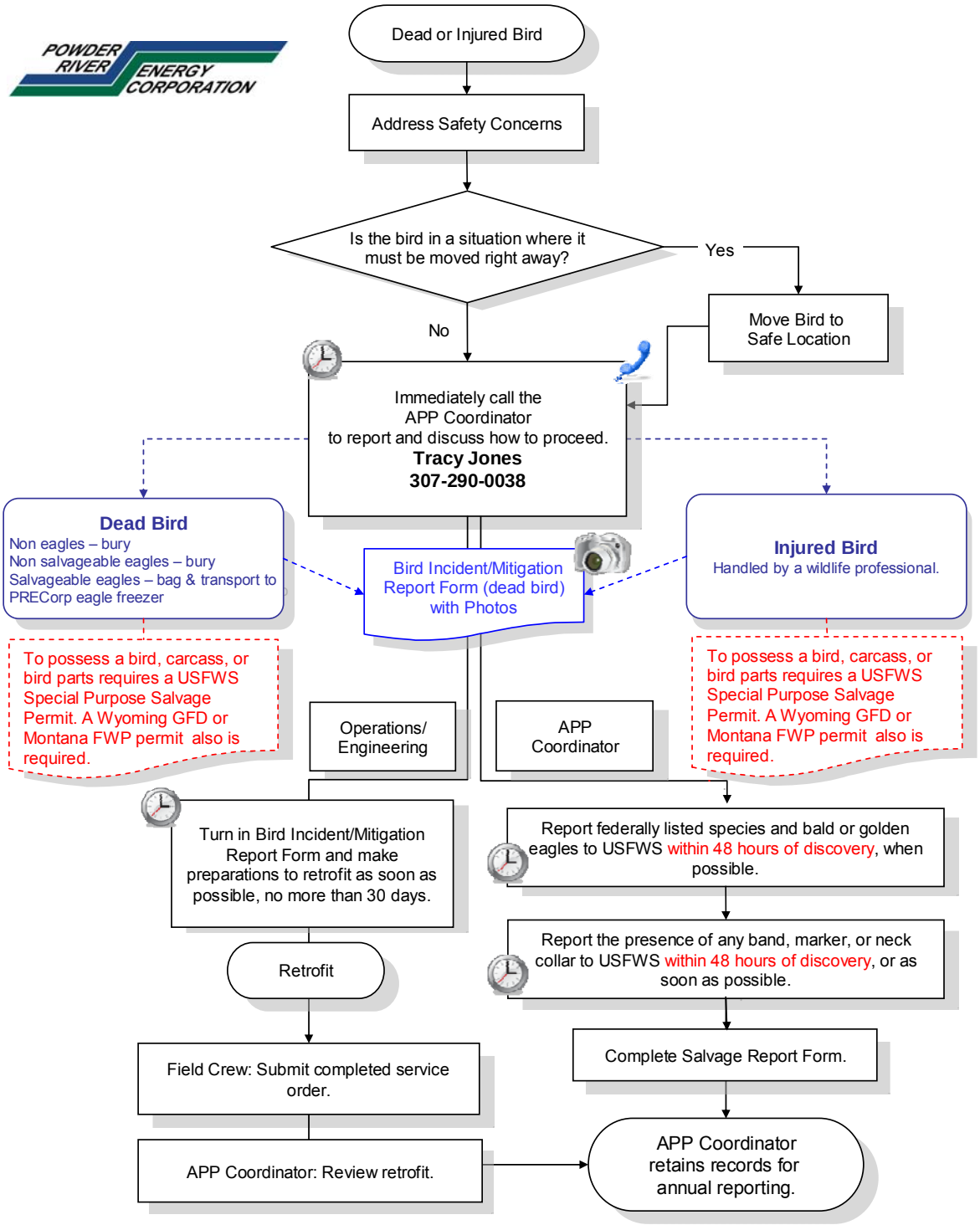


Figure 8-1 Bird Mortality/Injury Management Procedures

8.2.2 Corrective Measures

If a bird is killed or injured on a PRECorp facility, the APP Coordinator's office will work with Operations to address the applicable retrofitting approach and will document the corrective actions.

This process begins with an Operations clerk initiating a Service Order with the proposed retrofitting measures. This electronic work flow task then flows to the linemen. After the work is completed the linemen must notify the Operations clerk to close the operations task. The modified structure information is added to PRECorp's GIS system and the APP Coordinator's office is notified of the completed task.

After mitigating measures (e.g., pole retrofit) are completed, a follow-up inspection will be conducted by the APP Coordinator. If corrective procedures are not determined to be sufficient, Operations/Engineering will readdress the measures and make the appropriate adjustments. If additional measures are needed, another inspection must be completed. The final inspection report must reside with the APP Coordinator's office and must be combined with the initial Bird Incident/Mitigation Report Form. Subsequent agency documentation is discussed in Section 8.2.5, Agency Reporting.

8.2.3 Carcass Disposal

Non-eagle carcasses are buried on-site or covered up with rocks, if burial is not possible. Eagles that are too decomposed or electrically burned to be salvaged should also be buried. Salvageable eagles are to be placed in the special bird carcass bags provided in the Salvage Packet provided for every line truck. These carcasses are to be transported to PRECorp's eagle salvage freezers located in Gillette, Kaycee, Newcastle, Sheridan, Sundance, and Wright. Refer to Personnel Safety in Section 8.2.4 on how to handle carcasses.

The APP Coordinator's office will coordinate with the appropriate agencies and arrange for transfer of salvageable eagle carcasses to the National Eagle Repository. The APP Coordinator's office also will complete a Salvage Report Form (Appendix H).

8.2.4 Personnel Safety

Any employee handling a carcass must wear protective clothing including gloves that can be disinfected or discarded. Coveralls, rubber boots, and latex or rubber gloves are recommended, if available. Disposable gloves are provided in the Salvage Packet provided for every line truck. Employees may not eat, drink, or smoke while handling carcasses and must wash hands with soap and water or disinfect with alcohol after disposing of a carcass. All work surfaces and equipment exposed to a carcass also must be disinfected.

8.2.5 Agency Reporting

The APP Coordinator's office is responsible for maintaining reports encompassing the company-wide bird injury, mortality, and nest management activities. The APP Coordinator's office is responsible for preparing and submitting all forms and reports to the USFWS (Appendix B). The APP Coordinator's office will compile an annual report of bird mortalities and injuries related to the electric power systems operated by PRECorp and of any corrective actions taken as a result. These reports will be submitted to the USFWS no later than March 31 of each year for the preceding year.

8.2.6 Permits Required for Carcass Disposal

Depending on the species, carcasses may be disposed of only after obtaining the appropriate permit.

8.2.6.1 Eagles

Eagle carcasses may not be disposed of without a Special Purpose Salvage Permit (refer to Section 7.1.1). Even with a permit, USFWS notification and coordination is required. In addition to the federal permit, Montana FWP requires a Terrestrial Scientific Collector's Permit and the Wyoming GFD requires a Chapter 33 Permit for disposal of an eagle carcass (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit). If an eagle carcass is in good shape, the carcass is to be transported and stored in a freezer until it can be collected by the USFWS for delivery to the National Eagle Repository in Denver, Colorado. The USFWS established the National Eagle Repository in the early 1970s to provide Native Americans with the feathers of golden and bald eagles requested for religious purposes.

8.2.6.2 Federally and State-Listed Species

Carcasses of T/E species may not be disposed of without a Special Purpose Salvage Permit (refer to Section 7.1.1). Even with a permit, USFWS notification and coordination is required. In addition to the federal permit, Montana FWP requires a Terrestrial Scientific Collector's Permit and the Wyoming GFD requires a Chapter 33 Permit for disposal of the carcass of a T/E species (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit).

8.2.6.3 Migratory Birds

Carcasses of migratory species may not be disposed of without a Special Purpose Salvage Permit (refer to Section 7.1.1). In addition to the federal permit, Montana FWP requires a Terrestrial Scientific Collector's Permit and the Wyoming GFD requires a Chapter 33 Permit for disposal of the carcass of a migratory species (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit).

8.2.6.4 Game Birds

Carcasses of non-migratory game birds such as quail, grouse, and ring-necked pheasant may not be disposed of without a Montana FWP Terrestrial Scientific Collector's Permit or a Wyoming GFD Chapter 33 Permit (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit).

8.2.6.5 Non-Native Species

Carcasses of non-native species may be disposed of without any permits.

8.3 Nest Management

Many birds nest on distribution and transmission structures, which can result in operational problems and increase the risk of outages, pole fires, and bird fatalities. Nest removal typically does not solve the problem because many species will rebuild at the same location. However, there are viable solutions to minimize nest problems including relocating nests, installing artificial nesting platforms, and using alternative structure designs. These options are discussed in detail in Chapter 12.0, Standards to Mitigate Nesting.

The purpose of this section is to ensure PRECorp's employees comply with federal and state requirements pertaining to migratory bird nests (including those of eagles). Following these guidelines will help ensure that a project is not delayed due to failure by PRECorp's personnel to comply with such requirements. A brochure with these guidelines is included Appendix E. Appendix G contains a copy of the USFWS Nest Destruction Policy, which provides additional guidance for destruction of nests including those of colonial, ground, and cavity nesting birds.

8.3.1 Nest Assessment and Reporting

When field personnel encounter a nest that is causing or may cause a problem, they will notify the APP Coordinator's office, which will then complete the PRECorp Nest Report Form (Appendix H). A reporting form is required even if the nest does not pose an immediate operational or maintenance problem.

If the nest poses an operational or maintenance problem, the following must be determined:

1. Is the nest is active?
2. What is the nesting species?
3. Does the nest pose an emergency situation?

It is important to identify the species and whether the nest is active (i.e., containing eggs or young), since eagles and T/E species have special protection extending to inactive nests (see Section 6.1, Protected Species). The procedural flow chart for field personnel and nest management is presented in Figure 8-2.

Nest on PRECorp Property or Facilities

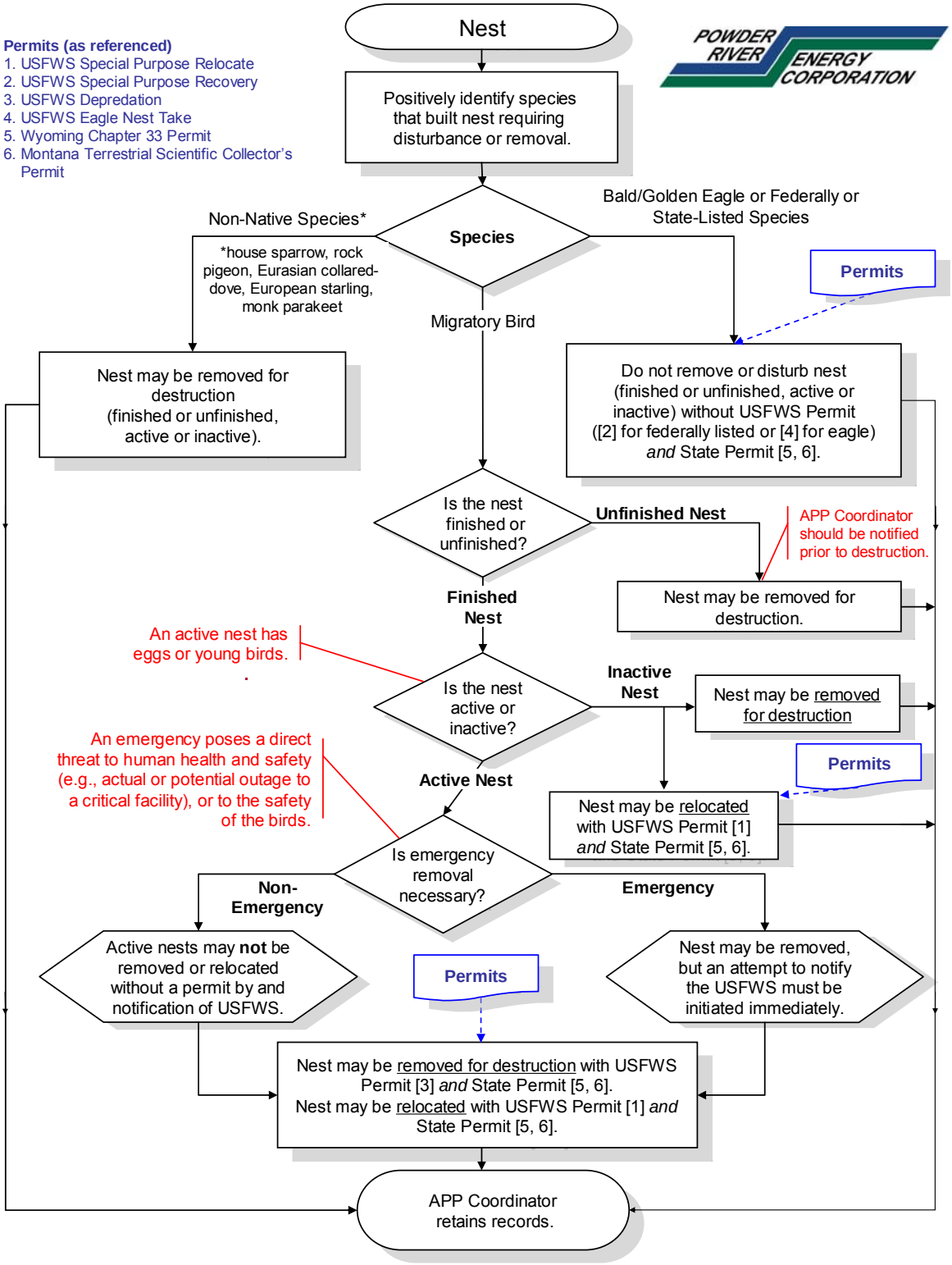


Figure 8-2 Nest Management Procedures

8.3.2 Nest Identification and Protection

Special status species that may be encountered in the PRECorp area include the bald eagle and golden eagle. These species and their nests are protected even from disturbance (see Section 6.1, Protected Species).

It is important to accurately identify the species involved. If the species is identified incorrectly, it can result in actions that are in violation of state and federal laws. The following sections describe the options for nest management based upon the species and whether the nest is active. *If uncertain about the identification of a nest or bird, contact the APP Coordinator's office.*

8.3.2.1 Eagles

Although eagles will nest on transmission structures, they avoid the smaller distribution configurations. Because eagles are legally protected from disturbance, the APP Coordinator's office will coordinate with an approved environmental contractor and the USFWS if any activity is planned within 0.5 mile of a known eagle nest or, in the case of bald eagles, within 0.5 mile of a communal roosting site.

The *National Bald Eagle Management Guidelines* (USFWS 2007) present USFWS recommendations for avoiding disturbance to bald eagles from new or intermittent activities proposed near eagle nests. Activities are separated into eight categories (A through H) based on the nature and magnitude of impacts that usually result from the activity. Power line construction is considered a Category A activity.

Impacts often vary, depending on the whether the activity can be seen from the nest, and whether similar activities are already occurring in the area. Visibility is a factor because eagles generally are more prone to disturbance when an activity occurs in full view. For this reason, the USFWS guidelines recommend that activities should be located farther from a nest in areas with open vistas, in contrast to areas where the view is shielded by rolling topography, trees, or other screening factors. The guidelines also consider the existence of similar activities in the area because the continued presence of nesting bald eagles near the existing activities indicates the eagles in that area may have habituated and can tolerate more human activity than can be expected from eagles in areas experiencing fewer human impacts. To illustrate how these factors affect the likelihood of disturbing eagles, the USFWS incorporated recommendations for Category A activities into Table 8-1.

Table 8-1 USFWS-Recommended Buffers for Category A Activities near Bald Eagle Nests

Category A	*If there is no similar activity within 1 mile of the nest*	*If there is similar activity closer than 1 mile from the nest*
If the activity will be visible from the nest	• Activities should be no closer than 660 feet from the nest. • Landscaping buffers are recommended.	• Activities should be no closer than 660 feet from the nest (or as close as existing tolerated activity of similar scope). • Landscaping buffers are recommended.
If the activity will not be visible from the nest	• Activities should be no closer than 330 feet from the nest. • Clearing, external construction, and landscaping between 330 and 660 feet should be done outside breeding season.	• Activities should be no closer than 330 feet from the nest (or as close as existing tolerated activity of similar scope). • Clearing, external construction, and landscaping within 660 feet should be done outside breeding season.

Source: USFWS 2007

For additional information, refer to the 2007 USFWS *National Bald Eagle Management Guidelines* at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

8.3.2.2 Federally and State-Listed Species

Nest management for federally or state-listed bird species is not likely applicable to PRECorp, since none of the federally or state-listed species listed in Table 6-2 for the company's service territory nests on utility structures. However, information pertaining to the federal and state permitting process for relocating or removing nests of federally listed species is described in Section 7.1.4, Recovery Permit; Section 7.2, Wyoming Permit; and Section 7.3, Montana Permit for future use and referral.

8.3.2.3 Migratory Birds

Most nests encountered within the PRECorp service territory will be those of migratory species and are protected by the MBTA. The most common migratory birds likely to nest on PRECorp's facilities are the osprey, red-tailed hawk, common raven, and western kingbird. Only active nests of migratory birds are protected by federal and state law. If the nest is inactive, it may be removed without a federal permit, but it is important to note that a federal permit is required to relocate a nest even if it is inactive. Nest removal, relocation, and destruction and the associated permits are discussed specifically for migratory birds in Section 8.3.3.3. Some migratory species' nests have additional federal protection, such as both active and inactive bald or golden eagle nests, which are protected under the BGEPA (see Section 8.3.2.1, Eagles).

8.3.2.4 Woodpeckers and Other Cavity Nesters

Woodpeckers and other cavity nesters are migratory birds and, therefore, are protected by the MBTA. If a pole with holes or cavities is to be "changed out," an inspection should be performed to determine whether any nests are active. This can be done by using a flashlight with a mirror to look down into the hole to where a bird might be nesting. If none of the holes contains eggs or young, then the nest is considered inactive.

8.3.2.5 Non-Native Species

Nests of non-native species are not regulated; therefore, activities involving these birds or their nests may proceed without interruption. Non-native species include the house sparrow, European starling, rock pigeon, Eurasian collared-dove, and monk parakeet (see Section 6.2, Non-Native Species).

8.3.3 Nest Removal, Relocation, and Destruction

After determining the nesting species and active status of the nest, the response protocol is based on the species involved and whether the nest is likely to cause an outage (i.e., whether the situation is an emergency or threat to human health and safety).

Emergency – It is PRECorp's policy that a nest may be removed or trimmed to address an emergency. Immediately thereafter, the APP Coordinator's office will notify the appropriate state and federal agencies. An emergency is a situation where human health or safety is at risk and immediate corrective action is necessary. An emergency includes actual or potential electric outages to critical facilities.

Non-Emergency – In a non-emergency situation, a permit to remove a nest will be obtained by the APP Coordinator's office when necessary. Non-emergency situations include all other circumstances where immediate corrective action is not necessary (Photo 8-2). A description of permits and how they are obtained is described in Chapter 7.0, Permits. Copies of the applicable permit will be on site during any nest removal or relocation.

Personnel Safety – Parasites and diseases can be transmitted through contact with nests. PRECorp's employees must wear gloves or use an inverted plastic bag to handle nests. Paper breathing filters also are recommended because dried bird feces may be dispersed into the air when a nest is moved. A "Lineman's Guide to Avian Diseases" is included in Appendix I.

Disposal Method – All removed inactive nests must be disposed of by scattering the nesting material off site to discourage birds from re-nesting at the same location. If active nests need to be removed during emergency situations, the nest must not be disposed of until the USFWS is notified.

Public Awareness – PRECorp's employees will consider public reaction to nest removal or relocation and act in an appropriate manner. Press inquiries will be directed to the APP Coordinator's office.

Photo 8-2 Red-Tailed Hawk Safely Nesting on a Distribution Pole – Non-Emergency

8.3.3.1 Eagles

Special permits and USFWS coordination are required for any activities potentially affecting eagles, including project construction, operations, and ROW maintenance. Active and inactive eagle nests may not be disturbed without first obtaining an Eagle Nest Take Permit and a Wyoming Chapter 33 Permit or a Montana Terrestrial Scientific Collector's Permit (see Section 7.1.5, Section 7.2, and Section 7.3). Typically, both the federal and state agencies will only authorize the removal or relocation of an active eagle nest under emergency conditions (i.e., threat to human health or safety). Refer to Section 3.1, Federal Requirements, for additional information on federal protection beyond disturbance. All activities impacting eagle nests also require a state permit.

8.3.3.2 Federally and State-Listed Species

The federal permit required to remove or relocate the nest of a federally listed species is described in Section 7.1.4, Recovery Permit. In Montana, a Terrestrial Scientific Collector's Permit is required to remove or relocate an active or inactive nest of any federally or state-listed species. In Wyoming, a state Chapter 33 Permit also is required to remove or relocate the nest of a federally or state-listed species (see Section 7.2, Wyoming Permit, and Section 7.3, Montana Permit). The relocation or removal of a federally or state-listed species nest is a special case and requires close coordination with and mandatory requirements through the USFWS' Endangered Species Office and the state. However, it is unlikely PRECorp would require these applicable federal or state permits, since none of the federally or state-listed species listed in Table 6-2 for the PRECorp service territory nests on utility structures.

8.3.3.3 Migratory Birds

Most nests encountered within the PRECorp service territory will be those of migratory species and are protected by the MBTA. Different permits are required for different

actions, depending on whether a nest is proposed to be relocated or removed or is active (i.e., containing eggs or young) or inactive (i.e., no eggs or young present).

If the nest is inactive, it may be removed without a federal permit, but it is important to note that a federal permit is required to relocate a nest even if it is inactive. A Special Purpose Relocate Permit (see Section 7.1.2) is required to relocate a migratory bird nest (both active and inactive). When it is not possible to relocate an active nest, a Depredation Permit is required to remove or destroy the nest (see Section 7.1.3). If a nest is active, a licensed wildlife rehabilitator would need to be on site to care for the eggs and/or young from the nest. The USFWS Nest Destruction Policy provides additional detail on nest removal (see Appendix G).

In Montana, a Terrestrial Scientific Collector's Permit is required to remove or relocate any active migratory bird nest. In Wyoming, a state Chapter 33 Permit also is required to remove or relocate any active migratory bird nest.

Permits require prior notification to the agencies, except during an emergency situation (i.e., threat to human health or safety) to prevent an immediate power outage.

8.3.3.4 Non-Native Species

Nests of non-native species are not regulated; therefore, activities involving these birds or nests can proceed without interruption.

8.4 ROW Management

Power line ROW activities such as mowing and tree trimming have the potential to affect protected birds and their nests. Sensitive species (i.e., eagles and T/E species) and their habitats are protected from disturbance by federal and state laws. In addition, there may be U.S. Forest Service and Bureau of Land Management regulations restricting human encroachment during certain times of the year. Field personnel are instructed to follow the guidelines in Section 8.3, Nest Management, prior to disturbing or relocating a nest. Personnel uncertain about whether an activity will adversely affect a protected species will consult with a supervisor and, if warranted, the APP Coordinator's office will contact the USFWS to discuss approaches to minimize impacts.

8.4.1 Preliminary Assessment

Before ROW activities begin, the site should be checked for active nests. Refer to Section 8.3.2, Nest Identification and Protection, and Section 8.3.3, Nest Removal, Relocation, and Destruction, for information on nest protection procedures. Active nest relocation must be in compliance with the applicable federal and state permits. Contents of an active nest may be relocated to rehabilitators if the nest cannot be avoided.

8.4.2 USFWS Consultation

The APP Coordinator's office will contact the applicable USFWS Permits Office and request the appropriate permits, if migratory species' nests will be affected by project or ROW activities. Additional protection is given to species listed under the ESA and bald and golden eagles (see Section 6.1, Protected Species). The appropriate USFWS Ecological Services Office will be contacted to determine whether projects have the potential to impact T/E species or their habitats. Contact information is provided in Appendix B.

9.0 CONSTRUCTION STANDARDS

PRECorp has developed bird-friendly construction standards (refer to Appendix J). These standards are designed to adhere to APLIC's *Suggested Practices* (2006), with RUS approved modifications, and apply to new construction. Standards are reviewed by the PRECorp standards committee as well as by EDM. Specifically, the following general measures are included:

- 60 inches of phase-to-phase and phase-to-neutral (or phase-to-ground) separation will be provided. When this is not feasible, insulation or isolating measures will be used.
- 40 inches of vertical separation will be provided. When this is not feasible, insulation or isolating measures will be used.
- New equipment will include bushing covers and covered jumpers.
- Arresters and cutouts will be installed with wildlife caps and covered jumpers.
- Primary jumpers with less than adequate separation for eagles or hawks will be covered with insulation.
- In critical sage-grouse habitats, avoidance routing will be practiced. When impractical to avoid critical habitats, perch discouragers will be added to structures to deter perching by eagles.

9.1 New Configurations

New facilities will be avian friendly and constructed using an approved design. If a new utility configuration is needed, it will comply with APLIC's *Suggested Practices* (2006). Because PRECorp is an RUS member, new construction standards also must adhere to RUS guidelines and use materials approved by RUS.

When designing new configurations, refer to Chapter 10.0 (Standards to Reduce Electrocutions) for discussions of avian-friendly construction approaches. After approval by RUS and Operations/Engineering, new configurations will be added to PRECorp's construction standards.

9.2 Retrofitting Standards

Existing power lines may require retrofitting to make them avian friendly. When possible, lines will be retrofitted to meet current new construction standards. If this is not possible, retrofitting approaches to minimize the risk of bird electrocution typically will involve either insulating or isolating potential contact points on a structure. Generally, perch discouragers should be used only as a redundant retrofitting measure. In critical

sage-grouse habitats, however, the addition of perch discouragers is required to deter perching by eagles. PRECorp will finalize its retrofitting standards by December 2010.

9.3 Line Routing

PRECorp utilizes several methods to effectively and economically reduce bird fatalities. An important consideration is in the routing of new lines. PRECorp's environmental review process includes an evaluation of potential bird issues and will follow pertinent recommendations included in APLIC's *Suggested Practices* (2006) for electrocutions and APLIC's *Mitigating Bird Collisions with Power Lines* (1994) for collisions. In addition, specific line routing guidelines are adhered to in critical sage-grouse habitats (refer to the PRECorp Sage-Grouse Protection Plan 2008).

9.4 Site Cleanup

After work is completed, extra materials such as wrap ties, jumpers, nuts, bolts, and broken insulators will be removed from the ground and either disposed of or salvaged. Ravens and hawks often use shiny material (e.g., wire) in their nests. When these birds construct nests on distribution poles, metal nesting material can cause operational problems.

9.5 Inspection

After new power lines are constructed or retrofitted, the Construction Maintenance Coordinator will review the work to ensure construction standards are followed. If corrective procedures are not effective, Operations/Engineering will readdress the measures and make appropriate adjustments. If additional measures are needed, another inspection must be completed.

10.0 STANDARDS TO REDUCE ELECTROCUTIONS

The following sections provide guidance on how to construct new poles or retrofit existing poles to reduce the risk of electrocution to birds and other wildlife. To minimize labor costs, an emphasis was placed on choosing products that are safe to install "hot." However, there are options to these approaches, depending on the company's focus, labor vs. materials costs, issues to be resolved, schedule, and budget. New-construction specifications and retrofit approaches are based on "insulation" vs. "isolation," as outlined in *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006). In areas of critical sage-grouse habitat, PRECorp will incorporate RG (Raptor Guard) construction standards according to their Sage-Grouse Protection Plan (2008).

*Raptor protection measures using insulation are **not** designed to protect linemen. Many products are not rated for the full line voltage and are designed to protect birds from incidental contacts only. Engineering standards should review and approve all raptor protection products prior to their acceptance.*

10.1 Tangent Structures

The most common distribution units located in rural areas are tangent structures. The main electrocution risk issue associated with tangent structures is the spacing of the energized conductors. Another issue is the separation between the primary wires and any groundwires or neutral wires. There are several options for making tangents avian friendly either through new construction techniques or by retrofitting existing lines.

10.1.1 Single-Phase Tangent Structures

Photo 10-1 illustrates a typical single-phase tangent structure constructed on a wood pole. Single-phase lines usually are constructed without crossarms and support a single energized phase conductor on a pole-top insulator. Single-phase structures without pole-top grounds or pole-mounted equipment generally provide adequate separation for all animals.

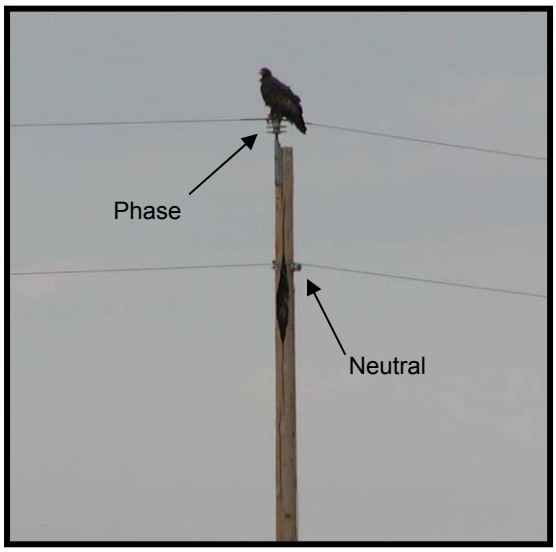


Photo 10-1 Typical Distribution Single-Phase Tangent Pole Configuration (Raptor Friendly)

10.1.2 Three-Phase Tangent Structures

The most common three-phase structures are tangent units. These units may be constructed with the center phase mounted up on the pole top (ridge-pinned) or all the phase wires may be mounted on the crossarm (flat-top).

10.1.2.1 Ridge-Pinned Unit

A typical ridge-pinned distribution unit is a three-phase tangent structure constructed with an 8-foot crossarm supporting two conductors (Figure 10-1). A single energized phase conductor typically sits on a pole-top insulator. Distribution three-phase tangent structures, without pole-top grounds or pole-mounted equipment, provide adequate separation for all but the largest raptors since this provides 48 inches of phase separation (Photo 10-2). The 22-degree angle between the outer and center phase wires provides additional protection. However, this separation is not adequate to protect eagles (Photo 10-3); therefore, in areas where eagles occur, additional protection to minimize the electrocution risk is recommended.

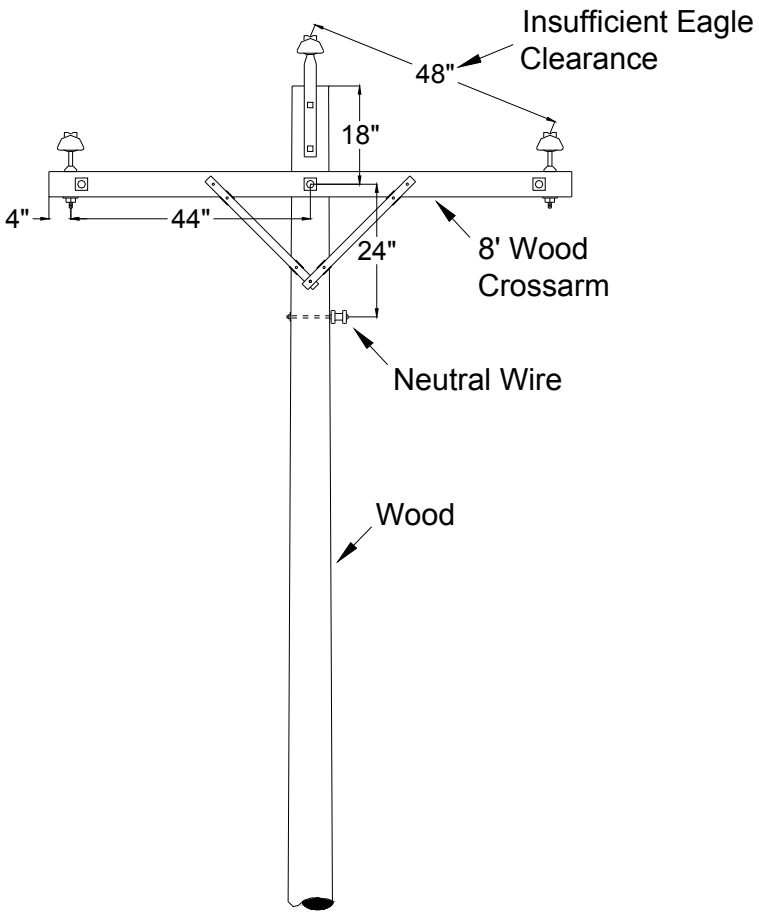


Figure 10-1 Typical Three-Phase Pole with Ridge-Pinned Construction

Photo 10-2 Typical Tangent Structure Provides Adequate Separation (40 Inches) for Hawks

Photo 10-3 Typical Tangent Structure Provides Inadequate Separation (60 Inches) for Eagles

10.1.2.2 Flat-Top Unit

Flat-top construction (Photo 10-4) often is used where additional ground clearances are required (e.g., road and railroad crossings). Unlike ridge-pinned construction, flat-top construction (including poles with the neutral wire below the crossarm) provides less than 40 inches of separation between phases and the neutral (the minimum safe distance for hawks). Accordingly, these configurations place both eagles and smaller raptors at risk.

Photo 10-4 Flat-Top Unit Provides Inadequate Separation (40 Inches) for Hawks

10.1.3 New Construction

In areas where eagles occur, new three-phase tangent structures with 8-foot crossarms should be framed to provide additional clearance, bringing the total phase-to-phase separation to at least 60 inches, as recommended in APLIC 2006. This additional clearance required for eagles can be obtained by lowering the crossarm 24 inches on new construction (Figure 10-2).

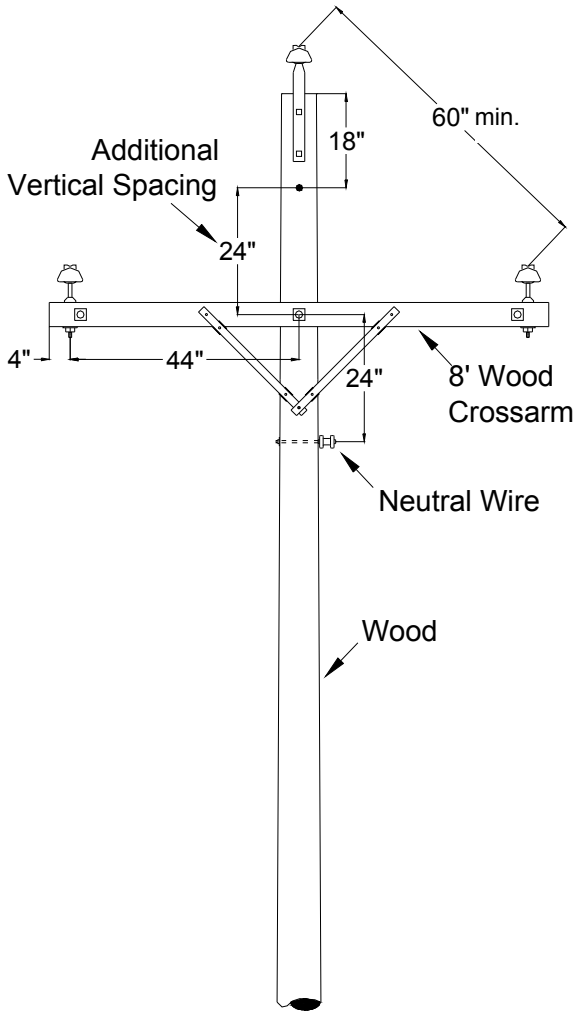


Figure 10-2 Eagle-Friendly Three-Phase Pole Configuration Using an 8-Foot Dropped Crossarm

If large conductors are used (mounted 8 inches from the crossarm end), the 8-foot crossarm would need to be dropped an additional 6 inches (48 inches from the top of the pole) to maintain 60 inches of separation.

Dropping a crossarm an additional 24 inches may require shorter spans or taller poles to maintain ground clearances, adding to the structure cost. A common alternative to dropping the arm is to use a 10-foot crossarm (Figure 10-3). This provides the recommended 60 inches of separation without using taller poles and is the most economical method to make a structure raptor friendly for new construction. On all poles with 10-foot crossarms, PRECorp drops the crossarm an additional 6 inches for a total of 24 inches between the pole top and crossarm.

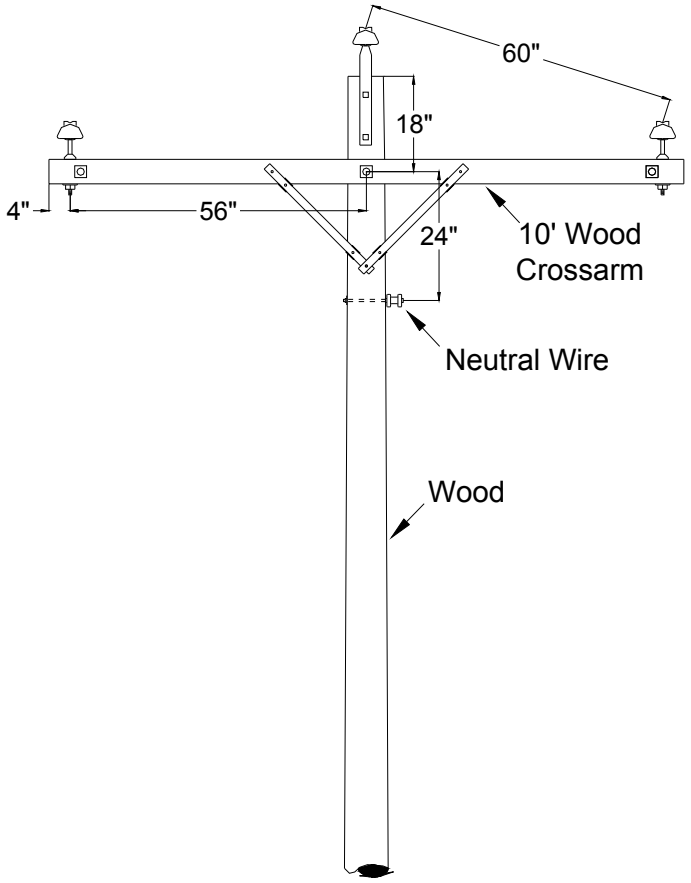


Figure 10-3 Eagle-Friendly Three-Phase Pole Configuration Using a 10-Foot Crossarm

If large conductors are used (mounted 8 inches from the crossarm end), the 10-foot crossarm also would need to be dropped an additional 6 inches (24 inches from the top of the pole) to maintain 60 inches of separation.

10.1.4 Retrofitting

A retrofitting option available to three-phase tangent structures includes installing conductor guards on exposed tangent phase wires. A typical three-phase ridge-pinned tangent unit requires a single unit on the center phase (Figure 10-4), while a typical flat-top tangent unit requires two sets of conductor guards (Figure 10-5).

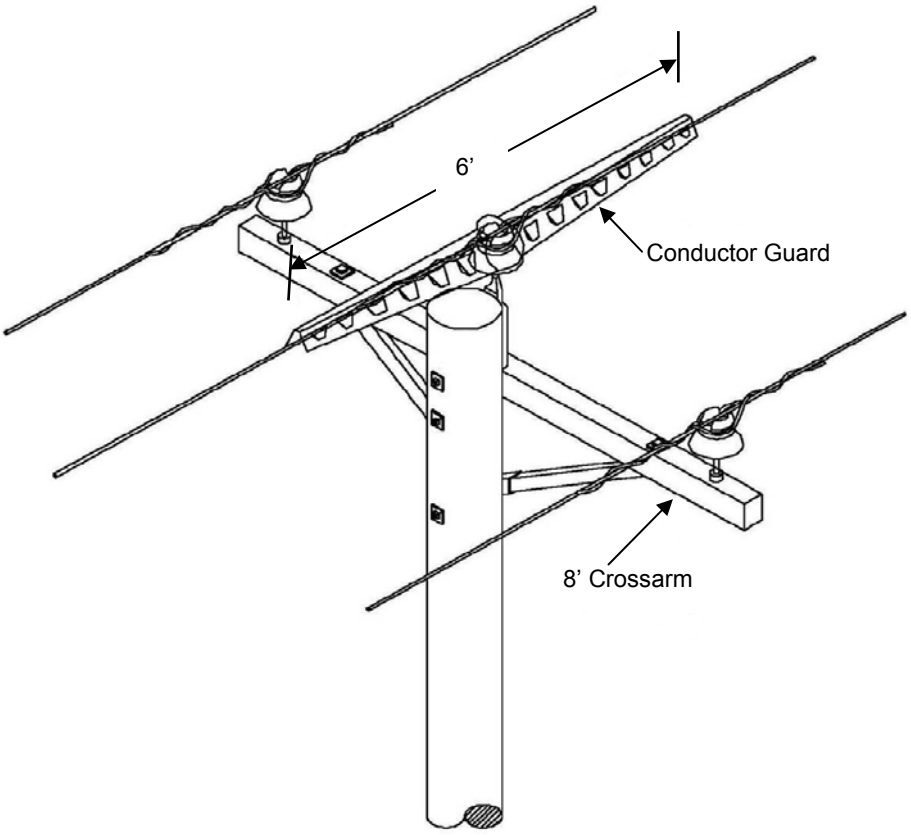


Figure 10-4 Retrofitting a Typical Ridge-Pinned Tangent Structure

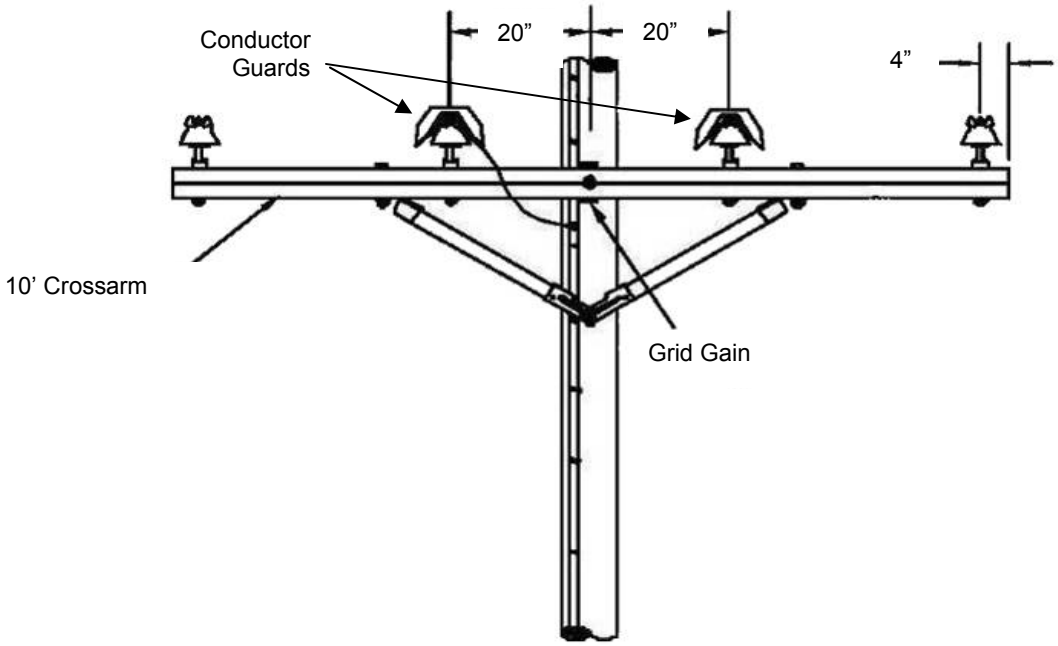


Figure 10-5 Retrofitting a Typical Flat-Top Tangent Structure

There are numerous conductor guards with varying properties (Table 10-1). Some conductor guards can be installed with hot line sticks and will accommodate small line angles.

Table 10-1 Conductor Guard Manufacturers

Manufacturer	Material	Website
Arkonia	Plastisol	http://arkonia.co.uk
Cantega	Polymer	http://www.cantega.com
DMX Industries	Polymer	
EcoElectrical	PVC w/Silicone Coating	http://www.ecoelectrical.com
Kaddas	ABS Plastic	http://www.kaddas.com
Midsun Group	Silicone	http://www.midsungroup.com
Power Line Sentry	Prototype	http://www.powerlinesentry.com
Preformed Line Products	Linear Low Density Polyethylene	http://www.preformed.com
Raychem	Polymer	http://www.Raychem.com

PVC=Polyvinyl Chloride, ABS=Acrylonitrile Butadiene Styrene

Products should be selected to comply with PRECorp's safe work practices and that are easy to install. Material properties should be reviewed to ensure the devices will provide a long-term solution.

In areas where airborne contamination is a concern (e.g., dust, pollution, pollen), a product that completely covers the insulator may cause flashovers because rain cannot wash the insulator. Covering an insulator also makes inspection difficult. Arkonia, Cantega, Midsun Group and Preformed make units that do not fully cover the insulator (Photo 10-5, Photo 10-6, Photo 10-7, and Photo 10-8).

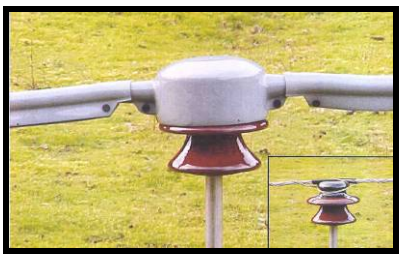


Photo 10-5 Arkonia Conductor Guard

Photo 10-6 Cantega Conductor Guard

Photo 10-7 MidSun Group Conductor Guard

Photo 10-8 Preformed Conductor Guard

When using conductor guards, the conductor must be covered with additional insulating hose for a minimum of 3 feet on either side of the insulator (Photo 10-9). Products from each of the other companies (DMX Industries, EcoElectrical, Kaddas, Preformed, and Raychem) come with snap-on wings to cover the conductor (Photo 10-10, Photo 10-11, Photo 10-12, and Photo 10-13).

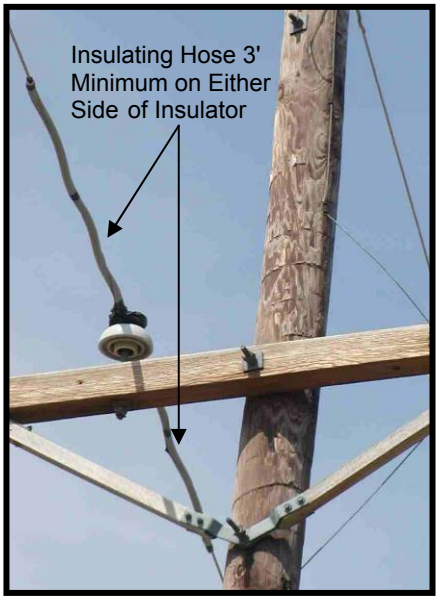


Photo 10-9 Conductor Cover with Additional Insulating Hose

Photo 10-10 DMX Industries Conductor Cover

Photo 10-11 EcoElectrical Conductor Cover

Photo 10-12 Kaddas Conductor Cover

Photo 10-13 Raychem Conductor Cover

Proper installation is critical for devices to perform correctly. For example, the ends of the Kaddas Bird Guard cover (Photo 10-12) must be trimmed to fit the conductor. Failure to properly trim the ends may result in the covers coming off in strong winds. If wind vibration is a concern, some utilities also fit armor rods over the conductor prior to fitting conductor covers.

Rigid covers do not easily accommodate line angles; therefore, special units are needed. Specific guards, such as the EcoElectrical and Raychem units, are constructed to accommodate line angles (Photo 10-11 and Photo 10-13). Additionally, certain guards may fit tightly to the wire and do not easily fit over hot line clamps or stirrups. The Raychem cover (Photo 10-13) is flexible and has sufficient space to accommodate a hot line clamp. Table 10-2 provides product comparison for a number of conductor guards.

Table 10-2 Conductor Guard Properties

Manufacturer	Photo No.	Flexible?	Extend Beyond Top Insulator Shed?	Accommodate Hot Line Clamps?
Arkonia	10-5	Yes	No	No
Cantega	10-6	Yes	No	No
DMX Industries	10-10	Partial	Yes	No
EcoElectrical	10-11	Yes	Partial	No
Kaddas	10-12	No	Yes	No
Midsun Group	10-7	Yes	No	No
Preformed	10-8	Partial	No	No
Raychem	10-13	Yes	Yes	Yes

10.2 Three-Phase Deadend Structures

A deadend is a point on a distribution line where conductors terminate. A double deadend has conductors terminating from two directions. Jumpers are used to connect these two sets of conductors. The arrangement of primary jumpers will affect the electrocution risk to perching birds (i.e., bird friendly or potentially lethal). For example, a three-phase double deadend structure can be configured with the outer phase jumpers placed either over (Photo 10-14) or under (Photo 10-15) the crossarms. To minimize electrocution risk, placing jumpers under the crossarms is preferred (Photo 10-15), because it precludes large birds from making a phase-to-phase contact between the center and outer phase jumpers. Where maintenance safety concerns require jumpers to be placed over the crossarm (Photo 10-14), all three primary jumpers should be covered with insulation materials, to allow incidental contact by perching birds.

Photo 10-14 Three-Phase Double Deadend with Exposed Jumpers Over the Crossarms

Photo 10-15 Three-Phase Double Deadend with Jumpers Passing Under the Crossarms (install insulating links on center phase)

10.2.1 New Construction

In areas where eagles occur, additional clearance is needed to prevent bird phase-to-phase contact when taking off and landing between conductors or between conductors and jumper wires. New three-phase deadend structures with 10-foot crossarms should be framed to 60 inches of phase-to-phase separation, as recommended in APLIC (2006).

This additional clearance required for eagles is achieved by mounting the center phase on the pole 24 inches above the 10-foot crossarm center (Figure 10-6 and Figure 10-7). This recommendation is assuming the outer phases are installed 5 inches from the crossarm end.

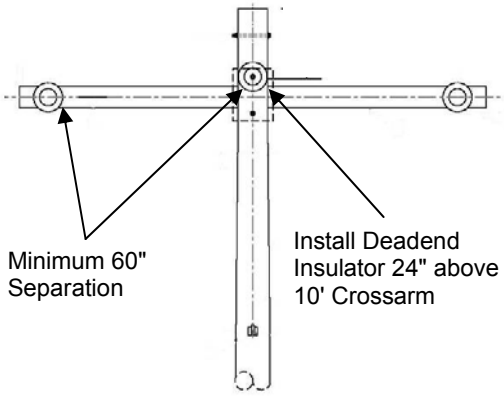


Figure 10-6 Three-Phase Deadend Structure Framed as Eagle Friendly

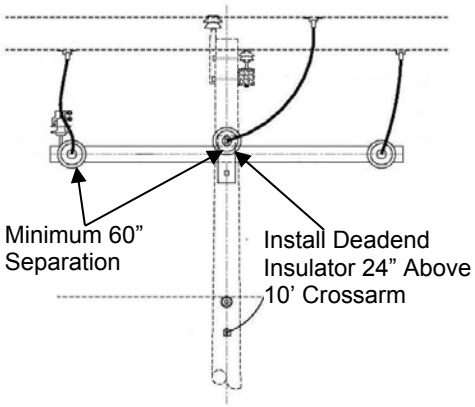


Figure 10-7 Three-Phase Tap Deadend Structure Framed as Eagle Friendly

If it is not feasible to frame a deadend with adequate separation, an alternative solution is to install insulating links. Phase deadends can be fitted with an insulated extension link to provide a minimum of 36 inches of separation for birds taking off or landing (Photo 10-16).

Double deadend configurations require links on both sides of the crossarms (Figure 10-8 and Figure 10-9).

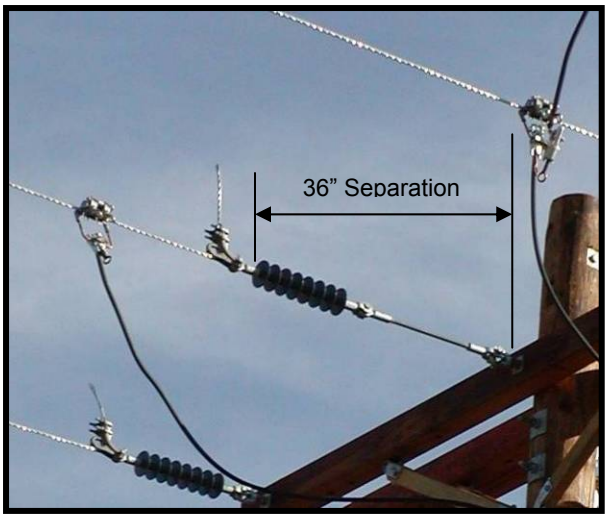


Photo 10-16 Three-Phase Deadend Structure Fitted with an Insulated Extended Link

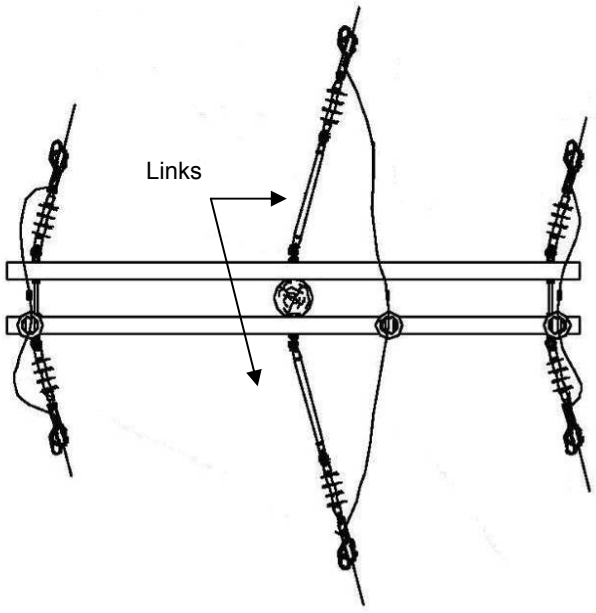


Figure 10-8 Three-Phase Double Deadend Structure Fitted with Two Insulated Extended Links

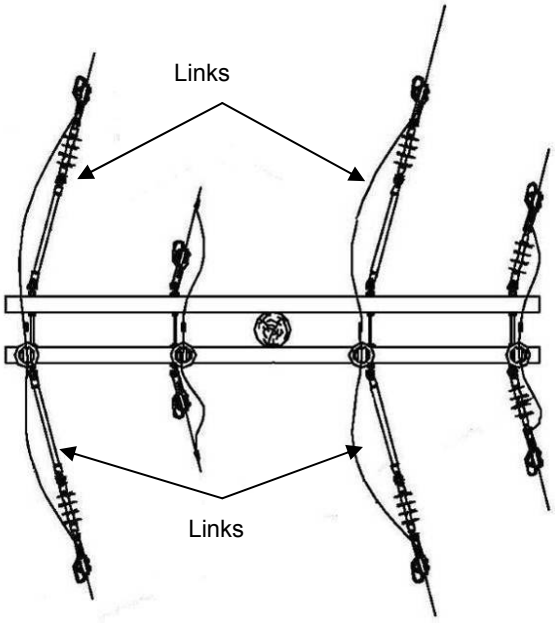


Figure 10-9 Three-Phase Double Deadend Structure Fitted with Four Insulated Extended Links

Deadend poles also require covered jumpers. Jumpers that are unnecessarily long can increase electrocution hazard and should be installed with minimal slack. Additionally, placing the neutral phase on the pole is preferable to terminating it on the crossarm.

Vertical construction is preferred at corners to eliminate jumper issues (Photo 10-17). If jumper wires are near groundwires or grounded guying attachments, the grounds should be covered with protective molding or the jumpers covered.

Photo 10-17 Three-Phase Vertical Structure

10.2.2 Retrofitting

Retrofitting options applicable to three-phase deadend structures include installing conductor deadend covers on exposed phase wires. A typical three-phase deadend unit requires a single unit on the center phase (Figure 10-10).

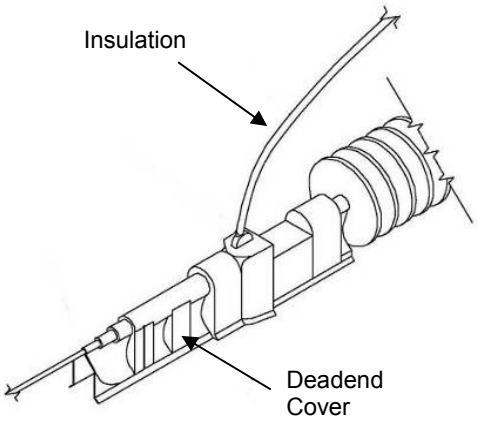


Figure 10-10 Typical Deadend Cover Installation

There are numerous deadend covers with varying properties (Table 10-3) and all can be installed with hot line sticks.

Table 10-3 Deadend Cover Manufacturers

Manufacturer	Material	Website
EcoElectrical	PVC w/Silicone Coating	http://www.ecoelectrical.com
Kaddas	ABS Plastic	http://www.kaddas.com
Raychem	Polymer	http://www.Raychem.com

PVC=Polyvinyl Chloride, ABS=Acrylonitrile Butadiene Styrene

10.3 Risers

A riser is a pole where overhead and underground systems are connected. Riser poles include protective surge arresters and fused cutouts or switches. The riser pothead is the point where overhead electrical conductors come together and transition down the pole to an underground cable. Potheads typically are supported either on metal brackets or wooden crossarms. The spacing of all of these components can be a risk to perching birds (Photo 10-18).

Photo 10-18 Unprotected Riser Pole

Grounded metal pothead brackets associated with riser poles can be hazardous for birds. The brackets are relatively large and offer an attractive perch platform, particularly where trees and other natural perching structures are limited. Riser protective equipment and jumpers should be bird friendly, as discussed in Section 10.6, Cutouts, and Section 10.8, Stinger and Jumper Wires, respectively. The riser pothead should be fitted with a snap-on cover (Figure 10-11). Energized areas that cannot be covered should be wrapped with insulating tape. No exposed wire should extend beyond the bushing cover, and leads should be kept as short as possible.

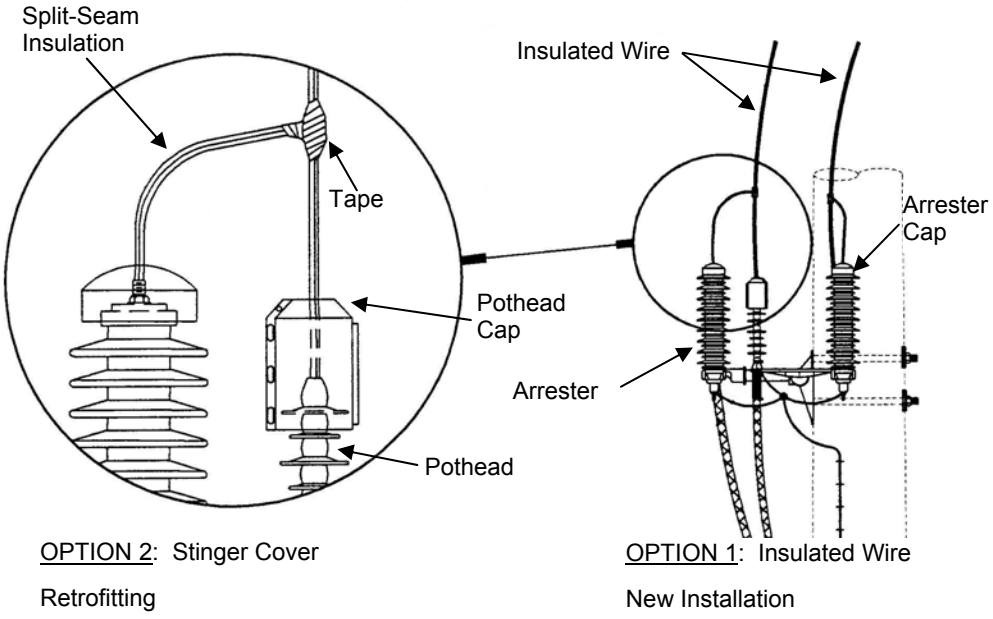


Figure 10-11 Protected Riser Pole with Pothead Covers

10.4 Transformers

Equipment poles can be hazardous to birds, especially if bushing contacts are exposed. Other potential hazards include cutouts, surge arresters, and uninsulated stinger wires. Outages often occur when an animal on a grounded transformer tank either touches one energized stinger wire or bridges the distance between two energized stinger wires. Other potential hazards include phase-to-phase contacts or phase-to-ground contacts among exposed cutouts and surge arresters.

Bushing covers and insulated coverings constitute a protective system that can provide the necessary insulation level to minimize animal-caused outages. There are three options for protecting transformers as depicted in Figure 10-12.

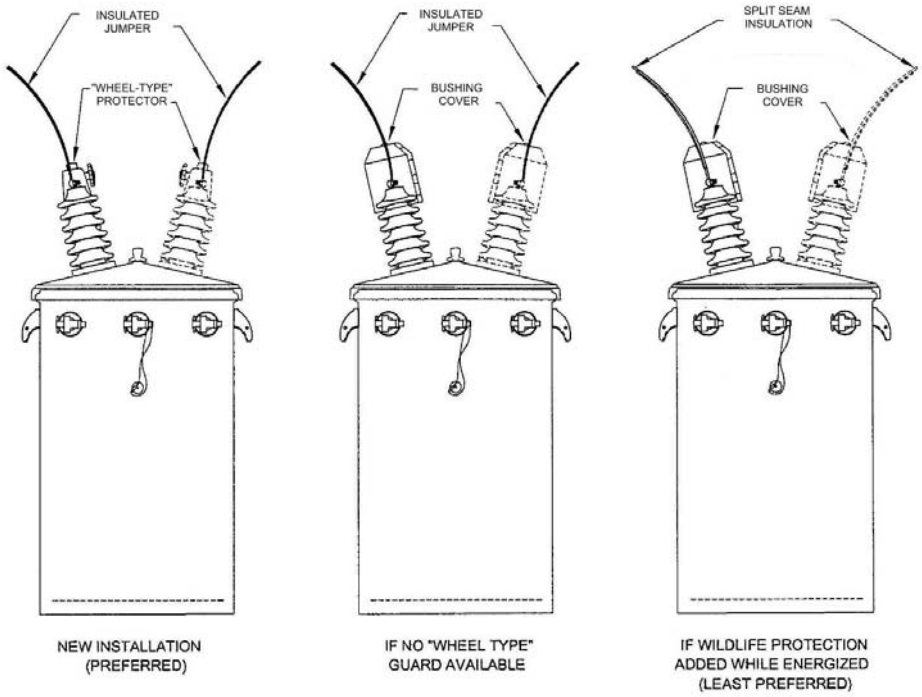


Figure 10-12 Three Options for Protecting Transformers

First, new transformers can be ordered with a "wheel-type" wildlife protector (Photo 10-19) installed by the manufacturer (Table 10-4).

Photo 10-19 "Wheel-Type" Bushing Cover on a Transformer Bushing from the Manufacturer

Table 10-4 "Wheel-Type" Transformer Protector Manufacturers

Manufacturer	Material	Website
Central Moloney, Inc.	Polypropylene	http://centralmoloneyinc.com
Cooper Power Systems	Polypropylene	http://www.cooperpower.com
Howard Industries, Inc.	Polymer	http://www.howard-ind.com
Porcelain Products Company	Porcelain	http://www.porcelainproductsco.com

If the transformer does not come with a "wheel-type" cover, varieties of after-market bushing covers are available (Photo 10-20, Table 10-5, and Figure 10-13). These covers generally are made of track-resistant, high-density polymers that either snap on or slide over bushings. Snap-on covers (Figure 10-13, items A, B, C, and D) allow the cover to be installed without removing the transformer stinger wire. Slide-over units (Figure 10-13, item E) require the transformer stinger wire to be removed temporarily in order to slide the cover over the bushing. For retrofitting purposes, the snap-on type is preferable. Some covers can be ordered in a fire-resistant material. A fire-resistant cover is less likely to cause a pole fire or associated wildfire, since it will not burn and drip if subjected to high temperatures. Bushing covers also can be ordered to cover both the transformer bushing and gapped arrester.

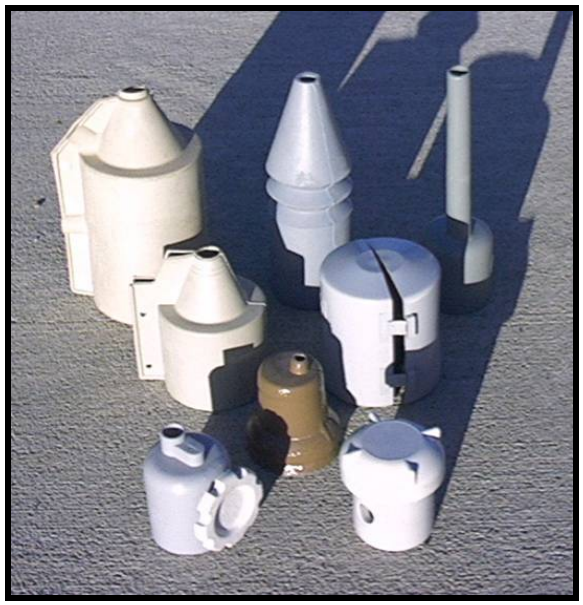


Photo 10-20 After-Market Bushing Covers

Table 10-5 Manufacturers of Snap-On Bushing Covers

Manufacturer	Material	Website
Central Moloney, Inc.	Polypropylene	http://centralmoloneyinc.com
DMX Industries	Polymer	
H.J. Arnett Industries	Polypropylene	http://www.arnettindustries.com
Hendrix Wire and Cable	Polypropylene	http://www.hendrix-wc.com
Howard Industries, Inc.	Polymer	http://www.howard-ind.com
Hubbell	Polypropylene	http://www.hubbellpowersystems.com
Kaddas	Polymer	http://www.kaddas.com
Midsun Group	Silicone	http://www.midsungroup.com
Preformed Line Products	Plastisol	http://www.preformed.com
Raychem	Polymer	http://www.tyco.com
W.H. Salisbury & Co.	SALCOR	http://www.whsalisbury.com
Warco, Inc.	Ethylene Propylene	http://www.warcoinc.com

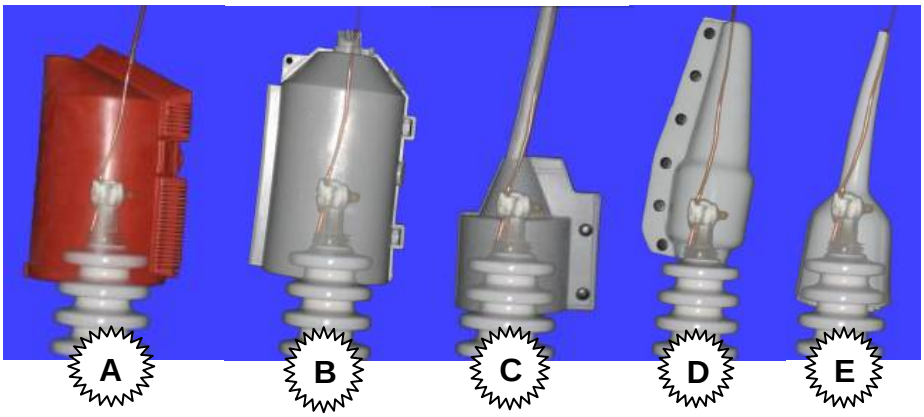


Figure 10-13 After-Market Bushing Covers

It is not uncommon for bushing covers to be installed improperly. Bushing covers installed below the proper insulator skirt can result in flashovers. Photo 10-21 depicts the proper and improper way to install bushing covers.

No uniform standards exist for bushing covers, and some are more resistant to ultraviolet (UV) and environmental degradation than others. This degradation can lead to tracking problems. Therefore, when bushing covers are selected, their properties should be thoroughly reviewed and line crews instructed on the proper method of installation. All bushing covers should be installed with insulated wire for additional animal protection.

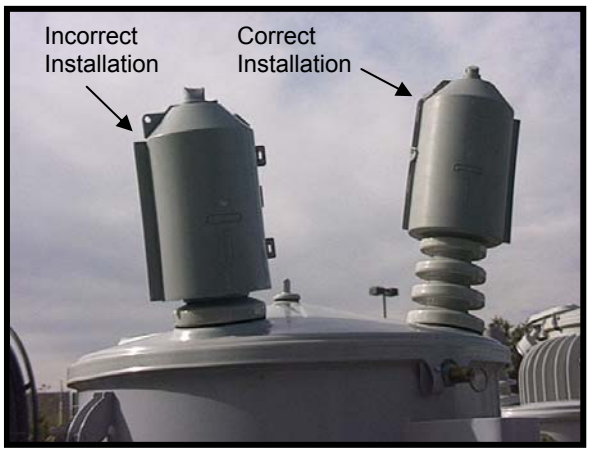


Photo 10-21 Fargo Bushing Covers Installed Incorrectly (Left) and Correctly (Right) over Transformer Bushings

10.5 Capacitors, Regulators, and Reclosers

A capacitor is an electrical device that stores a charge of electricity and returns it to the line. It is used to balance the inductance of a circuit. Regulators maintain the level of voltage within a prescribed range to maintain efficient equipment operation and prevent equipment damage. Reclosers are devices sensitive to interruptions of current flow in the overhead wires. When a recloser senses an interruption, it automatically opens and then immediately closes. If problems with the current persist after a number of reclosings or "shots," the recloser will remain open, cutting the power until the recloser is reset manually. Most reclosers are set to remain open after three shots. Therefore, a recloser may mask detection of a bird electrocution by clearing an interruption. If a bird is killed in a remote location, it may remain undetected.

Capacitors, regulators, and reclosers can be lethal to animals because of exposed bushings and jumpers. These devices should have bushing covers and insulated covering (Figure 10-14) as discussed in Section 10.4, Transformers. Groundwires near energized items should be either isolated or insulated. No bare portion of the insulated leads should extend beyond the bushing covers.

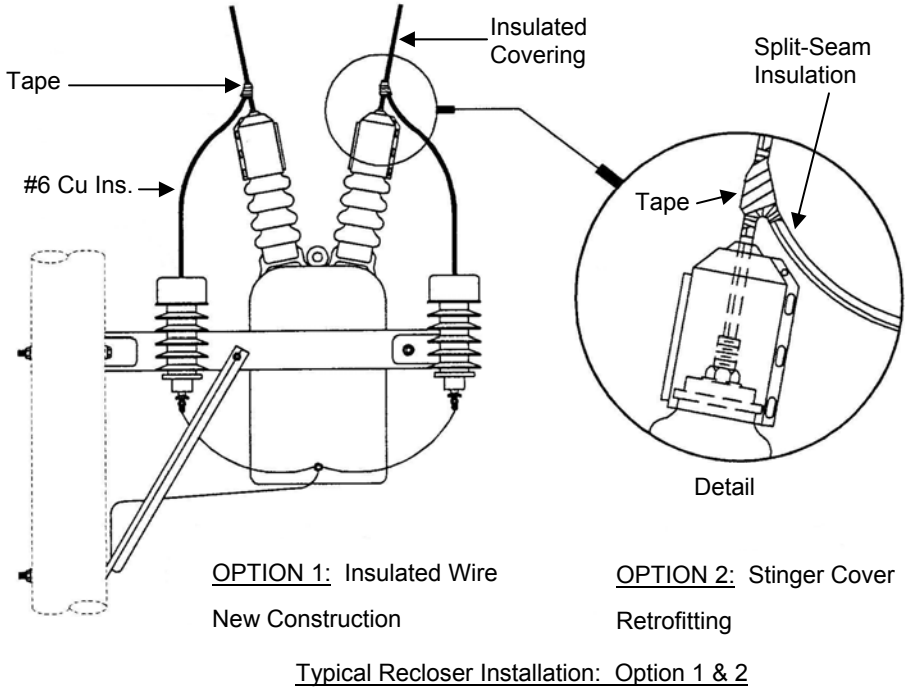


Figure 10-14 Recloser Fitted with Animal Protection

Capacitors always should be purchased with animal protection already installed (Photo 10-22). Animal protection consists of custom-fitted bushing covers and covered jumpers. Stinger wires and all capacitor protective devices should be animal guarded. Capacitors without animal protection can be retrofitted with after-market bushing covers and stinger wire cover.

Photo 10-22 Capacitor Bank Factory-Ordered with Animal Protection

10.6 Cutouts

A cutout is a device used to install fuses between primary conductors; this device is often called a "fused cutout." If the fuse fails, this mechanism provides a visible open, which can be seen from the ground. The top plate of the cutout is energized and can be hazardous to animals if they are mounted near a grounded surface or near other energized equipment (Photo 10-23).

There are two ways to prevent cutout problems: insulation and isolation. Insulation consists of covering the potential phase-to-phase or phase-to-ground contact points where a bird may perch (Photo 10-24). Isolation entails mounting cutouts in a manner that makes an animal contact more difficult.

Photo 10-23 Hawk Perched between Unprotected Cutouts and Arresters

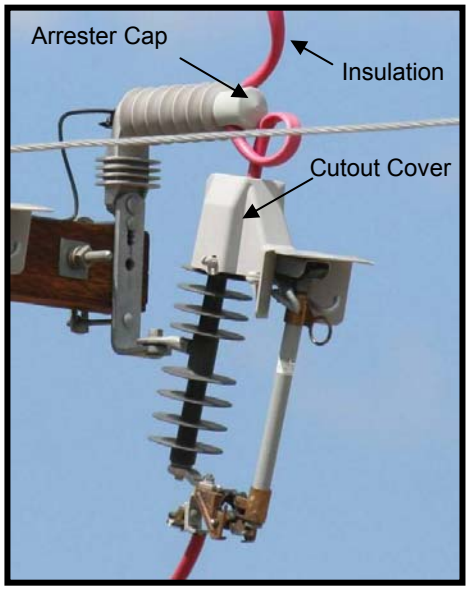


Photo 10-24 Protected Cutout/Arrester Combination

Table 10-6 lists manufacturers that produce several cutout covers to insulate a variety of cutouts. Cutout covers always should be used in tandem with insulated jumpers, and

covers for load break cutouts also are available. Any conductor that cannot be covered should be wrapped with insulating tape.

Table 10-6 Cutout Cover Manufacturers

Manufacturer	Material	Website
EcoElectrical	PVC w/Silicone Coating	http://www.ecoelectrical.com
Kaddas	ABS Plastic	http://www.kaddas.com
Midsun Group	Polymer	http://www.midsungroup.com
Raychem	Polymer	http://www.Raychem.com

PVC=Polyvinyl Chloride, ABS=Acrylonitrile Butadiene Styrene

Some cutout covers can still leave the upper cutout horns still exposed (Photo 10-25). In such cases a perch discourager should be used as a redundant protection measure.

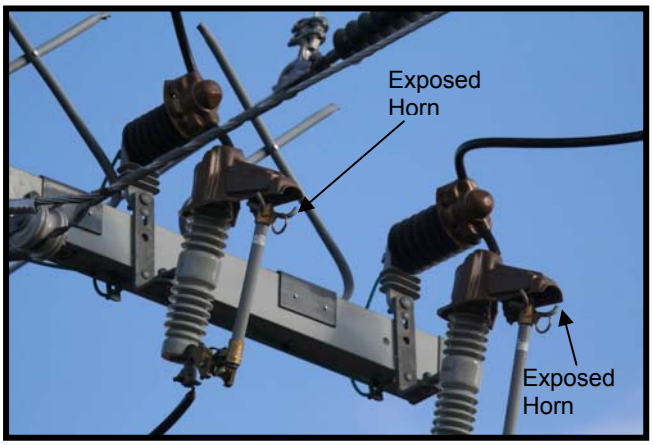


Photo 10-25 Protected Cutout/Arrester Combination with Exposed Horns

10.7 Surge Arresters

Arresters clear over-voltage problems such as lightning strikes. Arresters have a groundwire attached to one end leading to the ground and another end either attached or in proximity (i.e., gapped) to an energized wire. Arresters are used on some equipment poles and all underground risers and can be mounted on crossarms or directly on a transformer. All new arresters should be ordered and installed with manufacturer-supplied wildlife caps (Figure 10-15). Insulated covering should be used for arrester hot leads. No exposed wire should extend beyond the wildlife cap, and leads should be kept as short as possible.

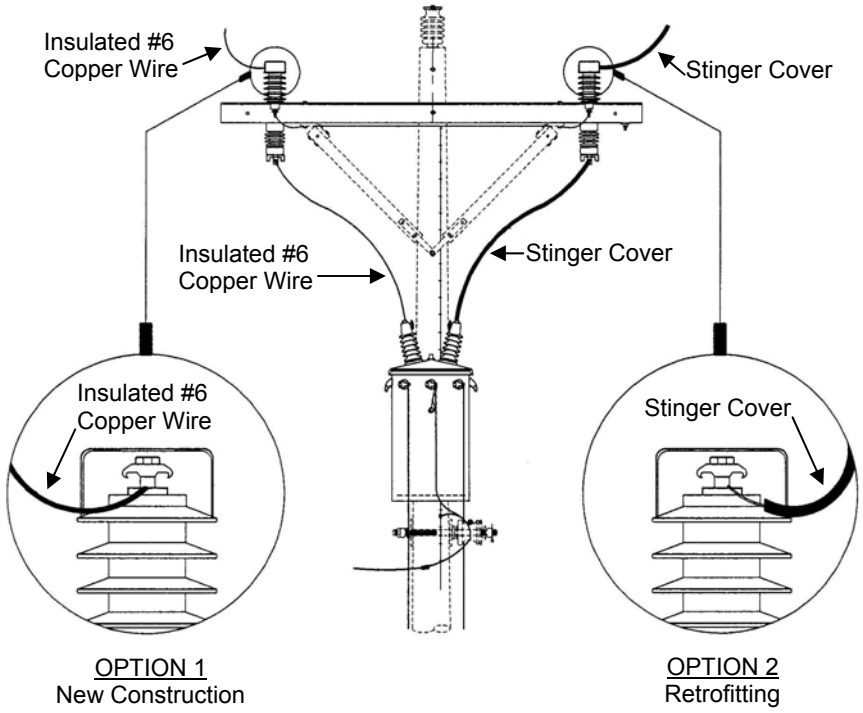


Figure 10-15 Installing New and Retrofitting Surge Arresters

Transformer mounted arresters also should be installed with manufacturer-supplied wildlife caps and insulated covering (Photo 10-26).

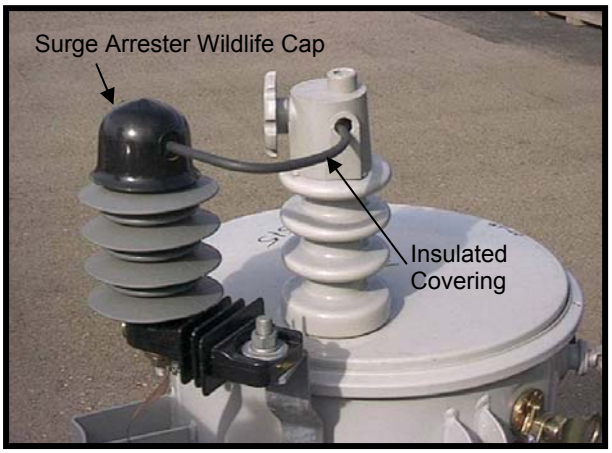


Photo 10-26 Transformer Mounted Surge Arrester with Wildlife Cap

Older gapped arresters (Photo 10-27) can cause problems if small birds, climbing animals, or even insects span the open gap. When gapped arresters are present, a transformer bushing cover with a side knockout can be used to provide an adequate opening for the spark gap rod, and the bushing cover opening must be aligned with the spark gap rod. However, problems may arise if the bushing cover rotates. Replacing the arresters with non-gapped units is the best solution, but if this is not an option, a cover which fits over both the arrester and bushing cover should be considered.

The position of an arrester can be modified to reduce potential contacts. Installing arresters horizontally with covered leads reduces exposure to animals (Photo 10-28). Such installation still should include an insulated cap.

Attention should be given to the groundwire exiting the bottom of the arrester. If the groundwire is near any energized hardware, it too should be covered or routed to avoid potential phase-to-ground contacts. Any conductors that cannot be covered should be wrapped with fusing tape.

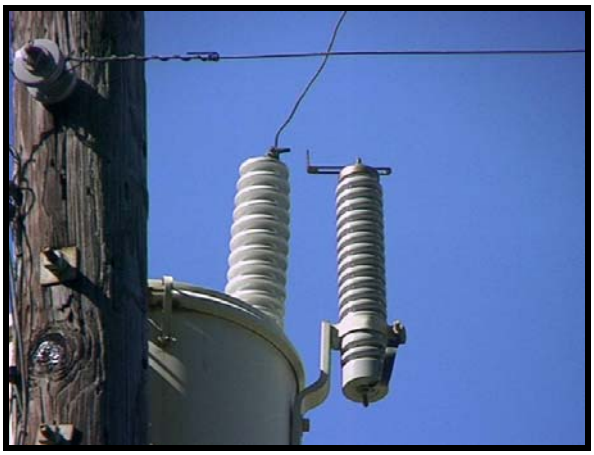


Photo 10-27 Gapped Surge Arrester

Photo 10-28 Horizontally Mounted Surge Arrester to Reduce Animal Exposure

10.8 Stinger and Jumper Wires

Jumper wires are used on corner and tap structures to connect circuits. Equipment, such as transformers, regulators, capacitors, and reclosers are fed with a primary "stinger" wire from the main power line or conductors. When an energized jumper or stinger wire is near a grounded plane or another phase conductor, and the potential exists for an animal to bridge the gap, the wire should be covered.

New jumper construction should include insulated covering (Photo 10-29); higher-rated covered jumper wire such as 5kV polyethylene cable is preferable. Covered jumper wire is available in sizes from #4 AWG to 795 kcmil. Although these insulated jumpers do not protect for the full-line voltage, they do provide protection to allow brief or incidental animal contact.

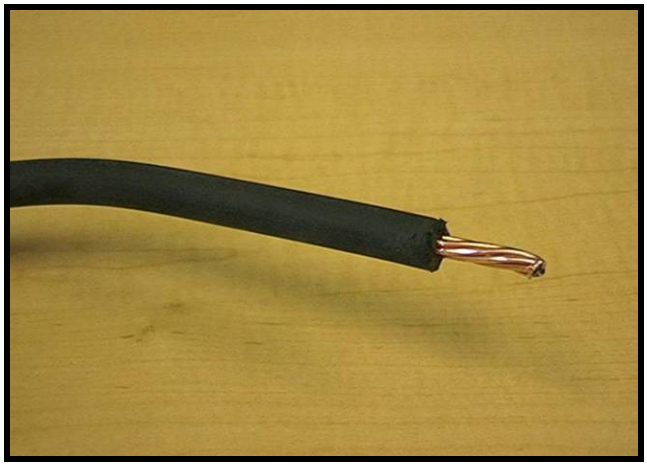


Photo 10-29 Insulated Jumper Wire for New Installations

When retrofitting, it may not be practical to install insulated wire on deadends and tap units. In these situations, split-seam insulation can be installed over existing wire without disconnecting the lead wire (Photo 10-30). Midsun, Salisbury, and 3M manufacturer split-seam jumpers.

To protect animals from electrocution, equipment such as cutouts, arresters, and bushings must include insulated stingers and properly mounted covers. No bare portion of the insulated leads should extend beyond the wildlife covers. If gaps exist, they should be covered with insulated fusing tape.

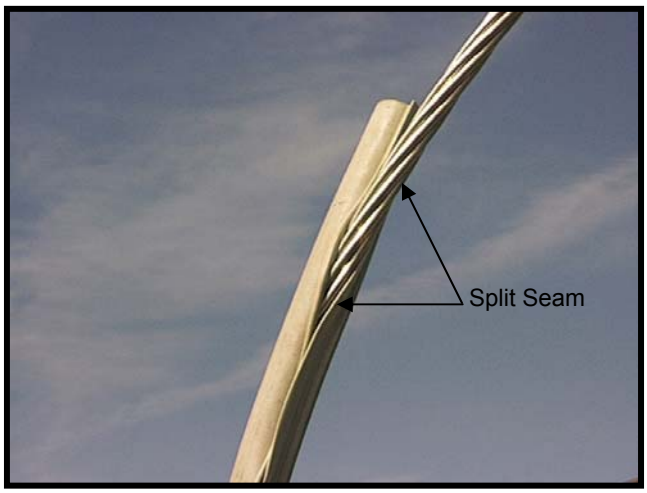


Photo 10-30 Stinger Retrofitted with W.H. Salisbury & Co. Insulating SALCOR Cover Material

Primary jumpers normally are fastened to pin-type insulators for support. Distribution ties made of aluminum-covered steel typically secure jumpers in the top groove of the pin insulator. If the jumper is not covered completely as it passes over the top of the supporting pin insulator, there is still the potential for phase-to-phase or phase-to-ground contact (Photo 10-31). One solution is to use a Hendrix vise-top insulator using a nylon insert (Photo 10-32). This approach allows covered jumpers to be supported without a wrap tie.

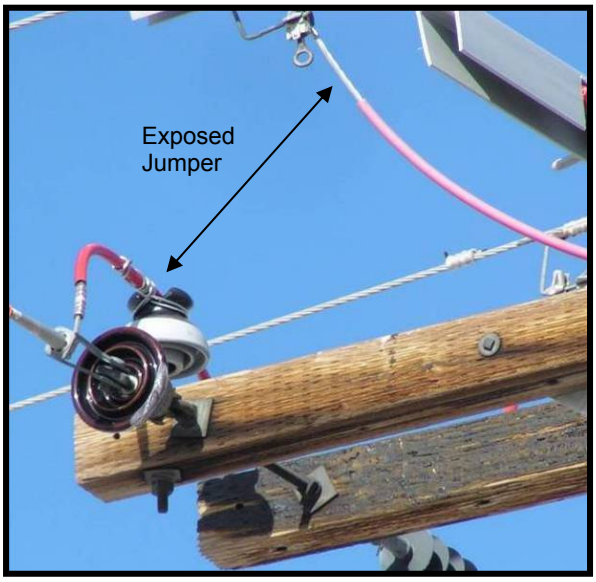


Photo 10-31 Covered Jumper with an Exposed Contact Point

Photo 10-32 Covered Jumper Supported with a Hendrix Vice-Top Insulator

Another option is to cover the pin insulator with a cover (Photo 10-33). Pin covers are available from the manufacturers listed in Table 10-7.

Photo 10-33 Covered Jumper Isolated with a Pin Cover

Table 10-7 Pin Cover Manufacturers

Manufacturer	Material	Website
EcoElectrical	PVC w/Silicone Coating	http://www.ecoelectrical.com
Kaddas	ABS Plastic	http://www.kaddas.com
Raychem	Polymer	http://www.Raychem.com

PVC=Polyvinyl Chloride, ABS=Acrylonitrile Butadiene Styrene

10.9 Pole-Top Grounds

Poles located in areas with few trees are attractive to raptors. Utility poles in these areas also are vulnerable to lightning strikes. Lightning can cause extensive damage to utility structures and equipment. Past construction practices attempted to limit lightning damage by running groundwires to the pole tops (Photo 10-34). A copper wire was placed down the pole and bonded to a ground rod or butt plate buried at the pole base. The groundwire also was tied into the neutral conductor. Under these conditions, lightning would travel down the groundwire to the earth, instead of passing through equipment or the pole, destroying it in the process.

Photo 10-34 Exposed Pole-Top Groundwire

Sometimes metal hardware, such as crossarm braces and guy wires, are bonded to overhead groundwires to eliminate leakage currents. These grounding practices can result in reduced phase-to-ground distances and be lethal to large perching birds. Pole-top grounds extending above the pole can be particularly hazardous and a bird can be electrocuted when perched on an insulator if its tail touches the pole-top groundwire.

Pole-top grounds can be gapped and still provide adequate lightning protection. The gaps break the pathway to earth, thereby reducing the risk for perching raptors. This is accomplished by placing two 4-inch gaps in the pole groundwire (Photo 10-35). Lightning will spark over the gaps while still allowing raptors to perch safely on the pole top. The groundwire should be at least 12 inches from the pole top, since an eagle's tail feathers can reach 10 inches below a perch. The preferred method of pole protection is to simply remove the pole-top grounds above the neutral and install lightning arresters with proper animal guards and covered stinger wires.

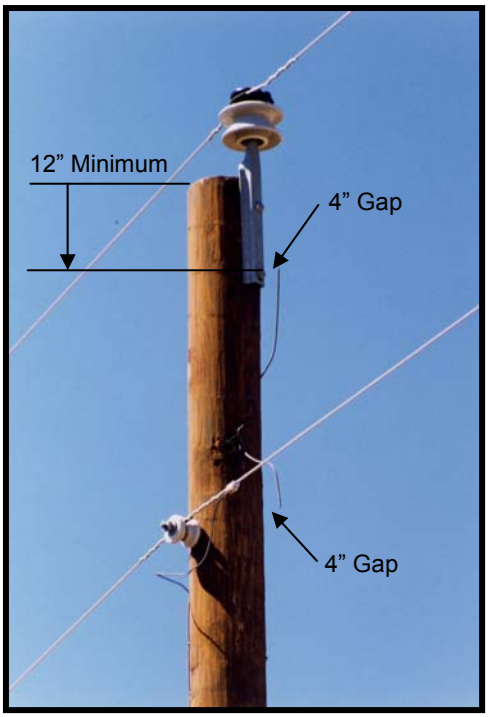


Photo 10-35 Pole with a Pole-Top Ground Properly Gapped to Prevent Raptor Electrocutions

10.10 Brackets

Metal brackets for risers, cutouts, and arresters can pose a risk to animals when they are bonded to earth through groundwires (Photo 10-36 and Photo 10-37). An animal on a conductive grounded bracket needs only to touch one energized jumper wire to complete a pathway to ground.

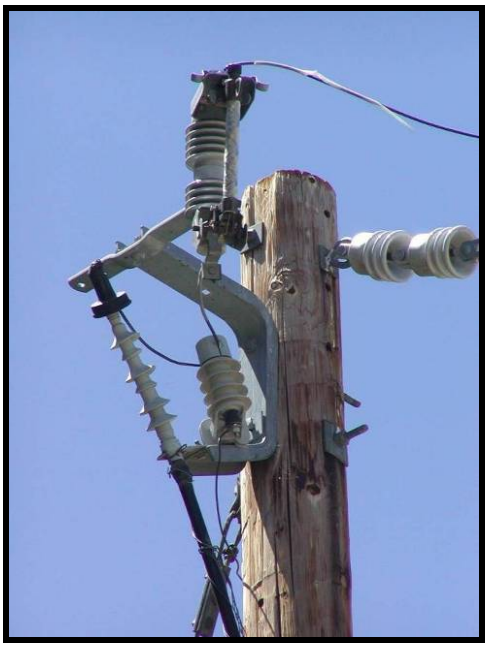


Photo 10-36 Single-Phase Grounded Metal Bracket with Unprotected Cutout/Arrester

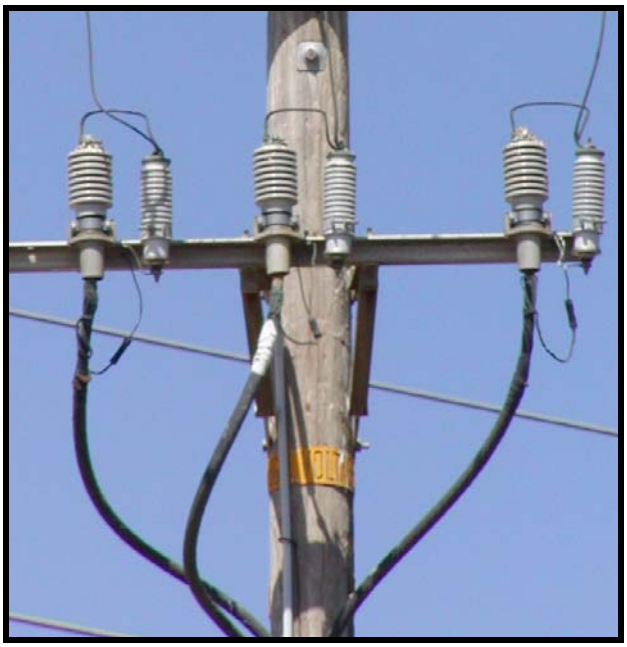


Photo 10-37 Three-Phase Grounded Metal Bracket with Unprotected Potheads/Arresters and Jumpers

For new construction, metal brackets can be replaced with nonconductive fiberglass brackets (Photo 10-38) or fiberglass arms (Photo 10-39). Either of these is preferable over metal because they are insulated. If possible, the metal ends of the brackets should not be bonded to ground.

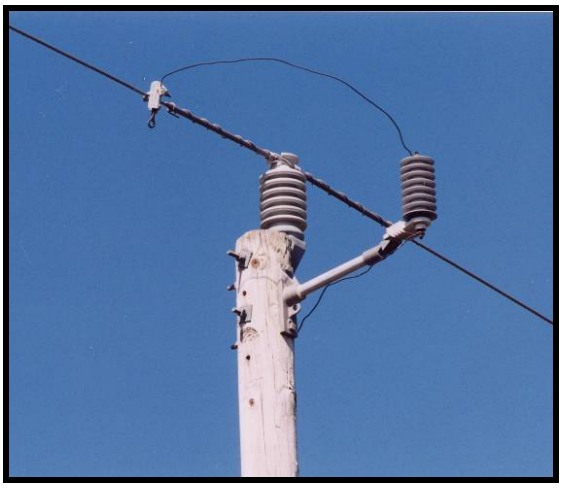


Photo 10-38 Single-Phase Ungrounded Fiberglass Bracket

Photo 10-39 Three-Phase Ungrounded Fiberglass Bracket with Protected Cutouts/Arresters and Jumpers

For retrofitting, it may not be economical to replace brackets. Instead, it may be more practical to cover exposed wires with insulation and install wildlife protectors on

exposed cutouts, bushings, potheads, and arresters, as discussed in Section 10.6, Cutouts; Section 10.4, Transformers; Section 10.3, Risers; and Section 10.7, Surge Arresters, respectively. Both conductive and nonconductive brackets supporting multiple phases should employ insulated jumper wires if there is not adequate separation between jumpers.

10.11 Guying

Steel guy wires typically are attached to poles with a thimble eyebolt. Guy wires create a path to earth because they are directly attached to anchors imbedded in earth. This configuration can be hazardous if a guy pole attachment is located near energized wires or hardware. Grounded guy wires can be particularly hazardous on deadend structures because guy wires tensioning the upper set of crossarms typically pass near energized jumpers on the lower set of crossarms (Photo 10-40).

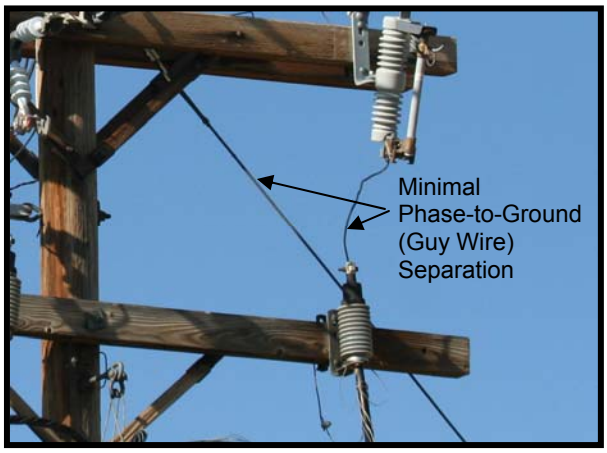


Photo 10-40 Guy Wire with Inadequate Separation

Installing fiberglass strain rods (Photo 10-41) or insulating links (Photo 10-42) in down guys provides protection by eliminating a pathway to ground. Insulating links have the advantage of reducing cathodic anchor rod deterioration.

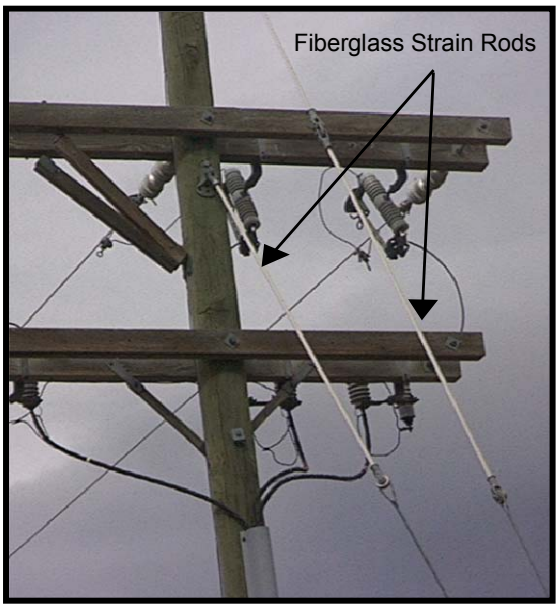


Photo 10-41 Fiberglass Strain Rods to Prevent a Pathway to Ground

Photo 10-42 Insulating Link to Prevent a Pathway to Ground

10.12 Perch Management

Perch management (i.e., using an isolation approach) is designed to either encourage perching in safer areas of a structure or deter birds from perching in dangerous or high-risk areas with inadequate separation (Figure 10-16).

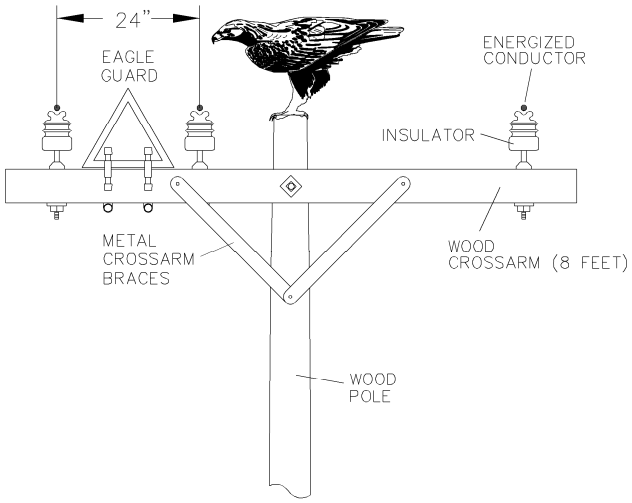


Figure 10-16 Eagle on a Three-Phase Tangent Structure with Inadequate Separation

Perch management generally is discouraged by the USFWS for reducing avian electrocution risks and should be employed only when there is no other alternative or as a redundant approach for specific high-risk scenarios. Perch management alone may be acceptable in temporary emergency situations where proper separation or insulation is not possible. Perch management is appropriate in the following situations:

1. When used along with insulation as a redundant form of protection.

2. To deter perching in areas where increased predation of sensitive species by raptors is an issue (e.g., sage-grouse), and only when specifically recommended by a state or federal management agency.*

   *When perch management is used for this purpose it should be placed only on equipment that is raptor friendly prior to installation of the perch management device. Extreme care should be used to ensure that perch management does not increase the chance of electrocution of birds.

PRECorp distinguishes between two forms of perch management: raptor protection and raptor guarding. The former is designed to protect raptors but still allow them to be on a structure. The latter is designed to keep raptors off a structure because of sage-grouse concerns. The BLM encourages PRECorp to use perch discouragers in sage-grouse habitat. Both forms of perch management are incorporated into PRECorp's detailed construction standards. Furthermore, EDM International provided PRECorp with an in depth review of its perch management (EDM International 2007). That report is included in PRECorp's Sage-Grouse Protection Plan (2008).

10.12.1 Elevated Perches

Perch encouragement typically is achieved with elevated perches designed to attract birds to the highest point on the structure. Elevated perches are particularly important on structures located at topographical high points near a prey base. However, perch installation must adhere to NESC and all other pertinent safety requirements.

When elevated perches are constructed, they should be designed so birds cannot access beneath the perch (e.g., to escape heat or rain). Therefore, eagle perches should be located approximately 16 inches above a crossarm (Photo 10-43). All exposed contacts on the pole also should be addressed.

Perch discouragers can be used in tandem with elevated perches. As with all devices, they should be installed properly so they do not create future operational problems. Elevated perches are available from Aluma-Form and Hughes Brothers (Table 10-8). PRECorp currently does not install elevated perches on its poles.

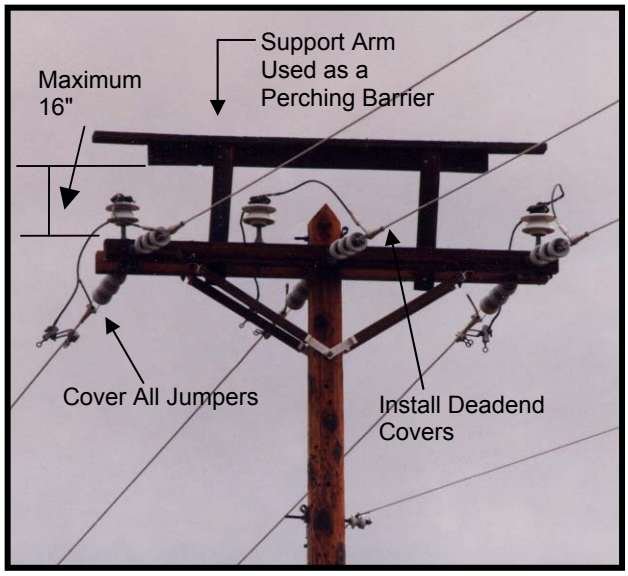


Photo 10-43 Elevated Perch on a Three-Phase Tangent Structure

Table 10-8 Perch Manufacturers

Manufacturer	Material	Website
Aluma-Form	Wood	http://www.alumaform.com
Hughes Brothers	Fiberglass	http://www.hughesbros.com

10.12.2 Perch Discouragers

Perch discouragers are designed to manage where birds perch on a structure, deterring the birds from landing on areas that present a high electrocution risk. They also may be used to keep birds from defecating on suspension insulators and equipment. Perch discouragers constructed of a variety of materials are available from several manufacturers (Table 10-9). Some devices can be installed “hot” with hot line sticks; others must be bolted to the structure. In general, perch discouragers that can be installed “hot” cost more than discouragers requiring more labor to install. Two unique designs (by Power Line Sentry and Kaddas) function to preclude perching under the perch discourager (Photo 10-44 and Photo 10-45).

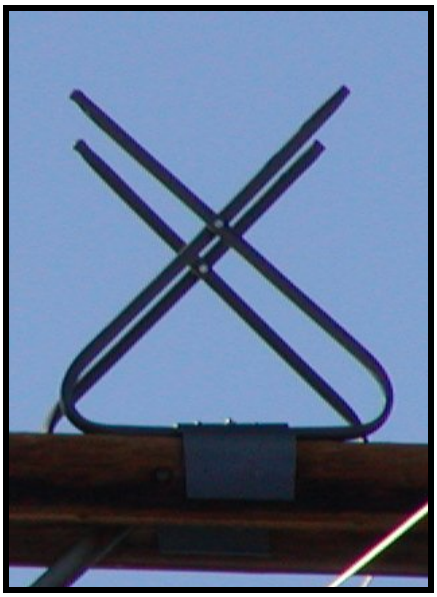


Photo 10-44 Power Line Sentry "Raptor Guard" Perch Discourager Design to Prevent Perching within the Triangle

Photo 10-45 Kaddas Perch Discourager Design to Prevent Perching within the Triangle

Some discouragers must be mounted on the horizontal crossarm surface. This may not be possible when cutouts, arresters, or other equipment is present. In those situations, a unit that mounts on to the vertical crossarm surface is required.

Table 10-9 Perch Discourager Manufacturers

Manufacturer	Material	Website
EcoElectrical	PVC w/Silicone Coating	http://www.ecoelectrical.com
Hendrix Wire and Cable	Polypropylene	http://www.hendrix-wc.com
Hughes Brothers	Fiberglass	http://www.hughesbros.com
Kaddas	PVC	http://www.kaddas.com
Mission Engineering	HDPE	http://www.mission-eng.co.za
Pacer Industries	PVC	None: (208) 733-8074
Power Line Sentry	Electrical PVC	http://www.PowerLineSentry.com
Raptor Guard	Electrical Grade PVC	http://www.raptorguard.com
Zena	HDPE	http://www.zenadesign.com

PVC=Polyvinyl Chloride; HDPE=High-Density Polyethylene

Perch discouragers do not always keep birds off structures (Photo 10-46). As discussed previously, the goal of a perch discourager is to manage where a bird perches on a structure. This approach is most successful if other, safer portions of the pole remain available to the bird for perching. A perch discourager is simply a tool to manage where birds can land on a structure (Photo 10-47).

Photo 10-46 Bird Perching on a Triangle Perch Discourager

Photo 10-47 Perch Discourager Shifting a Raptor to the Pole Top

For new construction, adequate conductor separation is recommended and a better approach, rather than using perch discouragers. Placing perch discouragers on top of some poles can contribute to electrocutions, because birds may choose to roost lower on the pole near energized equipment. Perch discouragers also may simply shift problems on to other more dangerous structures in the vicinity (Photo 10-48).

Perch discouragers should be sized properly to discourage birds from perching under or adjacent to the discouragers (Photo 10-49), and should be purchased with a protective coating to prevent UV deterioration. Makeshift discouragers without UV protection often are inappropriate and deteriorate prematurely, becoming ineffective (Photo 10-50).

Photo 10-48 Perch Discourager Shifting a Bird to a More Problematic Area

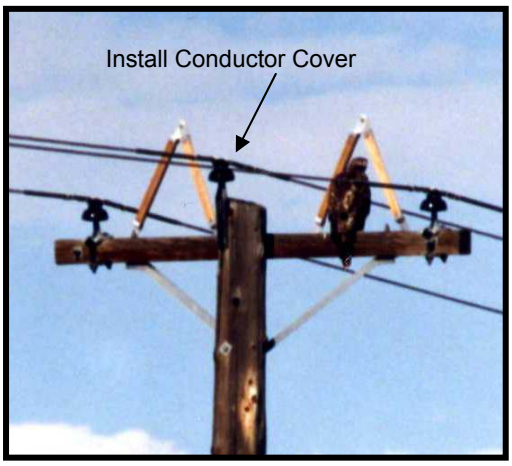


Photo 10-49 Raptor Perching Under a Perch Discourager

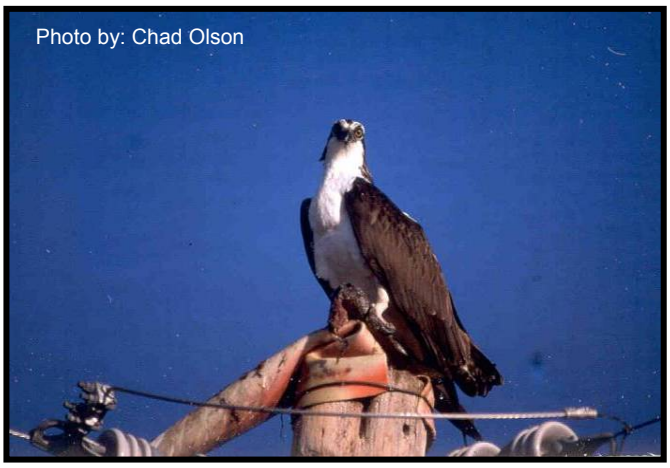


Photo 10-50 Inappropriate Use of a Traffic Cone as a Perch Discourager

Like all utility components, perch discouragers should be installed according to the manufacturers' specifications and using NESC clearances to avoid potential electrical problems. Discouragers placed too close to conductors can lead to flashovers under certain environmental conditions. Conversely, providing too much separation may allow birds to land.

Tests with captive birds reveal that hawks can defeat a perch discourager when more than 5 inches of separation between an insulator and a perch discourager is provided (Photo 10-51). Eagles can defeat a perch discourager when more than 10 inches of separation is between a discourager and insulator. Accordingly, if the goal is to keep hawks and eagles off of structures, utilities should not increase this separation beyond 5 inches. This must be driven by the proper NESC electrical separation.

Figure 10-17 provides specific installation diagrams for a variety of perch discouragers.

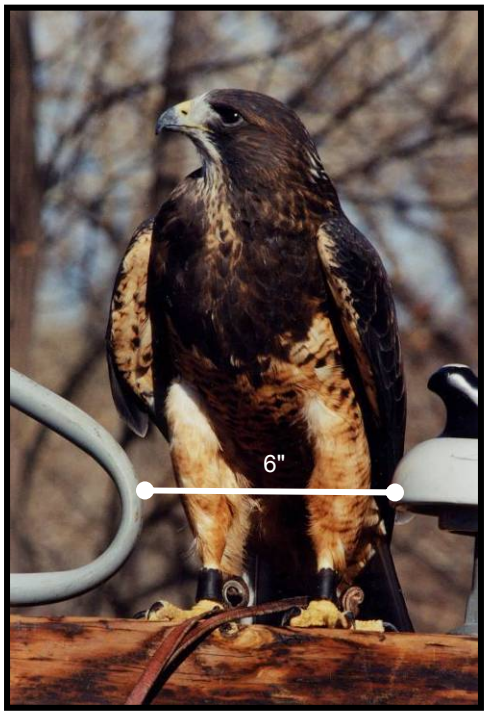


Photo 10-51 Perch Discouragers should be Installed Correctly to Minimize Space for Perching while Adhering to Operational Specifications

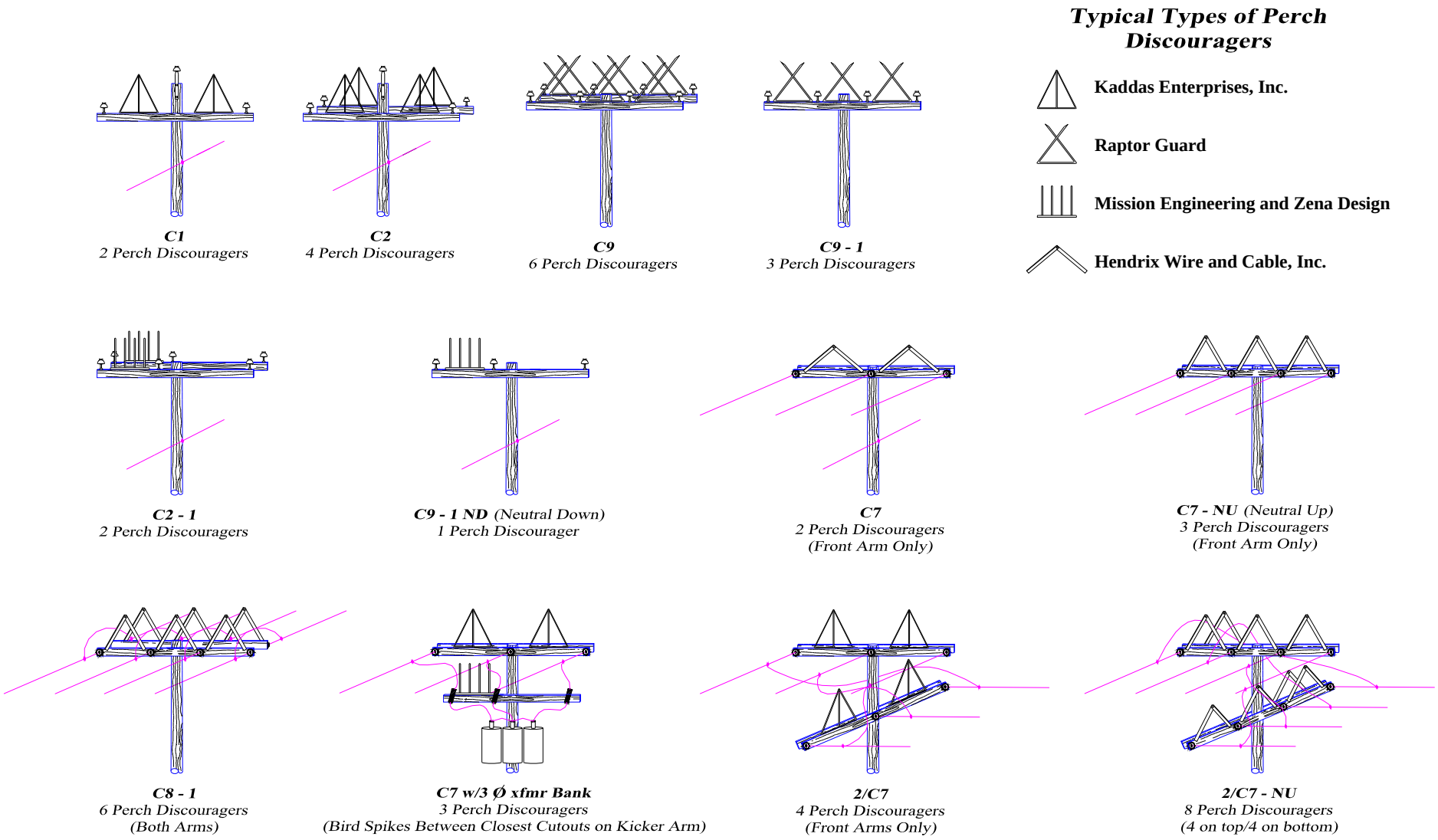


Figure 10-17 Correct Perch Discourager Installation for Different Configurations Using a Variety of Products*

* These products should be used only if the structure has been properly protected as described throughout Chapter 10.0.

Specific types of bird spikes can be effective perch deterrents. Spikes can be placed in hard-to-reach areas and they come in a variety of sizes and materials (e.g., metal, plastic polymers) to deter a wide range of bird species from perching on utility structures. However, spikes must be sized properly and installed in the right locations to effectively deter birds. Small spikes will not deter large birds from perching, and small birds may nest in them (Photo 10-52). Small, plastic spikes break easily, reducing their effectiveness. Finally, the potential risks to employees climbing and working around sharp spikes also can be significant. Spikes should be used only as extra protection after all energized parts have been insulated or covered. Photo 10-52 shows an example of suitable bird spikes to manage bird perching on utility structures.

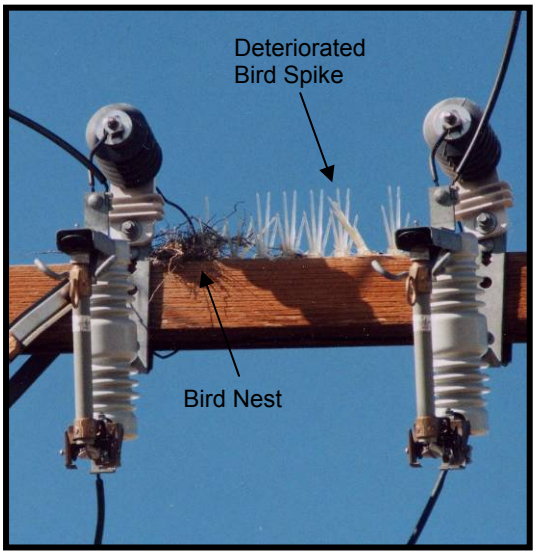


Photo 10-52 Bird Nesting in Small Plastic Spikes

Photo 10-53 Bird Spikes Available for Perch Management

11.0 STANDARDS TO REDUCE COLLISIONS

As discussed in Section 4.2, Collisions, birds face collision threats from many sources including power lines (Photo 11-1, Photo 11-2, and Photo 11-3). Although birds often exist near power lines without significant collision risks, problems emerge in localized areas where certain risks occur.

This chapter describes what contributes to bird collisions with power lines and provides options that can be implemented to minimize those risks.

Photo 11-1 Transmission Line with Aviation Markers as Seen During Weather Conditions with Limited Visibility

Photo 11-2 Sandhill Crane Flock Crossing Over a Distribution Line in a Feeding Area

Photo 11-3 Great Blue Heron Carcass on Unmarked Static Wire (Not on PRECorp's Line)

11.1 Overhead Static Wires

Overhead static (i.e., shield) wires are frequently located above transmission conductors. These wires are grounded and are used to prevent lightning from striking the transmission conductors. As discussed in Section 4.2, Collisions, overhead static wires usually are smaller in diameter than transmission conductors, and a number of observations and collision reports emphasize that reduced or smaller static wires are more likely to cause bird collisions (APLIC 1994; Pandey et al. 2007). Eyewitness accounts have reported birds flaring to avoid the larger phase conductors, only to collide with the less-visible overhead static wires (Crowder 2000).

11.2 Wire Marking

One of the most effective ways to reduce avian mortality from collisions with power lines is to mark wires to make them more visible (by increasing the line profile) (Beaulaurier 1981), particularly on the overhead static wires. Wire-marking devices were tested using the sandhill crane as a surrogate research species for the less common but federally endangered whooping crane. These tests identified a variety of markers which reduced collisions by up to 61% (Morkill 1990; Morkill and Anderson 1991, 1993; Brown and Drewien 1995).

From an engineering perspective, however, wire marking is not always an option for all power lines. Devices that enlarge the wire are prone to wind or ice loading, increasing the risk of wire breaks and power outages from line tension and stress loads. Attached devices may damage the conductors from abrasion. Also, applying marking devices to conductors is limited by voltage levels, and corona discharge may be an issue (see Section 11.2.6, Corona). Wire marking has not proved to be the perfect solution and there is no broad agreement among biologists and researchers on its success. However, the effectiveness of some marking methods targeting specific species has shown to reduce the incidence of bird collisions with overhead lines in certain areas, and marking is particularly justified if spans are determined to be dangerous to T/E or otherwise vulnerable species.

Although several products are available to mark power lines, there have been very few studies testing their effectiveness or comparing products. As with any other device installed on a power line, wire-marking devices should be assessed for long-term use and potential effects to the line operation.

There are two types of marking device. “Active” marking devices consist of markers with moving parts, such as the Flapper, BirdMARK, and FireFly. “Passive” marking devices do not have moving parts and include the Bird Flight Diverter (BFD), Swan Flight Diverter (SFD), and Spiral Vibration Damper (SVD). The following sections present discussions of the various wire-marking products available and their advantages and disadvantages. Table 11-1 lists product and manufacturer information.

Table 11-1 Bird Collision Devices and Manufacturers

Manufacturer	Device	Description	Website
Kaddas	Flapper	Swinging Plate	http://www.kaddas.com
P&R	BirdMARK / Firefly	Swinging Plate	http://www.pr-tech.com/product/birds/birdmark.htm
Dulmison	BFD	Coiled Solid PVC Wire Marker	http://catalog.tycoelectronics.com
Dulmison	SFD	Coiled Solid PVC Wire Marker	http://catalog.tycoelectronics.com
Dulmison	SVD	Vibration Dampers	http://catalog.tycoelectronics.com
Preformed Line Company	BFD	Coiled Solid PVC Wire Marker	http://www.preformed.com

BFD=Bird Flight Diverter, PVC=Polyvinyl Chloride, SFD=Swan Flight Diverter, SVD=Spiral Vibration Damper

11.2.1 Flapper

The Flapper (Photo 11-4) was designed in South Africa in partnership with Preformed Line Products, Eskom, and the Endangered Wildlife Trust (EWT). The Flapper is distributed by Kaddas and is designed to securely grip wires up to a diameter of 0.75 inch with a locking plastic jaw. The Flapper can be installed and removed from the ground (Photo 11-5); has been UV stabilized; and is available in red, white, and black. Black and white flappers provide maximum contrast.

Photo 11-4 White Flapper

Photo 11-5 Flapper Installation

Eskom experienced problems with the Flapper shifting in some the earlier versions (van Rooyen pers. comm. 2000). The EWT recommends two modified ways of attaching the flapper to mitigate this problem:

- Attach the flapper disk (not the clip) to a helical holder (essentially a metal wire pigtail), then wind the holder around the conductor or groundwire. Eskom has used this attachment method for several years on very small conductors (0.9-inch diameter) with no shifting.

- Attach a spiral onto the conductor and then attach the flapper by its hook to the spiral. This has the advantage of making the line even more visible as the device is now bigger. According to Eskom, spirals have not shifted since implementing these measures.

There are two versions of the Flapper. One is attached with a ratcheted clamp and the other is installed with a breakaway, nonmetallic composite screw. Both devices can be installed using a hotline stick. According to the manufacturer, a properly applied unit will not move on the line, although it is recommended using silicone adhesive on the clamp to minimize the potential for any movement.

The Flapper is available with a luminescent paint that glows in low-light situations. The device color plays an important role in reducing collisions (Kreithen 1996). Device color

and effects to reducing avian collision risk are discussed in Section 11.3.1, Marker Type.

The advantage of the Flapper is the swinging plate's movement makes a line more visible than simply increasing its profile. The effectiveness of the Flapper has been tested in South Africa, showing a reduced collision rate between bustards/cranes and power lines (van Rooyen pers. comm. 2000; Anderson pers. comm. 2001). In some areas, however, a marking system resembling a target might result in increased vandalism. The potential for devices slipping on hard-to-access overhead static wires also is a concern.

11.2.2 BirdMARK and FireFly Bird Flight Diverters

The BirdMARK BFD (Photo 11-6) is distributed by P&R Industries and is designed to securely grip wires up to a diameter of 2.5 inches with a strong spring-loaded clamping jaw. The clamping jaw also is used with several other P&R products designed specifically for power lines.

Photo 11-6 BirdMARK Bird Flight Diverter

The BirdMARK can be installed and removed from the ground without interrupting power. The manufacturer claims the BirdMARK will stay in position even in a Force 8 gale. The swinging roundel is available in either orange or red-and-white.

As discussed for the Flapper, the advantage of the BirdMARK is the swinging plate's movement makes a line more visible than simply increasing its profile. As with the Flapper, the BirdMARK's target-like appearance may result in increased vandalism. Unfortunately, no studies on the effectiveness of the BirdMARK were found in the scientific literature, although it appears the device should be similar in effectiveness as the Flapper.

In addition to the BirdMARK, P&R Industries manufactures the FireFly. The FireFly uses the same clamp but the circular plate has been replaced with a rectangular plate. The rectangular plate includes a reflective and fluorescent reflective plate (Photo 11-7 and Photo 11-8). This product also has an alternative non-swiveling plate to minimize wear in high wind areas.

Photo 11-7 FireFly During the Day

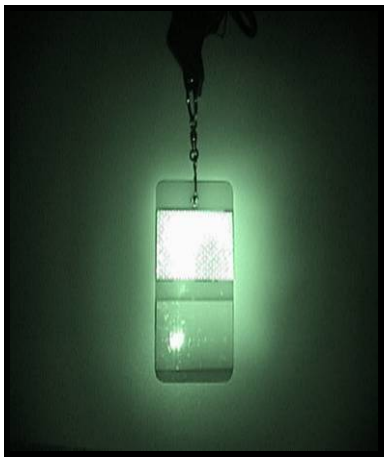


Photo 11-8 FireFly at Night

11.2.3 Bird Flight Diverter

The BFD was developed in Europe during the 1970s (Figure 11-1). The BFD is made from a high-impact, standard polyvinyl chloride (PVC) and is UV stabilized.

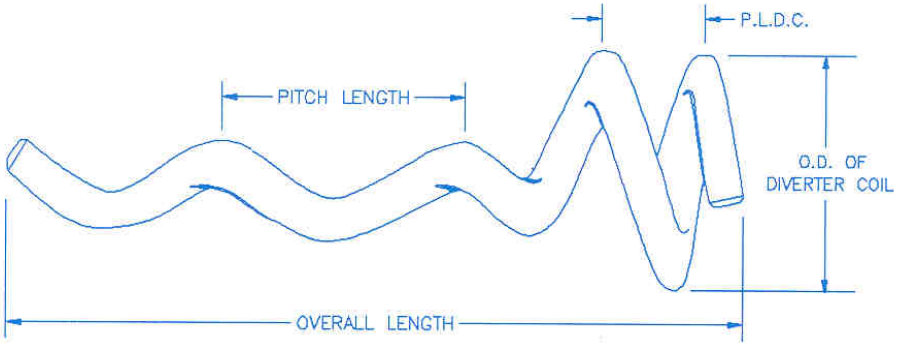


Figure 11-1 Bird Flight Diverter Manufactured by Dulmison

The Dulmison BFD is available in a variety of colors and sizes to accommodate a conductor ranging from 0.175 to 1.212 inches (Photo 11-9).

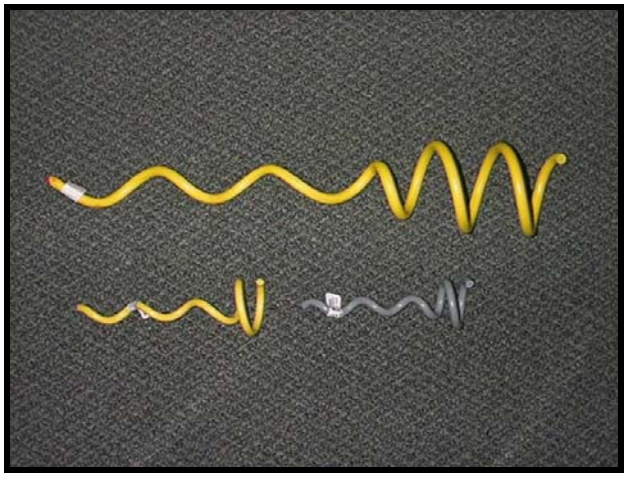


Photo 11-9 Bird Flight Diverters for Various Wire Sizes

The BFD has been effective when installed on overhead static wires in Europe, where typical spacing ranges from 16 to 33 feet. In North America, the BFDs (spaced 20 feet apart) were shown to be effective in reducing waterfowl collisions with overhead static wires (Crowder 2000). The BFD is believed to be effective because its profile increases line visibility.

Although the colors may fade after long periods of exposure, the BFDs should not become brittle or lose their elastic properties. As described in van Rooyen (pers. comm. 2000), Eskom used the Preformed Line Company BFD in South Africa for years with no reports of mechanical failure, although some red PVC devices have faded.

11.2.4 Swan Flight Diverter

The SFD is similar to the BFD but includes four 7-inch spirals (Photo 11-10). The SFD also is made from a high-impact, standard PVC and is UV stabilized. The Dulmison SFD is available in a variety of colors and sizes to accommodate conductors ranging from 0.175 to 1.212 inches.

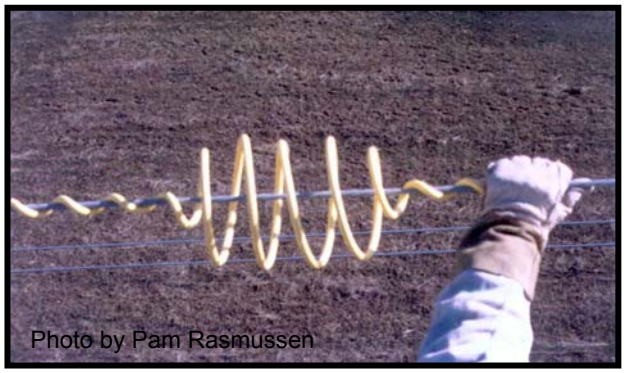


Photo 11-10 Swan Flight Diverter Being Placed on a Static Wire

The SFD has been shown to be effective when installed on overhead static wires in North America. In the early 1990s, Northern States Power (NSP)-Wisconsin addressed a problem where endangered trumpeter swans were colliding with a power line during the winter months over a small bay on the St. Croix River in Hudson, Wisconsin. Yellow SFDs were installed to increase the overhead static wires' visibility in low-light conditions. The SFDs were

installed in May 1996, using a 50-foot spacing staggered on each parallel wire, resulting in an appearance of 25-foot spacing. To date, no additional collisions or deaths have been documented on the marked overhead wires at this location (Rasmussen pers. comm. 2009).

In Indiana, the SFD also has shown to be effective in reducing waterfowl collisions with overhead static wires (Crowder 2000). The spacing of the SFDs in Crowder's 1998-2000 study was 20 feet (Photo 11-11). The close spacing was required to compare the effectiveness of the SFD to the BFD.

As discussed for BFDs, the colors may fade after long periods of UV exposure but the SFDs should not become brittle or lose their elastic properties.

Photo 11-11 SFDs Installed at 20-Foot Intervals in Indiana

11.2.5 Spiral Vibration Damper

SVDs are manufactured from solid PVC into a helix (Figure 11-2). The purpose of the damper is to reduce high-frequency aeolian vibration. The SVD is designed to provide the action/reaction motion to oppose the natural vibration of cable by gripping a conductor tight at one end and loosely on the other. The vibration often is inducted by low velocity winds of 3 to 8 mph.

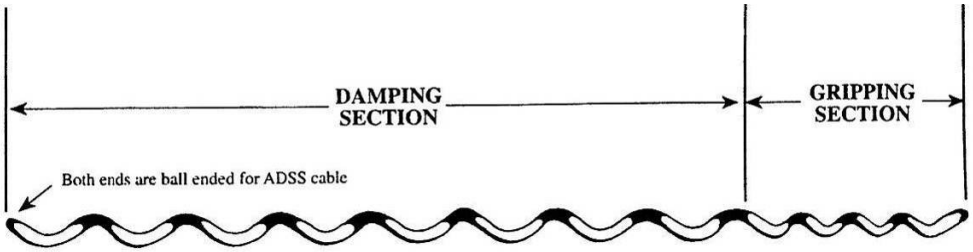


Figure 11-2 Spiral Vibration Damper

The Dulmison SVD is made from a high-impact, standard UV-stabilized PVC. The SVD also is available in a variety of colors, and different sizes are available to accommodate conductors ranging from 0.175 to 0.76 inch.

SVDs have been used in Colorado's San Luis Valley to mitigate crane collisions. Coverage of the wires was 27.5 percent per span, reducing collisions by 61 percent (APLIC 1994). The colors also may fade after long periods of UV exposure but the SVDs should not become brittle or lose their elastic properties, making them appropriate for overhead static wires and lines below 230kV.

Tri-State Generation and Transmission Association used the Dulmison and Preformed SVDs since 1985 without any failures (Dille pers. comm. 2007). The dampers are easy to install; however, after several years they become brittle and may break if removed.

11.2.6 Corona

One of the most effective ways to reduce avian collisions with power lines is to mark wires, making them more visible. As discussed in Section 11.2, Wire Marking, there can be engineering and maintenance issues associated with placing devices on energized wires. One of the issues associated with marking devices is corona discharge (Photo 11-12). Corona discharges occur when surface electric field intensity surrounding an energized electrode exceeds a critical value resulting in a localized ionization of the surrounding gas, in most cases air. Corona activity generates light (mainly in the UV spectrum), sound waves, ozone, and other by-products. Corona activity also may occur from sharp edges on energized hardware, broken conductor strands, or defective insulators.

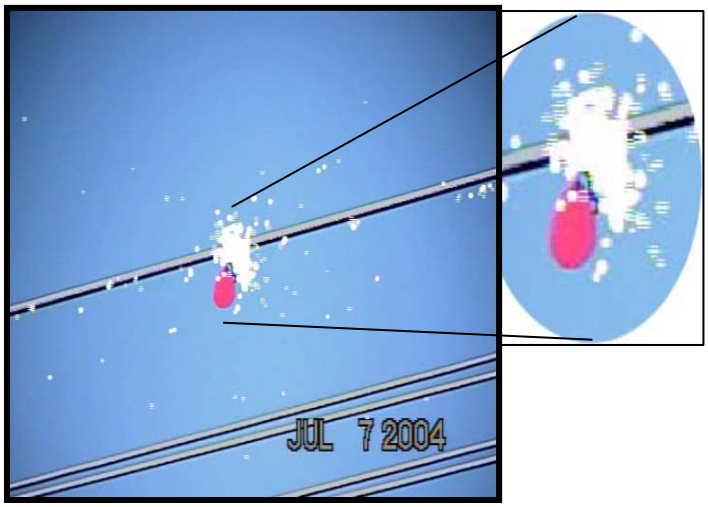


Photo 11-12 UV Corona Discharge from a Flapper Device Mounted on an Energized 345kV Transmission Conductor

Testing has shown that at 115kV, all marking devices have little or no corona (Hurst 2004). At 230kV, all devices have a high level of corona; this corona increases at 345kV. Given the small amount of corona emission found on devices at 115kV, it is assumed devices on energized wires will not emit significant amounts of corona in the lower distribution and subtransmission voltages of 46kV to 69kV. Corona emission at the intermediate transmission voltages of 138kV and 161kV will be slightly higher than that at 115kV. Devices placed on energized wires at 230kV and above will produce high levels of corona and by-products. For these higher-voltage lines, it is recommended that marking devices be placed only on the overhead static wires.

11.3 Wire Marking Conclusions

11.3.1 Marker Type

There are few comparative studies testing the effectiveness of the various marker devices. One study by Crowder (2000) compared the SFD and BFD in their effectiveness in reducing waterfowl collisions at an Indiana wetland. Another study in South Africa by the EWT tested the effectiveness of the Flapper and BFD for reducing bustard and crane collisions with power lines (van Rooyen pers. comm. 2000). Both

studies showed all devices to be effective in reducing, but not eliminating, collisions. In Crowder's study, there was no significant difference between the SFD and BFD based upon the number of dead birds per search.

This lack of information on the success of various line markers makes it difficult to select an appropriate marking device. Currently, there are no studies detailing which marker effectively reduces collisions; however, active marking devices will likely prove more effective than passive devices. Unfortunately, there are problems associated with some moving devices. An experimental swinging plate used in Colorado's San Luis Valley effectively reduced collisions, however, the aerodynamic instability of the plate proved to be destructive to conductors.

Passive marking devices have been shown to reduce collision rates for waterfowl, cranes, bustards, and swans. Passive PVC devices also have proven to be effective over the long term. Tri-State Generation and Transmission Association has used SVDs since 1985 without any failures, and Northern States Power has successfully used the SFDs since 1996 with no maintenance problems. Likewise NorthWestern Energy (previously Montana Power) has used the BFDs since 1998 with no shifting or other maintenance problems.

Passive marking devices are manufactured from a high-impact PVC that possesses excellent strength and durability properties. Although these devices are available in a variety of colors and passive markers can be ordered in yellow to maximize contrast with the horizon during low-light conditions, there is a general consensus these devices work because they increase the profile of the line, not because of their color. Because the SFD has the largest profile, it is preferred over the SVD and BFD. In areas with heavy ice loading, the larger profile might not be preferable.

It is important to select mitigating measures that need minimal maintenance to reduce the potential for future disturbance. Until test data are available proving that active marking devices are aerodynamically stable and stay in place during high winds, passive devices should be used in hard-to-access areas. Swinging plate systems show great potential for reducing collisions, but they should be tested on less-critical lines with easy access.

11.3.2 Marker Spacing

The space between wire markers varies depending upon a number of factors including the size of marker, bird species, and extent of the concentration area. The optimal way to install markers is to stagger them to minimize the number of devices required. According to APLIC (1994), collision studies determined the following:

- The BFD reduced collisions from 86 to 89 percent when spaced 16 feet apart, and 57 to 58 percent when spaced 33 feet apart.
- The larger BFD (Catalog BFD-7) reduced collisions 65 to 74 percent when spaced 50 feet apart.

- The SVD reduced collisions 61 percent when 27.5 percent of the span was covered.

It is important to note the reported collision reduction levels are compiled from a variety of sources and are not directly comparable due to varying methodologies, environments, and bird species.

PRECorp addresses bird collisions by using SFDs to give the appearance of 15-foot spacing. The optimal diverter placement is to stagger the devices midway between each other on alternating lines to reduce the number of markers required. For example, for three wires, diverters are spaced 45 feet apart and staggered to give the illusion of a device every 15 feet (Figure 11-3); for two overhead static wires, SFDs would be placed 30 feet apart, also simulating a 15-foot distance (Figure 11-4).

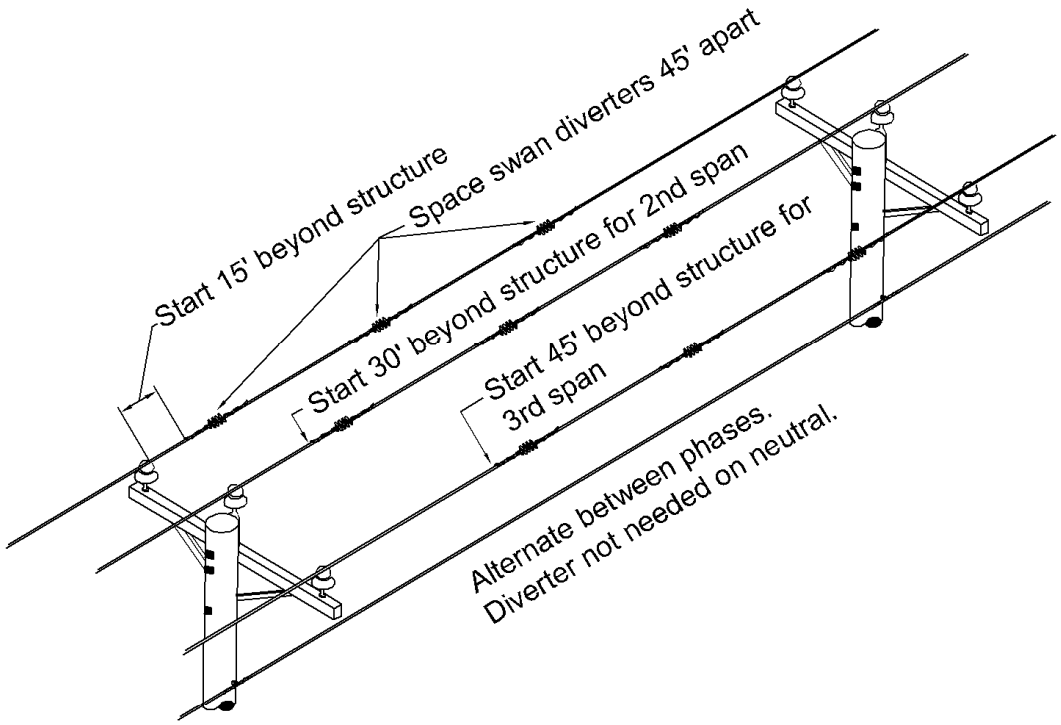
A significant portion of the cost associated with installing any marker is achieving the proper device placement. When stringing the conductors, it is advantageous to paint the conductor at intervals for diverter placement rather than to perform measurements after the wires are already strung. This is more critical when installing markers with a helicopter or tall crane than when using a bucket truck or pull cart.

11.3.3 Engineering Considerations

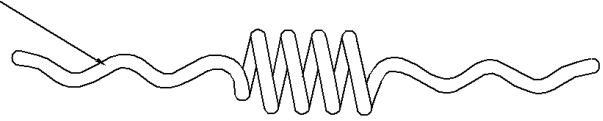
Given today's pressures to ensure electrical reliability, it is imperative that utilities exercise due diligence when solving collision problems. By doing so, utilities can avoid creating additional operational problems that could lead to forced or scheduled outages. Therefore, utilities should exercise caution by using solutions with a proven track record or by thoroughly testing potential solutions before implementing them on critical facilities.

Prior to installing diverters, Operations/Engineering should perform a structural analysis on that line. If the static wire or structures cannot safely support the additional load plus appropriate safety factors for all design conditions, then alternate solutions must be evaluated. Alternate solutions may consist of reducing the number of diverters or delaying installation until that particular segment of line is rebuilt (for routine replacement or capacity upgrade).

PRECorp also will consider worker safety when selecting methods of access to the site and installation. If worker safety cannot be maintained, then diverters will not be installed until that particular segment of line is rebuilt (for routine replacement or capacity upgrade).



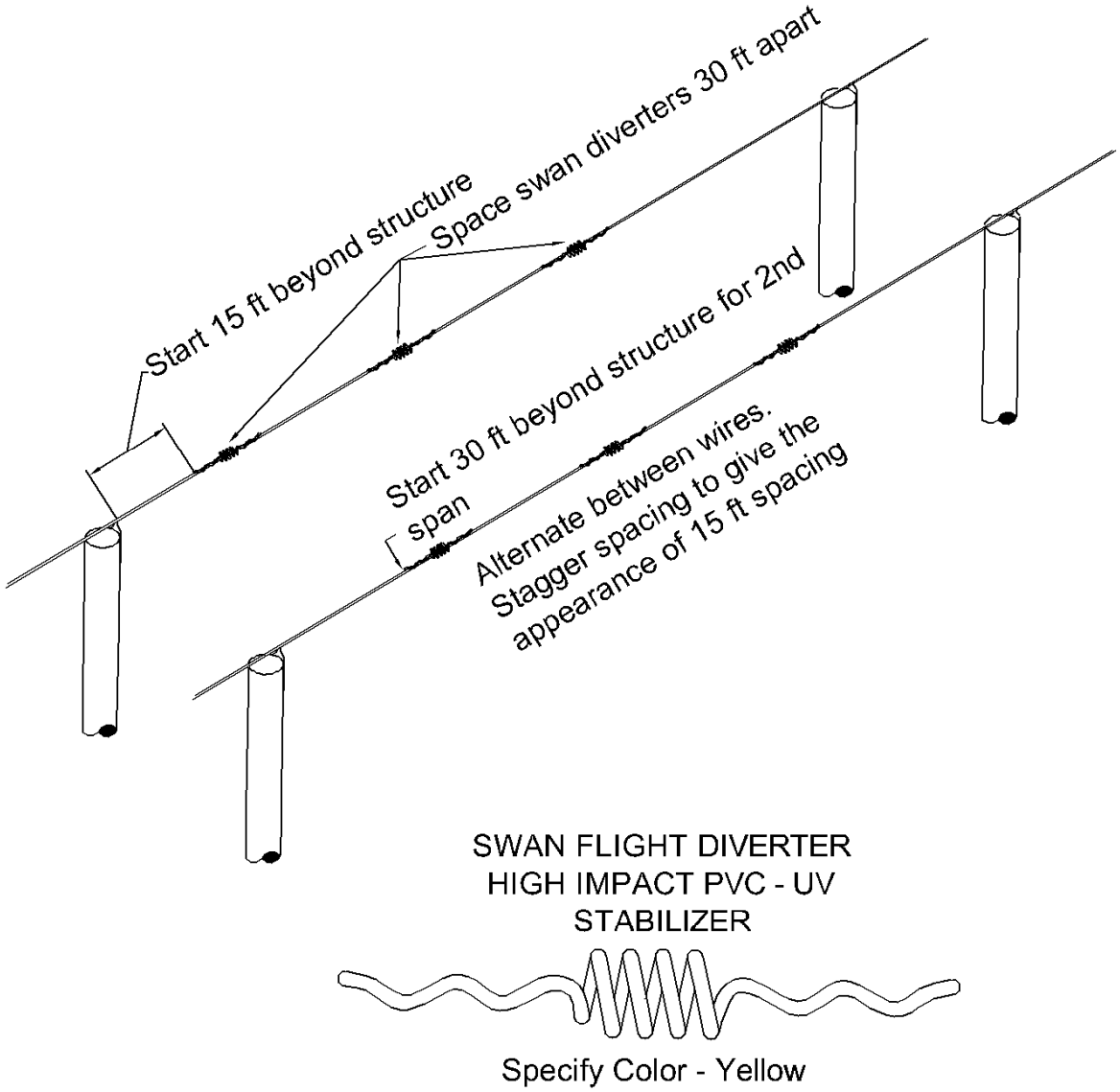
Spiral Swan Diverter	
CU	CONDUCTORS
EOWLSWAN2	#2 ACSR
EOWLSWAN2/0	2/0 ACSR
EOWLSWAN336	336 ACSR/AA
EOWLSWAN556	556 AA
EOWLSWAN795	795 AA



NOTES:

1. Use swan flight diverters to increase visibility of line in problem areas.
2. Place swan flight diverters on all phase conductors for flat construction. Space 45 feet apart and alternate between conductors. The overall effect is to present the illusion of a swan flight diverter every 15 ft.
3. For vertical construction place a swan flight diverters on top conductor only and space 15 feet apart.
4. Follow all manufactures instructions for installation.

Figure 11-3 Swan Flight Diverter Placement for Three Wires



NOTES:

1. Use Swan Flight Diverters to increase visibility of line in problem areas.
2. Place Swan Flight Diverters on both static wires. Space 30 ft apart and alternate between conductors. The overall effect is to present the illusion of a swan flight diverter every 15 ft.
4. Follow all manufactures instructions for installation.
5. If ice loading is a concern, smaller bird flight diverters may be substituted.

Figure 11-4 Swan Flight Diverter Placement for Two Static Wires

12.0 STANDARDS TO MITIGATE NESTING

Migratory birds and their nests are protected as described in Chapter 6.0, Species Protection. Before taking any action involving a nest, refer to the PRECorp nest management procedures flow chart (Figure 8-2) and contact the APP Coordinator's office. Chapter 8.0, Management Procedures, details PRECorp's regulatory process and internal reporting requirements.

This chapter describes how to manage nesting problems only *after* the regulatory requirements have been met.

12.1 Introduction

Nests located on power poles, particularly smaller distribution lines, cause a number of problems for utilities and for birds. Nest material, debris, excrement, and prey items can cause power outages, flashovers, equipment contamination, pole fires, bird electrocutions, and loss of eggs or young (Photo 12-1 and Photo 12-2). Some birds, including osprey and ravens, may build nests with conductive materials, such as bailing wire or fence wire, which increases the risk of a fire or outage. Outside the nesting season, nests deteriorate and storms may blow them off the unity structures. As deteriorating nests collapse, the debris also may cause outages.

Photo 12-1 Problem Red-tailed Hawk Nest on an Unprotected Distribution Line

Photo 12-2 Problem Osprey Nest on a Distribution Line

Unfortunately, nest removal typically does not solve the problem because many species will rebuild at the same location. However, the use of artificial nest platforms along with nest relocation effectively mitigates nesting problems on power line structures. Stick deflectors can be used to further discourage nesting on problem structures.

Nesting issues on larger transmission structures include contamination of insulating strings, nesting debris flashovers, and outages (Photo 12-3 and Photo 12-4). Relocating a nest to a different part of a transmission structure that mimics the original site is one method used to move birds away from a critical area. Cover-up materials may be installed on insulators or conductors to provide additional protection. These two methods, combined with perch management in areas of concern, can minimize transmission operational issues and adverse impacts to birds.

Photo 12-3 Golden Eagle Nest Debris on a 220kV Transmission Line Structure

Photo 12-4 Golden Eagle Nest on a 345kV Transmission Line Structure

When nesting birds are present on utility structures, line access for maintenance can be restricted. Birds can be very aggressive when defending their territory (Photo 12-5) and may try to drive away workers. With their sharp beaks and talons, raptors can inflict serious injuries. It is also important to note that eagles have an elevated layer of protection making it a federal violation to even disturb eagles (without a permit).

Photo 12-5 Raptor Chick Defending Itself in a Nest

12.2 Nest Platforms

Raptors such as osprey have a very strong attachment to their nest sites. They will attempt to rebuild at sites where they successfully raised young in the past. Constructing artificial nest platforms followed by nest relocation is the best method for such problem nests, but it is important to implement relocations carefully. If a nesting platform is rejected and results in nest failure, ospreys will spend the remainder of the season building frustration nests on nearby poles (Photo 12-6). These frustration nests may lead to outages. The following information describes how to successfully install nest platforms.

Photo 12-6 Osprey Frustration Nest

Nest platforms may be installed either on an existing structure (Photo 12-7) or a non-energized pole set specifically for a platform (Photo 12-8). Installing a platform on a non-energized surrogate pole is preferable because it eliminates problems associated with falling nesting material. Prior to setting a new pole, it is important to secure the appropriate land rights or permission for a new platform structure because most easements do not allow for this type of use. If a new pole cannot be installed, a nest platform may be mounted on an existing pole, depending on the pole configuration and any associated equipment.

Photo 12-7 Nesting Platform Above a Retrofitted Single-Phase Pole

Photo 12-8 Nesting Platform on a Surrogate Pole

In either case, Operations/Engineering must approve the nesting platform design along with the weight of the platform under wet conditions. If the platform is on an energized pole, all electrical and safety clearances must be addressed. Additionally, all exposed hardware and equipment in the vicinity of a nest should be retrofitted to keep young birds from becoming electrocuted when learning to fly. Young raptors often make short perch-to-perch flights before they become adept at flying. An electrocution risk assessment of poles should be performed near the nesting platform, with the nearest four poles taking priority. Other at-risk configurations in favorable habitat also must be reviewed with APP Coordinator's office input.

If nearby poles need to be retrofitted due to possible electrocutions, insulation is the preferred method over the use of perch discouragers. Perch discouragers (Photo 12-9) make it easier for birds to accumulate sticks, particularly on single-crossarm configurations.

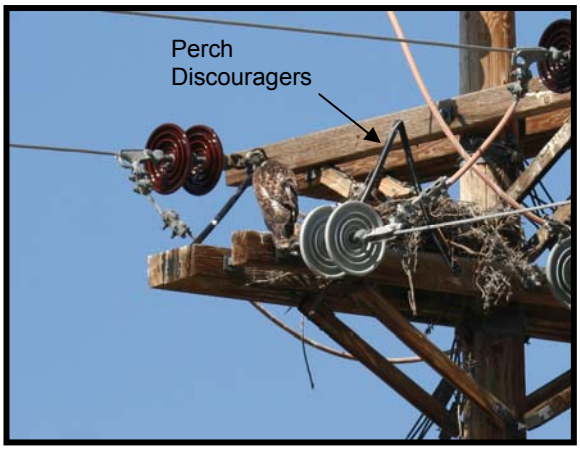


Photo 12-9 Red-Tailed Hawk Nest on a Pole Fitted with Perch Discouragers

Numerous platform designs are available, depending on the bird species. For osprey, platforms should be large enough (48 by 48 inches) to allow birds to continue adding nesting material in future years (Photo 12-10). Smaller platforms (36 by 36 inches) can be used for buteos such as red-tailed hawks and Swainson's hawks, and for ravens. Larger birds such as golden eagles require larger platforms (60 by 60 inches) (Photo 12-11).

Photo 12-10 Osprey Platform with an Elevated Perch on a Surrogate Pole

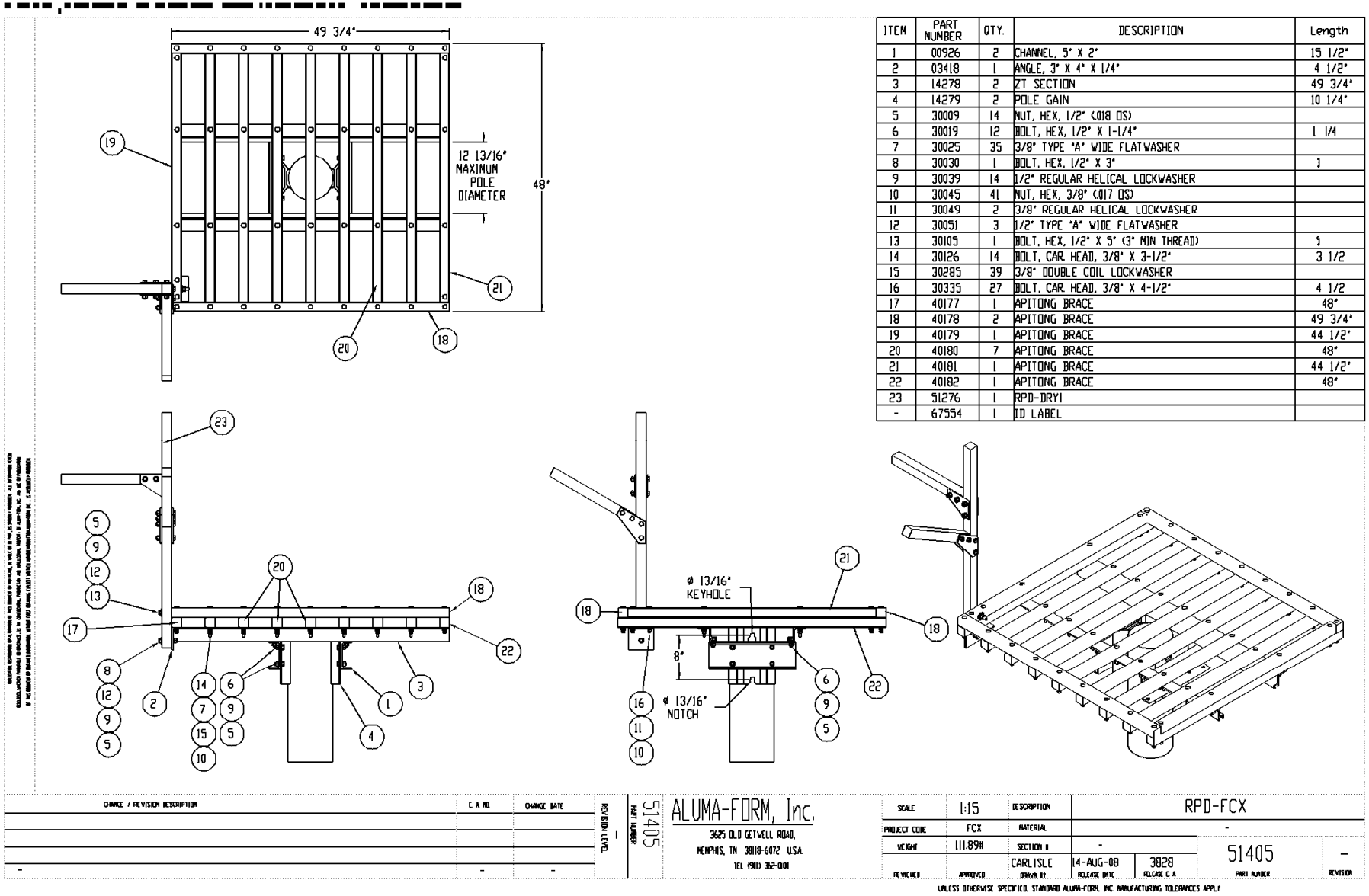
Photo 12-11 Golden Eagle Nesting Platform on a Transmission Lattice Tower

Nest platforms can be purchased (Figure 12-1) or constructed with readily available materials (Figure 12-2). Platforms should be designed so the nesting material does not blow off in strong winds. This can be accomplished by installing small vertical pegs (Figure 12-2) or by building a lip around the edge of the platform.

When an artificial platform is installed, it should be well supported and nesting material added to entice birds to use the platform. The sticks and their arrangement should emulate the species for which the platform is designed. Tying some of the larger sticks to the base of the platform also will protect the nest in high winds. Lashing material should be trimmed so that birds cannot become entangled in any loose ends. Installing an artificial perch on the platform perpendicular to the wind is recommended. Poles can be wrapped with a 5-foot predator guard wrapped around the pole to prevent raccoons and other mammals from accessing nests; however, this is not an option when poles must be climbed by linemen.

Nest relocations should be timed to avoid the critical period just before egg laying. Disturbing birds during this time may result in breeding failure. Likewise, ROW and maintenance activities should be scheduled to avoid the breeding season so nesting birds are not disturbed. In general, eagles begin laying eggs in early February and smaller raptors, such as owls, begin in mid- to late February, with some species extending into April. The APP Coordinator's office can provide guidance on these critical time periods.

When a non-energized surrogate pole is installed, the nest platform should be at least as high as the old nest. Installation of nesting platforms must consider the surrounding habitat and the APP Coordinator's office must be consulted for guidance on how far a platform can be set from an existing nest location. It is best to keep the platform near the existing nest site. For osprey, distances between 65 and 325 feet are most common; in addition, the new location should be in sight of the previous location and the new pole should be placed in the direction of the water body (if applicable). The pole with the original nest should be fitted with stick deflectors to discourage the birds from seeking out the original location (refer to Section 8.3.3, Nest Removal, Relocation, and Destruction).



ITEM	PART NUMBER	QTY.	DESCRIPTION	Length
1	00926	2	CHANNEL, 5" X 2"	15 1/2"
2	03418	1	ANGLE, 3" X 4" X 1/4"	4 1/2"
3	14278	2	ZT SECTION	49 3/4"
4	14279	2	POLE GAIN	10 1/4"
5	30009	14	NUT, HEX, 1/2" (.018 OS)	
6	30019	12	BOLT, HEX, 1/2" X 1-1/4"	1 1/4
7	30025	35	3/8" TYPE "A" WIDE FLATWASHER	
8	30030	1	BOLT, HEX, 1/2" X 3"	3
9	30039	14	1/2" REGULAR HELICAL LOCKWASHER	
10	30045	41	NUT, HEX, 3/8" (.017 OS)	
11	30049	2	3/8" REGULAR HELICAL LOCKWASHER	
12	30051	3	1/2" TYPE "A" WIDE FLATWASHER	
13	30105	1	BOLT, HEX, 1/2" X 5" (3" MIN THREAD)	5
14	30126	14	BOLT, CAR. HEAD, 3/8" X 3-1/2"	3 1/2
15	30285	39	3/8" DOUBLE COIL LOCKWASHER	
16	30335	27	BOLT, CAR. HEAD, 3/8" X 4-1/2"	4 1/2
17	40177	1	APITONG BRACE	48"
18	40178	2	APITONG BRACE	49 3/4"
19	40179	1	APITONG BRACE	44 1/2"
20	40180	7	APITONG BRACE	48"
21	40181	1	APITONG BRACE	44 1/2"
22	40182	1	APITONG BRACE	48"
23	51276	1	RPD-DRY1	
-	67554	1	ID LABEL	

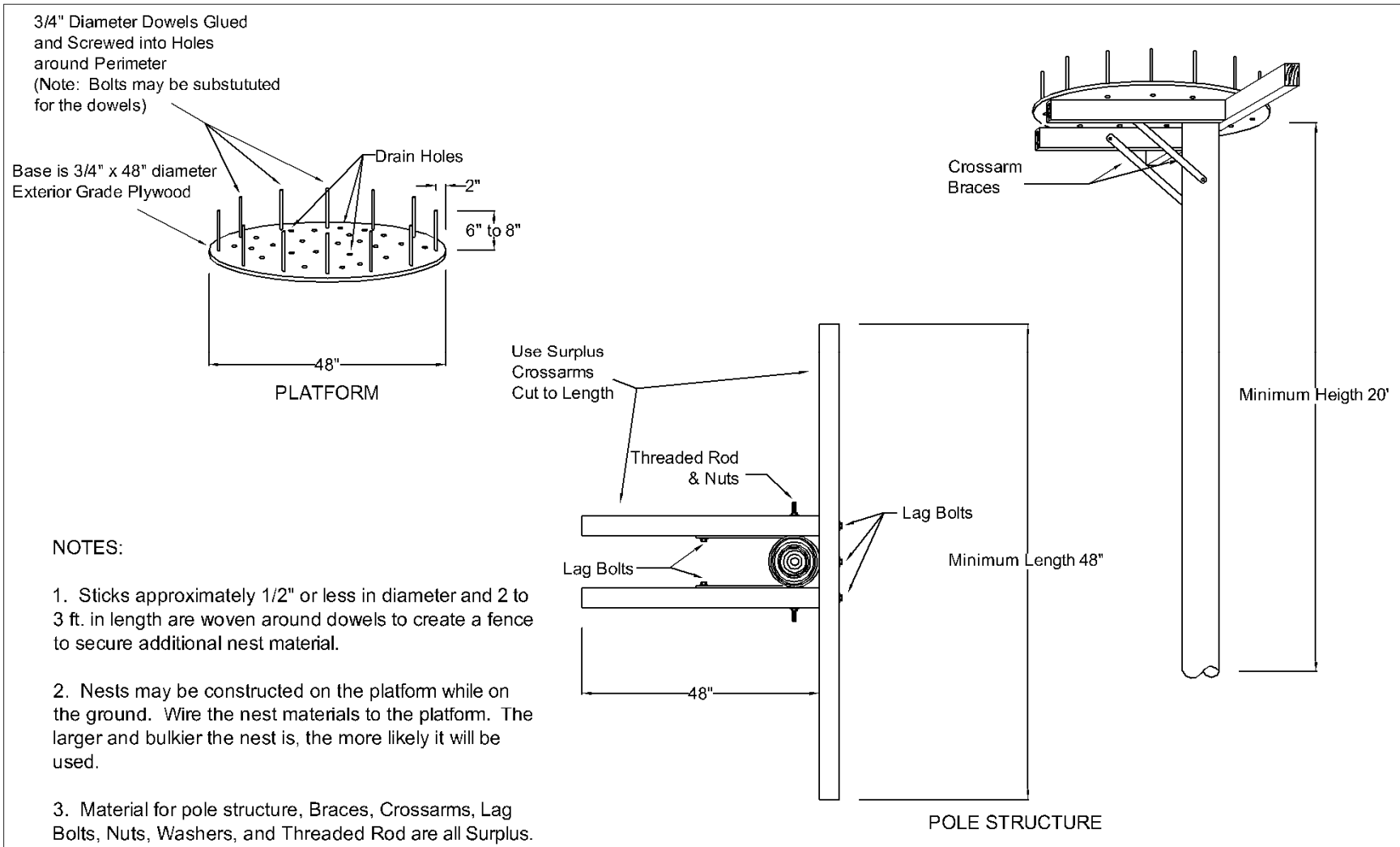
CHANGE / REVISION DESCRIPTION	C.A.NO.	CHANGE DATE
-	-	-

REVISION LEVEL: -

SCALE	1:15	DESCRIPTION	RPD-FCX
PROJECT CODE	FCX	MATERIAL	-
WEIGHT	111.89#	SECTION #	-
REVIEWED	APPROVED	DRAWN BY: CARLISLE	RELEASE DATE: 14-AUG-08
			RELEASE C.A.: 3828
			PART NUMBER: 51405
			REVISION: -

UNLESS OTHERWISE SPECIFIED, STANDARD ALUMA-FORM, INC. MANUFACTURING TOLERANCES APPLY

Figure 12-1 Aluma-Form Osprey Nesting Platform



NOTES:

1. Sticks approximately 1/2" or less in diameter and 2 to 3 ft. in length are woven around dowels to create a fence to secure additional nest material.

2. Nests may be constructed on the platform while on the ground. Wire the nest materials to the platform. The larger and bulkier the nest is, the more likely it will be used.

3. Material for pole structure, Braces, Crossarms, Lag Bolts, Nuts, Washers, and Threaded Rod are all Surplus.

4. Affix platform to pole structure crossarms with lag bolts. Use Large washers to reduce wear on platform

EDM

OSPREY NEST PLATFORM

Construction Drawing

SCALE: NOT TO SCALE | SHEET: 1 OF 1

Figure 12-2 Plans for an Osprey Nesting Platform

When a nest is relocated on an existing structure, platforms for raptors should be placed on the pole top (Photo 12-12). It may be possible to relocate nests for non-raptors (e.g., raven) beneath the crossarms (Photo 12-13).

Photo 12-12 Raptor Platform on Pole Top

Photo 12-13 Raven Platform Below Crossarms

As part of the permit process, platform installation should be coordinated with state and federal biologists to ensure nest relocations do not adversely affect other sensitive species.

Parasites and diseases can be transmitted through contact with nests, therefore, linemen must wear gloves or use an inverted plastic bag to handle nests. Paper breathing filters also are recommended because dried bird feces may be dispersed into the air when a nest is moved (refer to Section 12.3, Stick Deflectors).

12.3 Stick Deflectors

When a nest is relocated, the original nest pole should be fitted with stick deflectors to discourage re-nesting at the original location. Stick deflectors can be purchased (Photo 12-14) or constructed with readily available materials such as plastic pipe (Photo 12-15). Stick deflectors should be designed so the nesting material bounces off the structure when dropped. For this to be effective, jumpers should be placed under the crossarms to make it more difficult for birds to lodge nesting material along the jumpers. Stick deflectors should be installed close enough to the crossarms to prevent birds from nesting under the deflectors, without compromising electrical clearances.

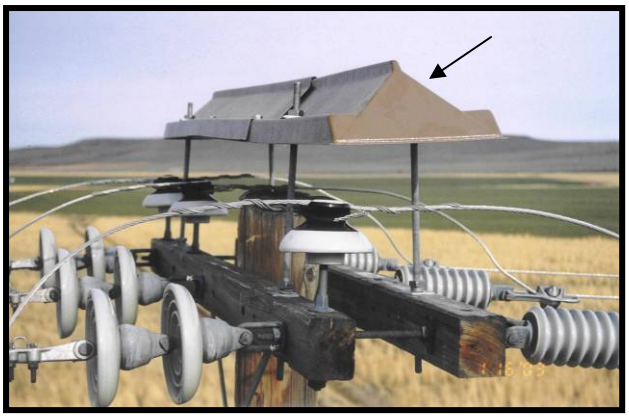


Photo 12-14 Stick Deflector to Keep Nesting Materials from Attaching to the Structure

Photo 12-15 Stick Deflector to Keep Nesting Materials from Attaching to the Crossarm

Stick deflectors should be securely attached to the utility structure and Operations/Engineering must approve of the stick deflector design along with all electrical and safety clearances. Stick deflectors should be monitored during the nesting season; sticks that have defeated the deflector should be removed immediately. Additionally, all exposed hardware and equipment on the pole should be retrofitted to protect birds from becoming electrocuted.

12.4 Alternative Construction

Poles with multiple crossarms (e.g., deadend and double deadend configurations) often are sought out for nesting. For example, ospreys regularly construct nests on double deadend structures that support line spans across or adjacent to rivers and lakes. Alternative framing techniques can be used in new construction to reduce these nesting opportunities.

Constructing new distribution power lines with armless vertical construction makes it difficult for nesting materials to lodge on a structure. Where crossarms are required, use of a single crossarm can eliminate a place for birds to nest. This can be accomplished by using engineered crossarms, which may eliminate the need for multiple crossarms and braces (Photo 12-16 and Photo 12-17).

Photo 12-16 Fiberglass Deadend Single Crossarm

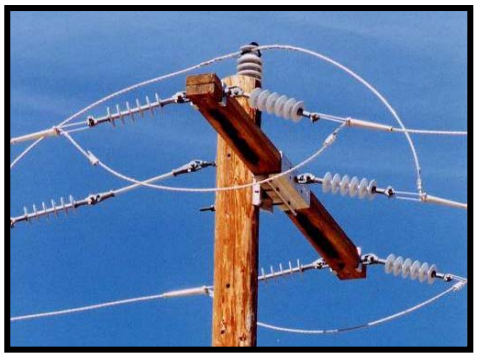


Photo 12-17 Apitong Wood Double Deadend Single Crossarm

13.0 RISK ASSESSMENT

When a company chooses to identify site-specific areas within their service territory for bird electrocution and/or collision risks, it is seldom feasible to survey every structure or line span. Typically, a risk assessment approach is used.

A risk assessment involves identifying areas where poles and line spans exist that may pose a relatively high risk to birds. After identifying the high-risk bird use areas, priorities are then assigned to specific pole configurations and line spans in order to develop electrocution and collision retrofitting schedules. This approach is useful for a utility's short- and long-term planning efforts.

Development of a risk assessment requires integrating detailed knowledge of the types of at-risk structures and line locations (relative to bird-use areas) with information on the habitats used by at-risk bird species. The strategy to rank habitats is key because geographic location, landscape features, and the associated habitats are as important as the utility pole configurations and span locations in determining the risks of avian interactions with power lines (Mañosa 2001; APLIC 1994, 2006). For example, nesting is a principal component associated with habitat; therefore, structures located near known raptor nests should be assigned a higher priority for raptor protection (Platt 2005) when assessing electrocution risks.

The approaches used for assessing electrocution risk (refer to Section 13.1, Electrocution Risk Assessment) and collision risk (refer to Section 13.2, Collision Risk Assessment) are fundamentally different, and are discussed separately in this chapter.

13.1 Electrocution Risk Assessment

Multiple approaches can be applied to define avian electrocution risk on a system. The following process-based approach is used to determine electrocution risk and delineate the appropriate retrofit prioritizations, using field observations and a decision flowchart.

13.1.1 Identifying At-Risk Bird Species

The first step in assessing the electrocution risk on a system is to determine "at-risk" bird species within a service territory. For the PRECorp service territory, these species are defined and discussed in Chapter 4.0, Avian Interactions with Power Lines, and Chapter 5.0, Species Susceptible to Utility Interactions, and detailed in Table 5-1. Identifying the at-risk bird species in an area also can be determined from a review of the company's historical bird fatalities.

PRECorp's service territory encompasses prime habitat for golden eagles, and accordingly, this species is frequently recorded in power line interactions. PRECorp's APP is designed to prevent golden eagle electrocutions and other avian interactions.

13.1.2 Pole-Risk Classification

The second step is to identify utility configurations on the system that comprise the greatest electrocution risk to these target bird species. Research on bird electrocutions has shown certain power line structures are more lethal to birds than other configurations. This is especially true when mortality rates are adjusted for structure frequency (Harness 1997). For example, three-phase tangent structures may be responsible for the same number of electrocutions as three-phase transformer banks. However, because three-phase transformer banks occur less frequently than tangent structures, their adjusted lethality is significantly higher. Determining at-risk structures can be accomplished by reviewing historical outage records and/or conducting field surveys.

PRECorp has an internal tracking system that provides information on the types of structures being contacted by raptors. Figure 13-1 depicts detected mortality in 2008 and illustrates that equipment poles are associated with a disproportionate number of detected electrocutions.

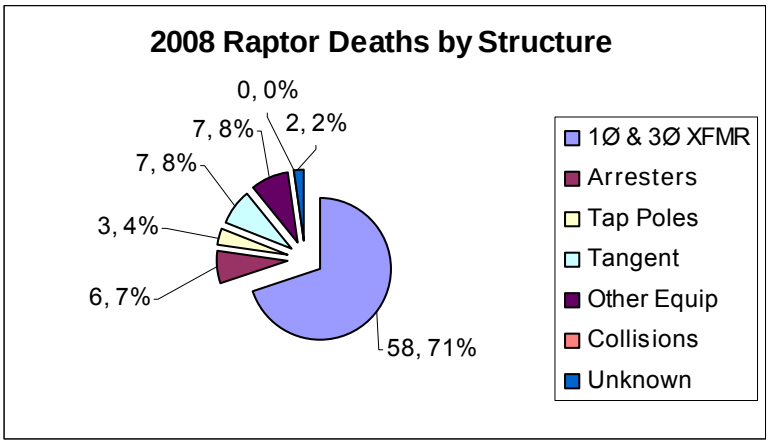


Figure 13-1 Detected Raptor Mortality by Structure Type (2008)

This PRECorp result is similar to a review of raptor mortality records gathered from 58 electric utilities located in the western U.S. These records provide data on 1,450 confirmed raptor electrocutions and suggest that, although transformers are relatively rare on rural overhead distribution systems, they are associated with a disproportionate number of detected electrocutions (Harness 1997).

The following approach, based on field observations by EDM was developed by assigning a risk factor to the primary units, based on phase-to-phase and phase-to-ground clearances. A ranking of High, Medium, Low, or No risk was assigned to the following utility primary configurations:

<u>High-Risk Configuration</u>

- Three-phase transformer banks and other three-phase equipment poles (capacitors/regulators/reclosers)

- Three-phase double deadend and angle poles
- Three-phase riser poles
- Three-phase tangent structures with all primary wires supported on a crossarm

Medium-Risk Configuration
- Poles with pole-top groundwires
- Single-phase transformer banks and other single-phase equipment poles
- Single-phase risers

Low-Risk Configuration
- Three-phase tangent structures with the center phase ridge-pinned

No-Risk Configuration
- Three-phase tangent structure with 60 inches separation
- Three-phase vertical structures
- Single-phase structure with no pole top grounds

A calculation of electrocution risks can be determined—as outlined in Figure 13-2, Figure 13-3, and Figure 13-4 for single-phase, three-phase, and transmission line configurations, respectively. These flowcharts examine structure configurations to assign an overall electrocution risk, based on a number of factors.

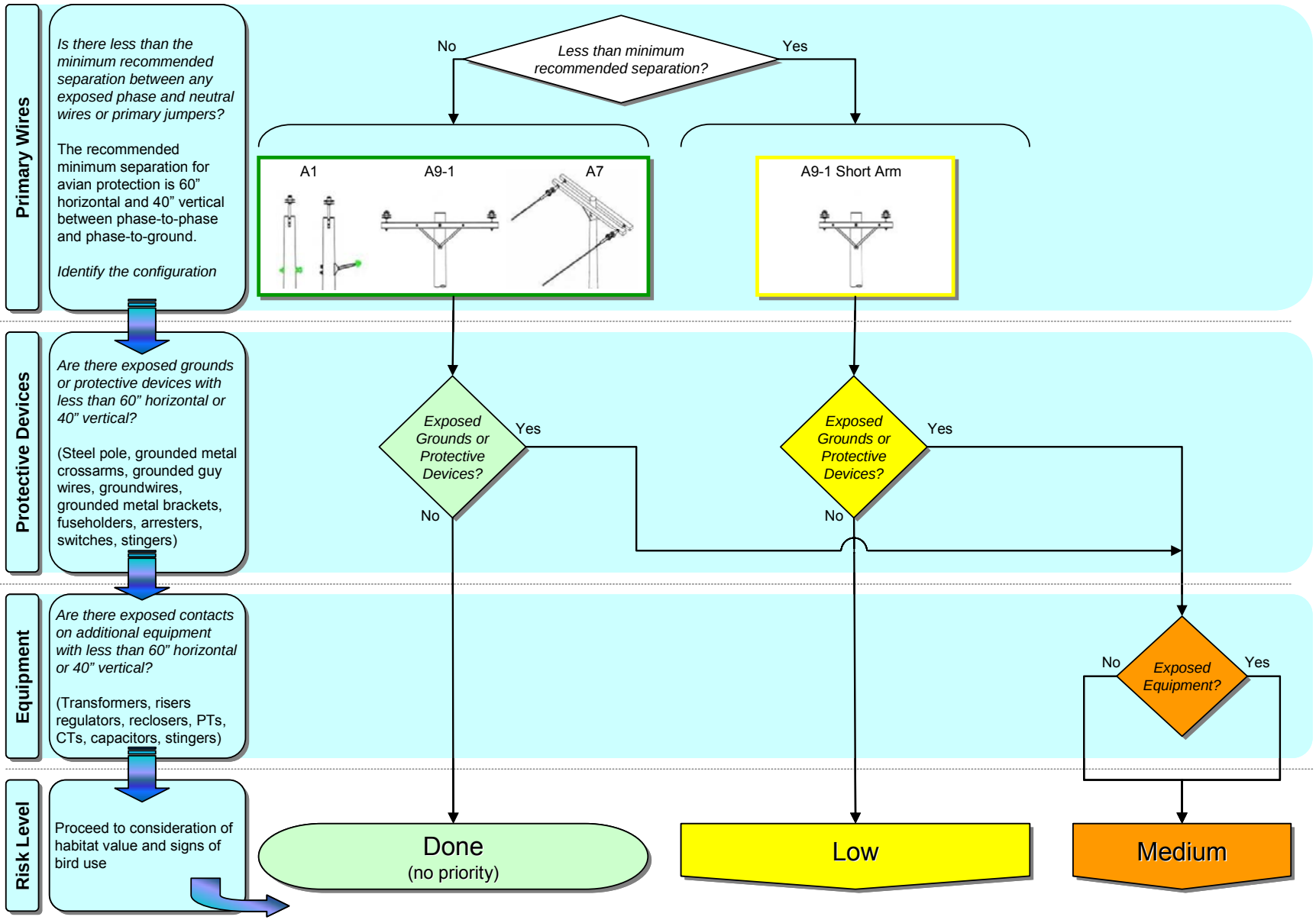


Figure 13-2 Configuration Risk Level for Single-Phase Structures

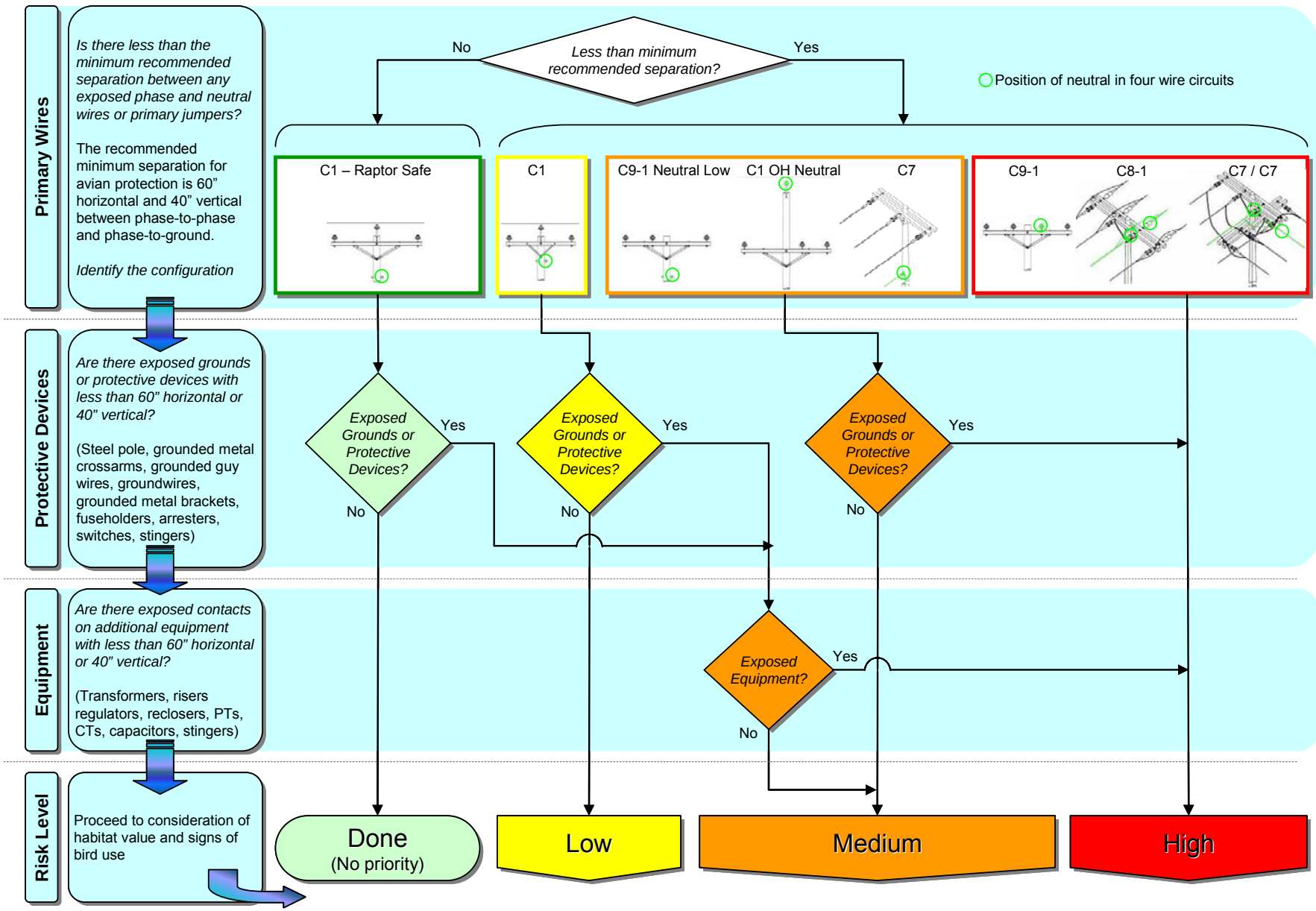
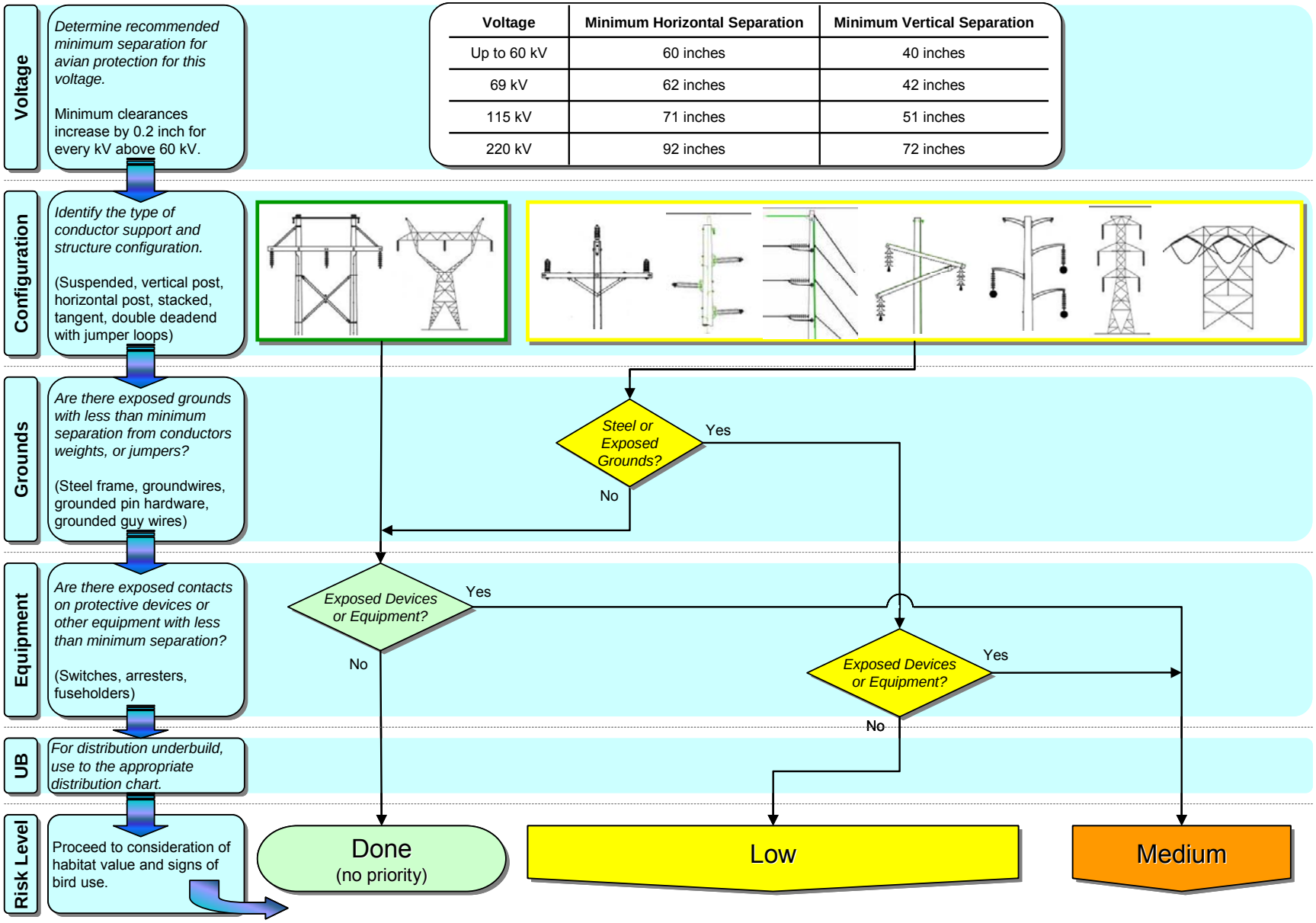


Figure 13-3 Configuration Risk Level for Three-Phase Structures



Voltage	Minimum Horizontal Separation	Minimum Vertical Separation
Up to 60 kV	60 inches	40 inches
69 kV	62 inches	42 inches
115 kV	71 inches	51 inches
220 kV	92 inches	72 inches

Figure 13-4 Configuration Risk Level for Transmission Structures

13.1.3 Habitat Classification

The next step is incorporating information on bird habitat, which comprises an important component of assessing avian risk near power lines. As discussed in Section 4.1, Electrocutions, numerous factors contribute to avian electrocution risk. In the field, it is important to look for and record signs of bird use and then evaluate the broader general habitat. Specific habitat within 100 yards of a pole should be further evaluated. In fragmented habitats, not all utility poles are at equal risk.

Poles should be field checked to identify "preferred perches," with an emphasis on three-phase lines. Since the purpose of still-hunting is to perch on the highest point with the best view of the countryside, raptors will select certain poles for perching over others. These preferred perches offer the best vantage point and, if unprotected, are more likely to be involved in electrocutions (APLIC 1996).

Habitat values should be recorded, including vegetation, presence of roads or other human disturbance, vantage point (i.e., high, medium, or low), prey species present, and signs of avian use (e.g., whitewash, castings, prey remains, feathers, nest, bird fatalities, live bird sightings).

In general, the highest value is given to poles in rural areas with native vegetation or in areas of limited human influences, poles exhibiting signs of bird use, and those providing a commanding view. The lowest value is given to spans and poles in more disturbed habitats with little or no native vegetation, poles in areas of high human use, and low-aspect poles. Figure 13-5 outlines the process that should be followed when assessing habitat types for avian electrocution risk.

13.1.4 Retrofitting Prioritization

The final step after assigning both a configuration risk and a habitat value is to combine both values to determine a retrofitting prioritizing value (Figure 13-6). A priority of "High" should be assigned to high-risk structures located in areas with high-quality habitat for birds and their associated prey base or near known raptor roost/nest sites. An electrocution retrofitting priority of "High" also should be assigned to structures with carcasses/bones (i.e., bird fatalities) at the pole base or preferred-perch poles with inadequate spacing.

Structures with reduced clearance, but located in lower quality habitat, are assigned a "Medium" retrofitting priority. Although these structure types are potentially lethal, they do not show signs of heavy raptor usage and are typically located near roads or other human-related areas. Low-risk structures in high-quality habitat also are assigned a medium retrofitting priority due to the potential high frequency of bird use.

A "Low" priority is assigned to potentially hazardous structure types located in more disturbed areas with low raptor use (e.g., degraded habitat, disturbed areas, areas with high levels of human activity).

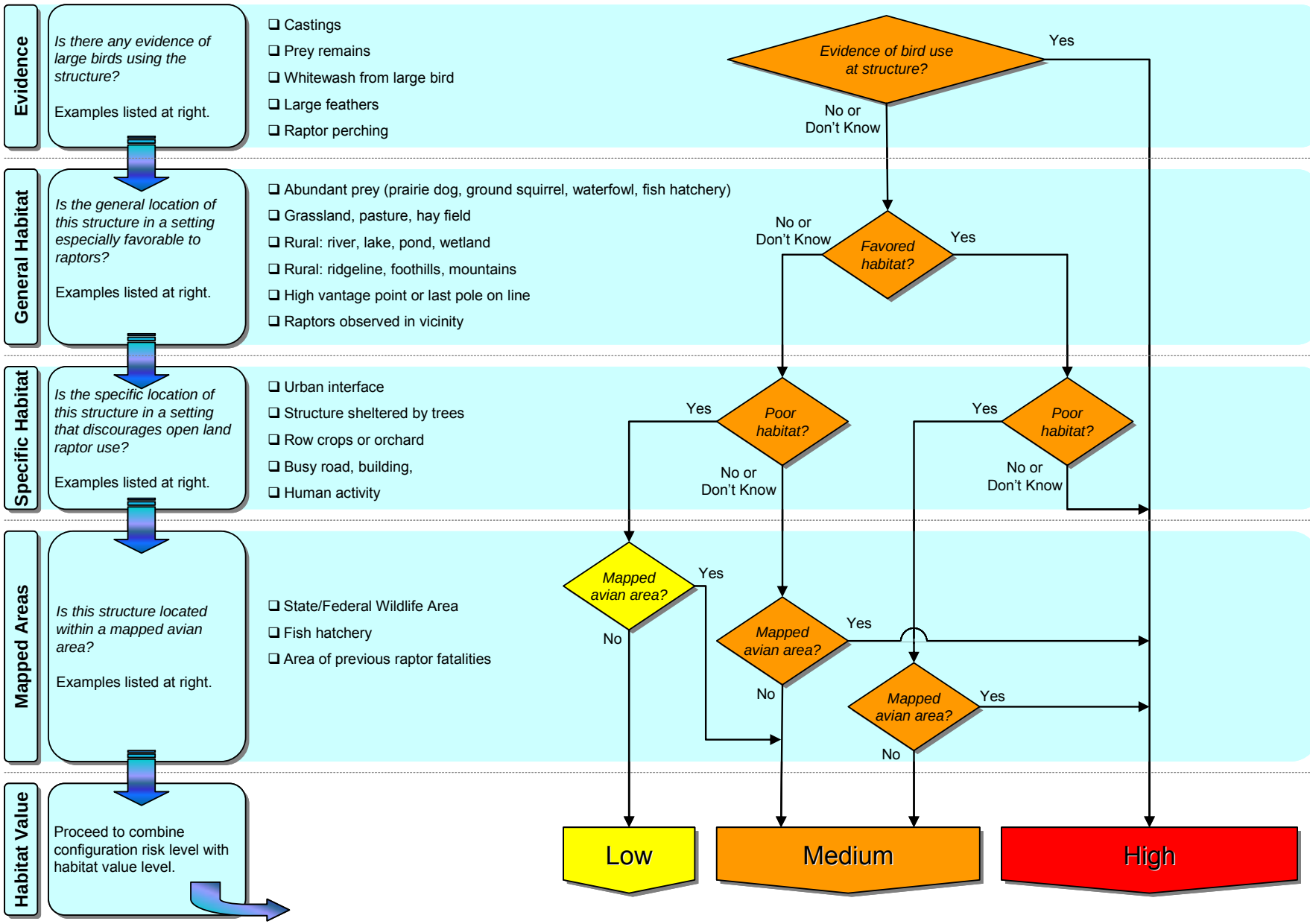


Figure 13-5 Habitat Value Level

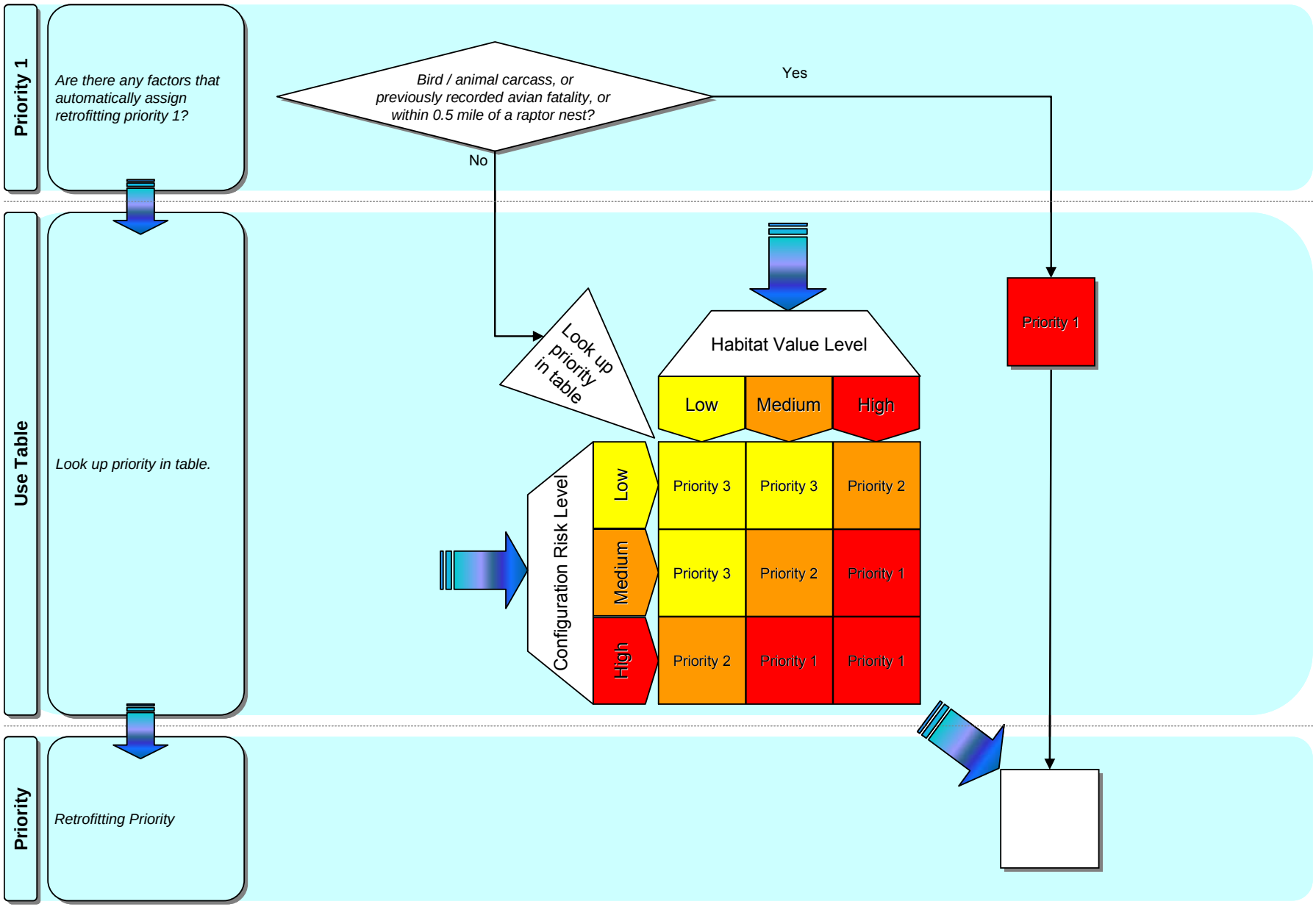


Figure 13-6 Calculating Retrofit Priority

13.1.5 Summary

Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 1981 (Olendorff et al. 1981) states that "correcting 2 percent of all structures can eliminate 95 percent of all eagle electrocutions." Even though the authors of this statement acknowledge this is probably optimistic, it does illustrate the importance of assessing the variables of pole configuration and habitat associations to optimize both proactive line design and reactive retrofitting approaches. Since an effective avian protection program includes both proactive and reactive approaches to bird fatalities, using these prioritization processes can facilitate operational and maintenance planning.

13.2 Collision Risk Assessment

Similar to the electrocution risk assessment, a number of variables apply to accurately assessing the avian collision risks along a power line corridor (see Section 4.2, Collisions). The recommended approach to assess avian collision risk at the local level is based on binary responses to questions about individual spans and relies on field observations to gather these data. Other model-based approaches to assess collision risks can require a greater level of sophisticated, GIS-based power line and habitat data that may be difficult to obtain for certain areas.

Different approaches have their strengths and weaknesses; therefore, the method selected should be based on available information, the company's technical capabilities, ultimate goals, and desired output. The following process-based collision risk assessment can be applied with all levels of available power line and biological data, providing an intuitive approach, based on expert opinion and field data collected by trained biologists with knowledge of electrical transmission and distribution systems.

13.2.1 Power Line Configurations and Locations

One of the first steps in conducting this level of collision risk assessment is to review the power line configurations and locations, particularly transmission lines with overhead static wires and distribution lines located in proximity to bird-use and movement areas. Similar to the discussion for assessing bird electrocution risks, line location and associated habitats are important. This review focuses on lines that bisect habitats documented as highly valuable for both resident and migratory birds. An example would be power lines located between a known waterfowl roosting area and a prominent feeding site (APLIC 1994).

13.2.2 Numerical Ranking

Once the target areas or “hot spots” have been defined at the landscape level, a numerically based approach can be employed, incorporating important biological factors, landscape features, land use, human presence, known avian mortality history, and key economic considerations. This approach assesses the avian collision risk and assigns a retrofit prioritization ranking for the appropriate spans using a linear scoring system.

Important factors for bird collisions include the following:

- Line configuration (i.e., vertical vs. horizontal)
- The use of overhead static wires
- Existing marking or shielding of the conductors or overhead static wires
- Presence and proximity of other power lines
- Associated habitat type(s)
- Prevailing winds and visibility
- Bird use information relative to numbers, species, seasonal or daily movement patterns, sensitivity, etc.
- Historical mortality information

These data are used to develop a prioritization chart to better assess the relative collision risk, as outlined in Figure 13-7.

13.2.3 Retrofitting Prioritization

A retrofit prioritization is applied to specific line spans, based on a numerical ranking system. Using the flow chart in Figure 13-7, a numerical value is assigned to particular span. Values that total up to one and below receive the highest retrofitting priority. Conversely, values of four and above do not require action. This approach can be used equally for both transmission and distribution lines. The applicable retrofits should be based on corporate policy, engineering preferences, line design, and site-specific factors (e.g., vandalism potential), as discussed in Chapter 11.0, Standards to Reduce Collisions.

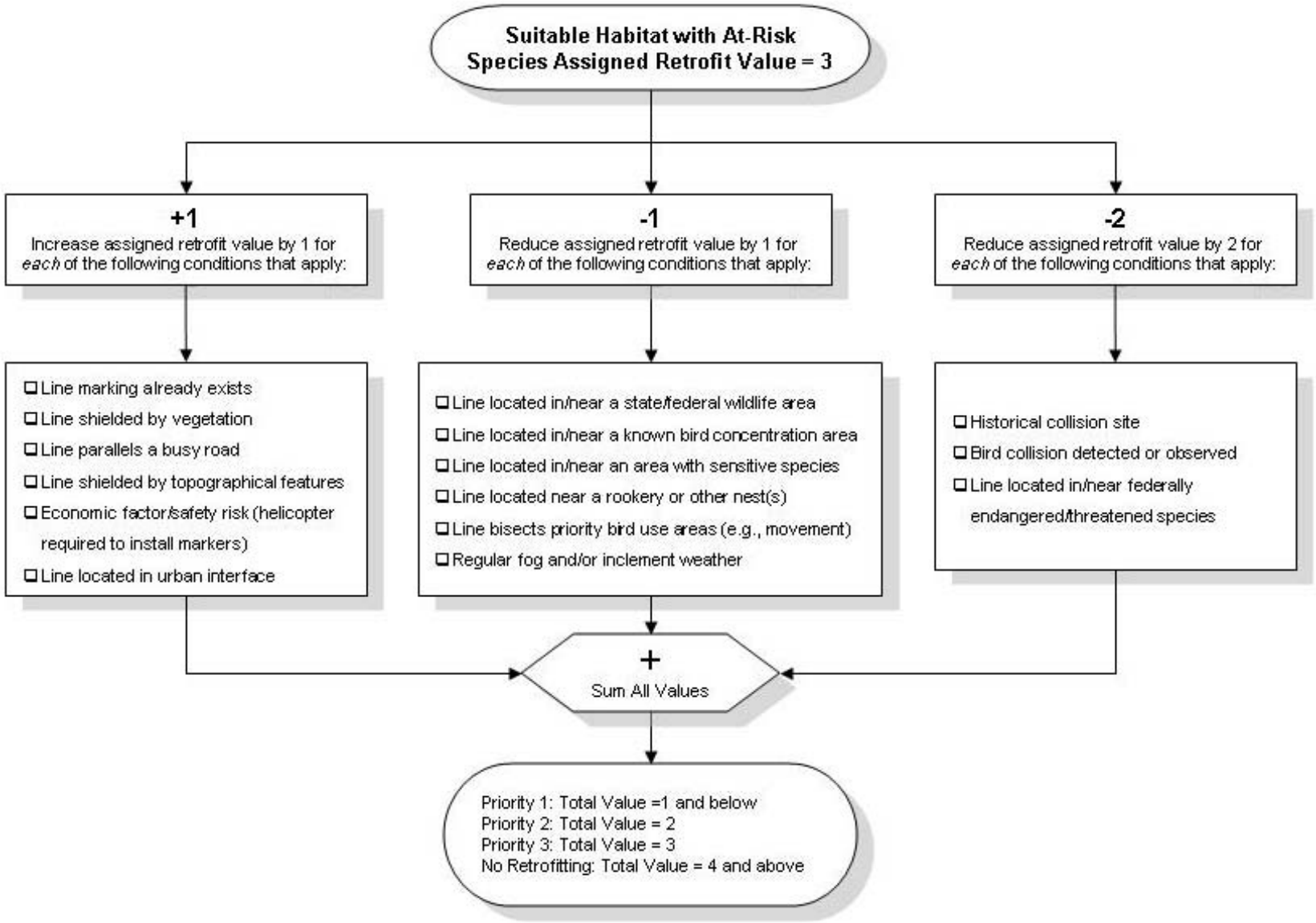


Figure 13-7 Determination of Collision Risk

14.0 ELECTROCUTION ANALYSIS AND MITIGATION PLAN

14.1 Historical Perspective

PRECorp first began reporting and recording raptor electrocutions in May 2001, and, in December 2005, completed and began implementation of its initial Avian Protection Plan. At that time, retrofitting standards for old construction were approved, and raptor friendly standards for new construction were defined. PRECorp included EDM in the review process for those standards.

Prior to the APP, PRECorp was already implementing a number of raptor protection approaches on their system, including:

- Using nonconductive wooden crossarms, 10 feet long on newer construction
- Installing bushing covers on transformer and capacitor banks
- Insulating jumper wires to transformers

14.2 Risk Assessment

Using historical raptor mortality data and GIS mapping, PRECorp has developed a phased, prioritized approach to retrofitting based on the density of raptor deaths within its service territory (Appendix L).

PRECorp's Phase 1 Retrofit Plan identified an area of fourteen townships having a greater occurrence of raptor electrocution. In 2005, EDM conducted a risk assessment in the Phase 1 area in order to document high-risk structures, and to examine the specific electrical configurations relative to the pole location, associated habitat types, and relative bird use. Several sites of historic mortality also were examined, as were rights-of-way in bird concentration areas examined for collision potential.

Emphasis in the Phase 1 retrofit area was placed on three-phase lines in proximity to favorable bird habitat, although some single- and two-phase lines also were surveyed. The goal was to identify the relative risk of electrocution in areas that represented the most optimal habitat, thereby providing PRECorp with information for both short- and long-term planning to minimize bird electrocution risks. Detailed results of EDM's field surveys and retrofitting recommendations are contained in PRECorp's initial APP (EDM International 2005).

14.3 Mitigation Plan

Since the adoption of PRECorp's initial APP in December 2005, the company has proactively been retrofitting dangerous structures. Because the PRECorp service territory is so vast, PRECorp has adopted a multi-phased, multi-year approach to retrofitting. This plan includes nine Avian Electrocution Retrofitting Phase Areas, which

were selected and prioritized based upon historical electrocutions (particularly golden eagles) occurring in rural sagebrush areas. The phases and years are as follows:

- Phase 1 – 2005
- Phase 2 – 2008
- Phase 3 – 2010/2011 (Figure 14-1)
- Phase 4 – 2012 (Figure 14-2)
- Phase 5 – 2013 (Figure 14-3)
- Phase 6 – 2014 (Figure 14-4)
- Phase 7 – 2015 (Figure 14-5)
- Phase 8 – 2016 (Figure 14-6)
- Phase 9 – 2017 (Figure 14-7)
- Future phases beyond 2017

The multi-phase retrofitting plan was developed using historical raptor mortality records combined with GIS mapping. The results provide a visual depiction showing the location and density of mortalities (Appendix L). Under this approach, PRECorp anticipates retrofitting between 1700 and 2500 structures per year (Table 14-1).

Table 14-1 Structures to be Retrofitted on a Yearly Basis

Year	Number of Townships	Number of Structures
2005	12	2524
2008	18	406
2010/2011	5	1700
2012	10	2020
2013	12	1904
2014	18	1914
2015	16	2000
2016	21	1782
2017	23	1866
2018–2037	290	45206

Within each area targeted for retrofitting, PRECorp will focus its efforts on structures being particularly lethal to wildlife: transformer banks, arrestor banks, taps, and other equipment structures. This schedule will be reviewed and modified as needed to reflect available resources and to incorporate new practices and products.

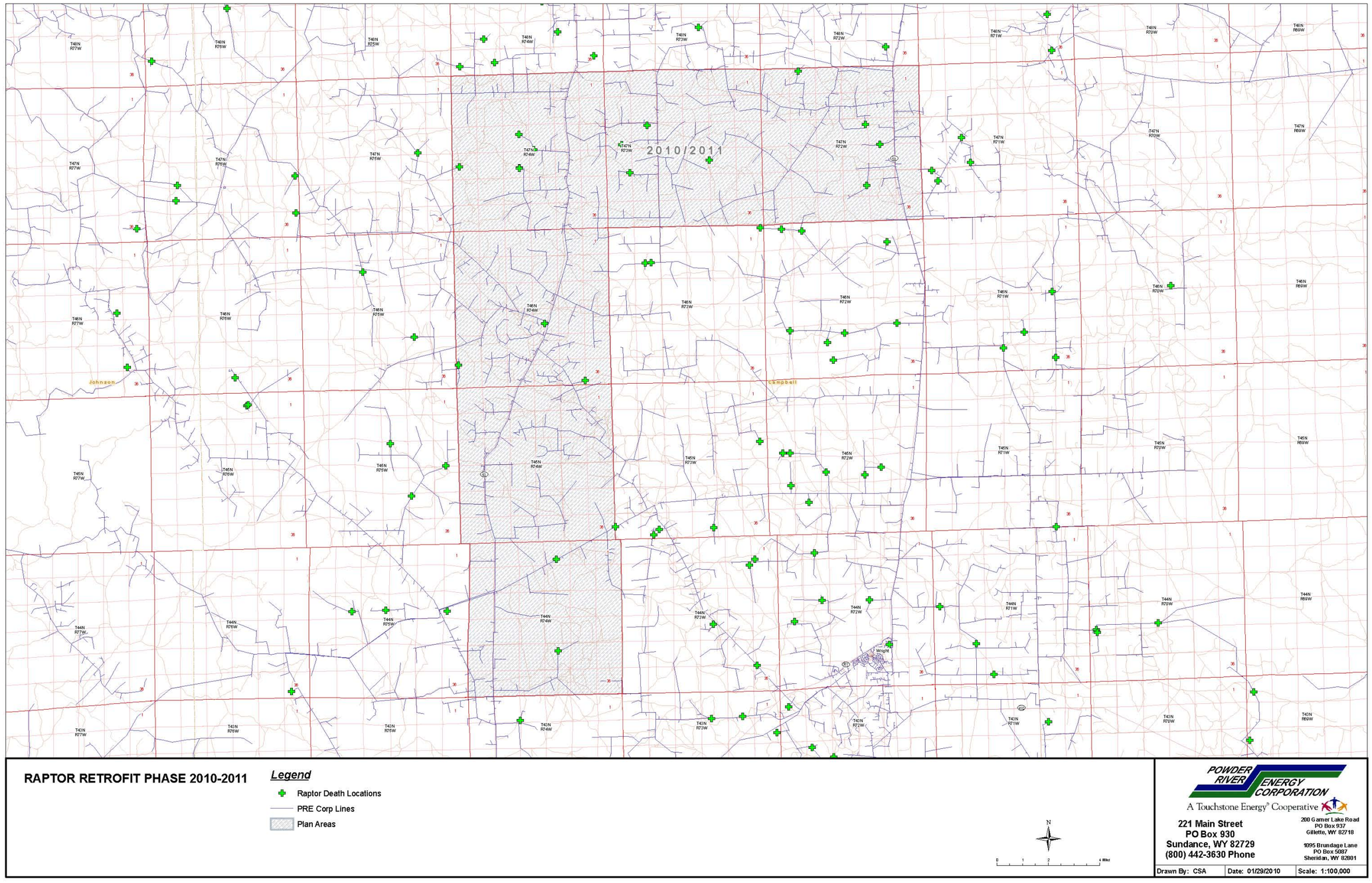


Figure 14-1 2010/2011 Schedule of Avian Electrocution Retrofitting

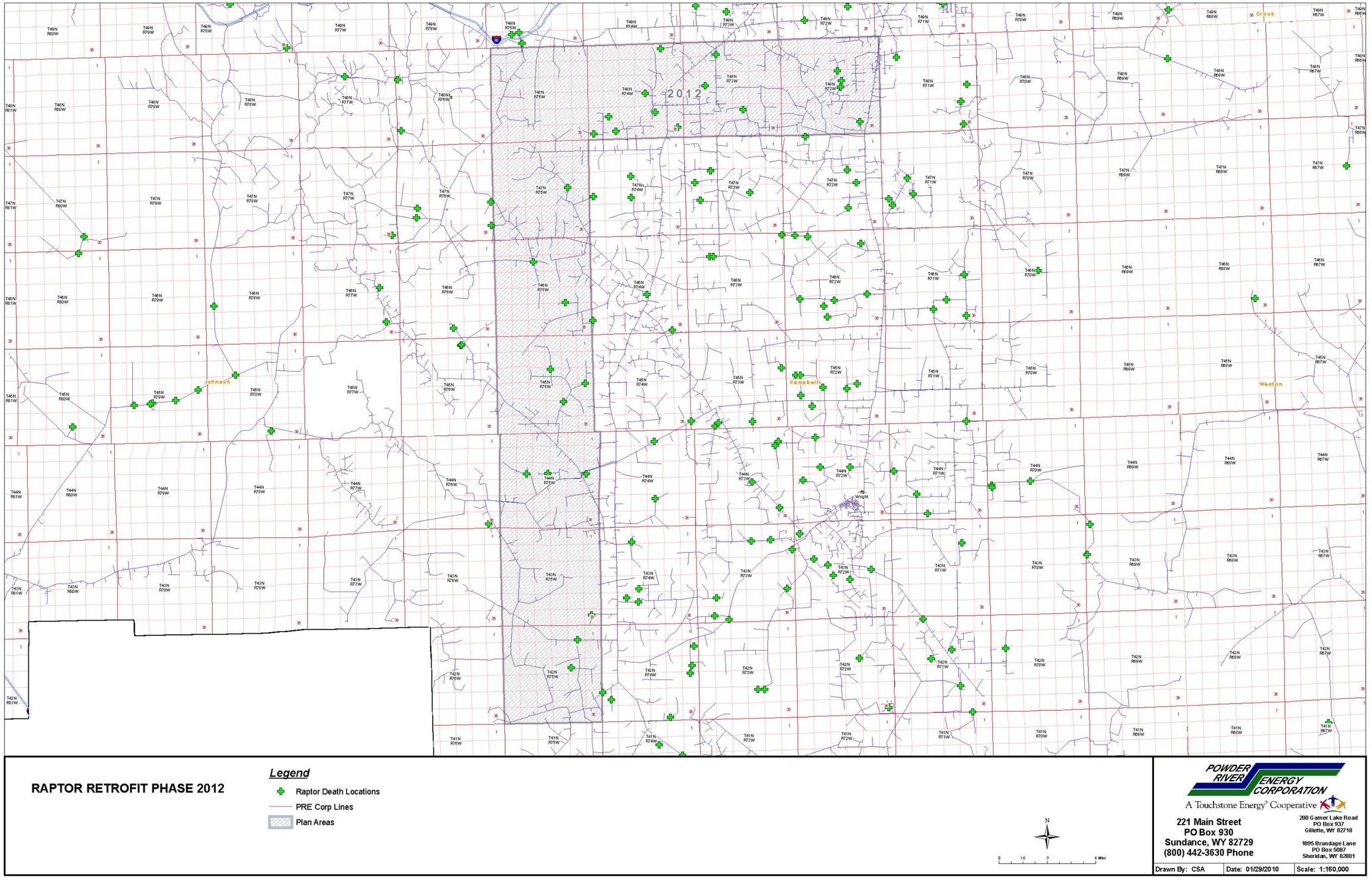


Figure 14-2 2012 Schedule of Avian Electrocution Retrofitting

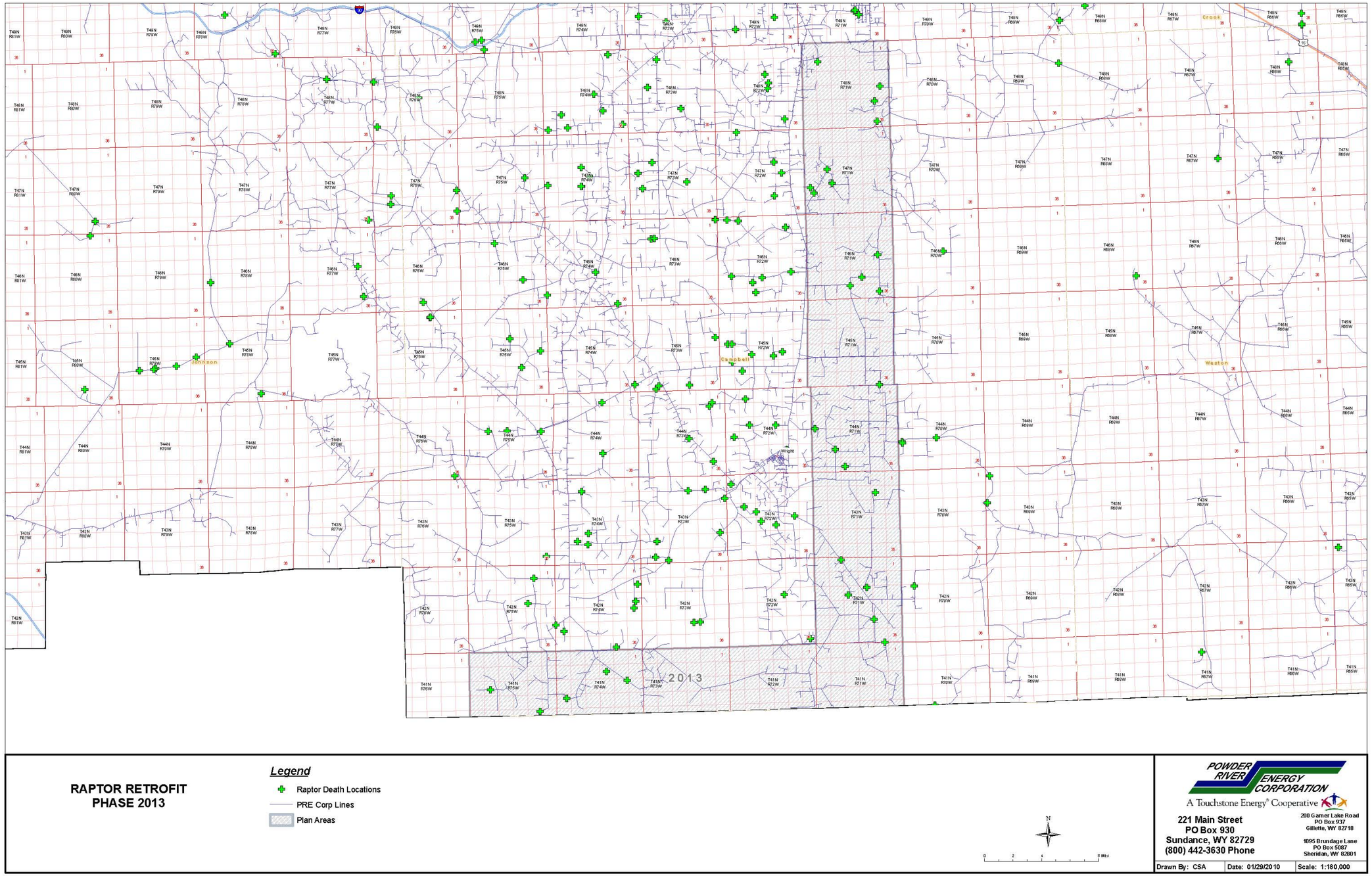


Figure 14-3 2013 Schedule of Avian Electrocution Retrofitting

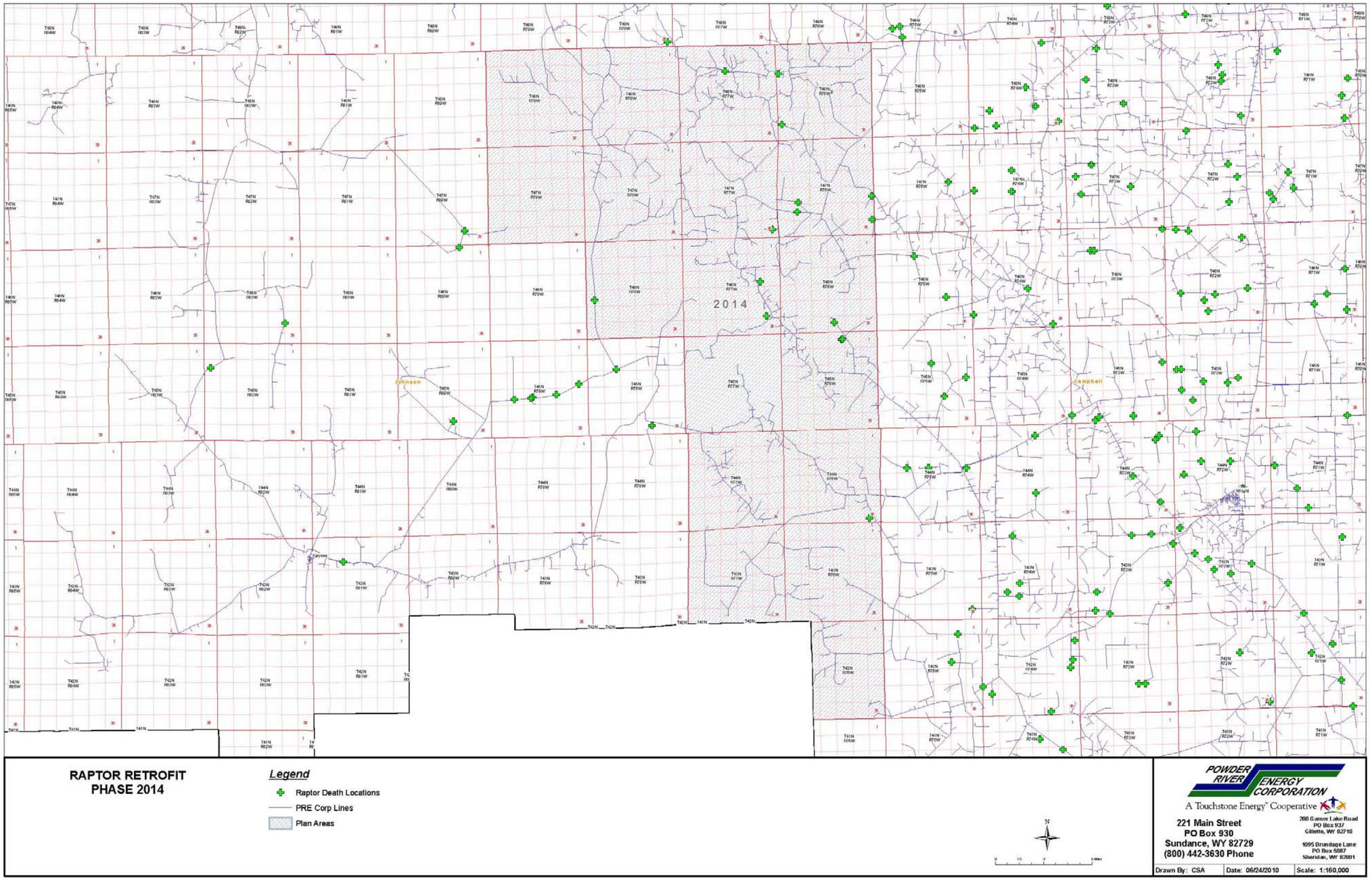


Figure 14-4 2014 Schedule of Avian Electrocution Retrofitting

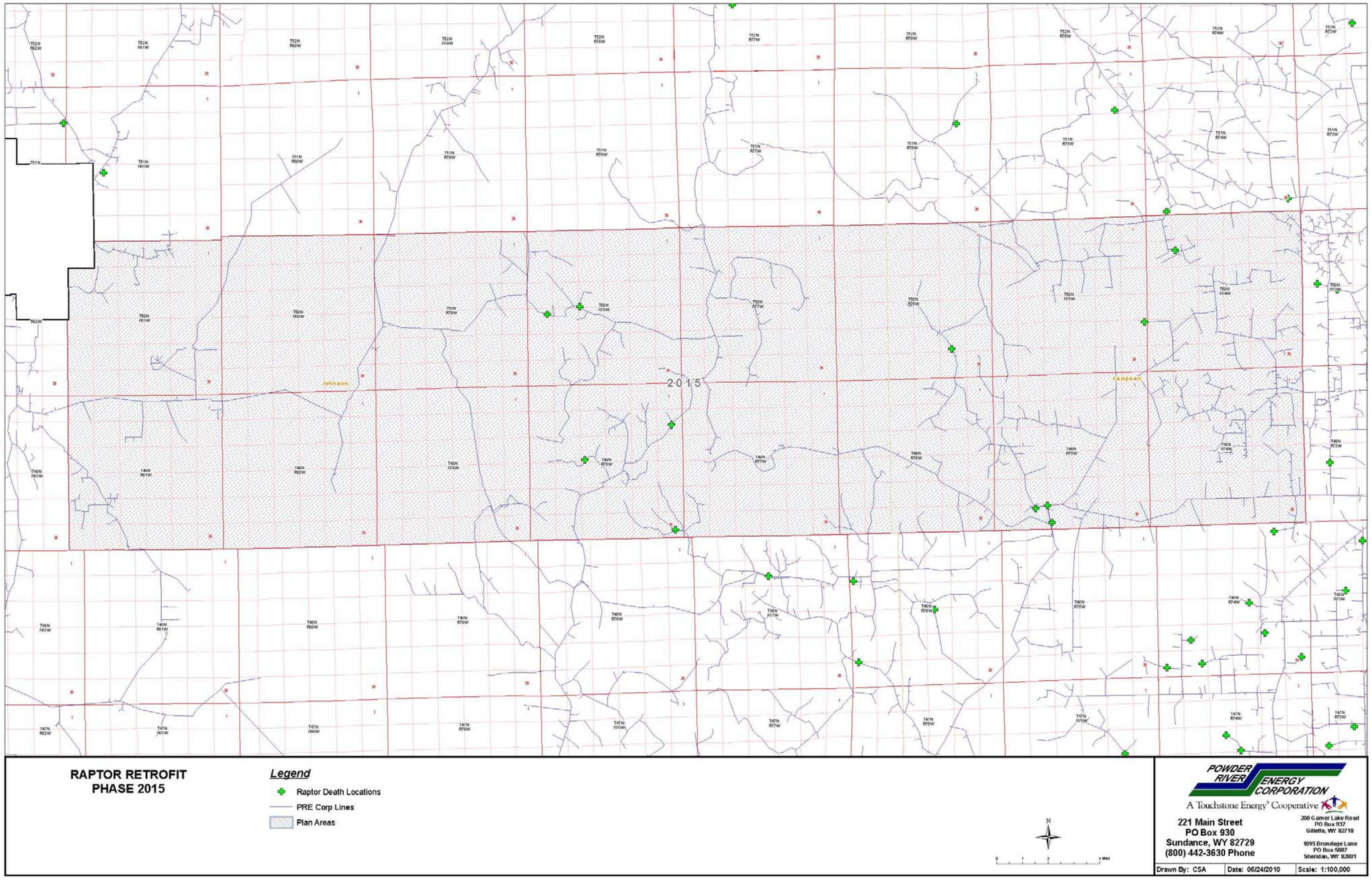


Figure 14-5 2015 Schedule of Avian Electrocution Retrofitting

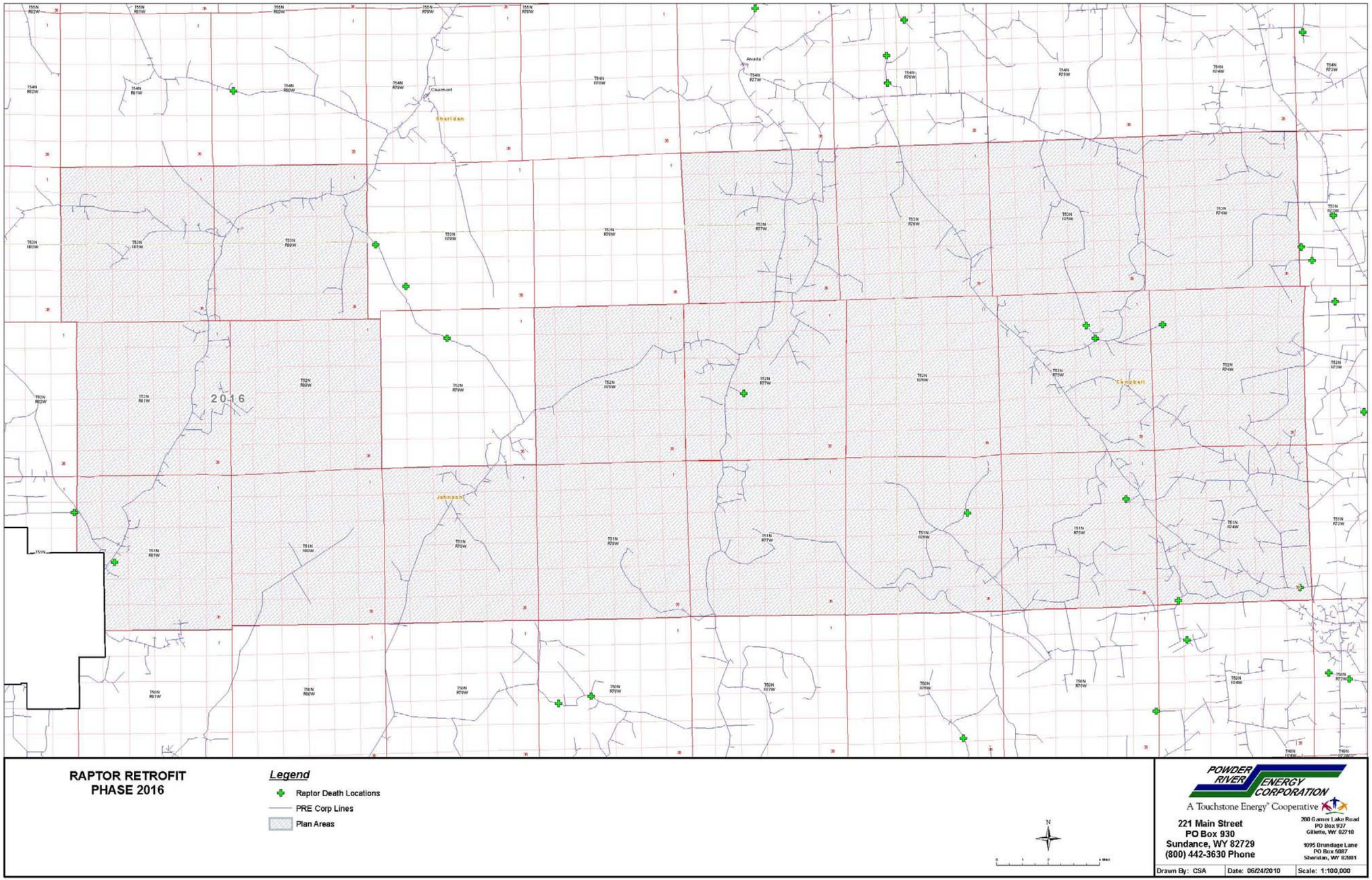


Figure 14-6 2016 Schedule of Avian Electrocution Retrofitting

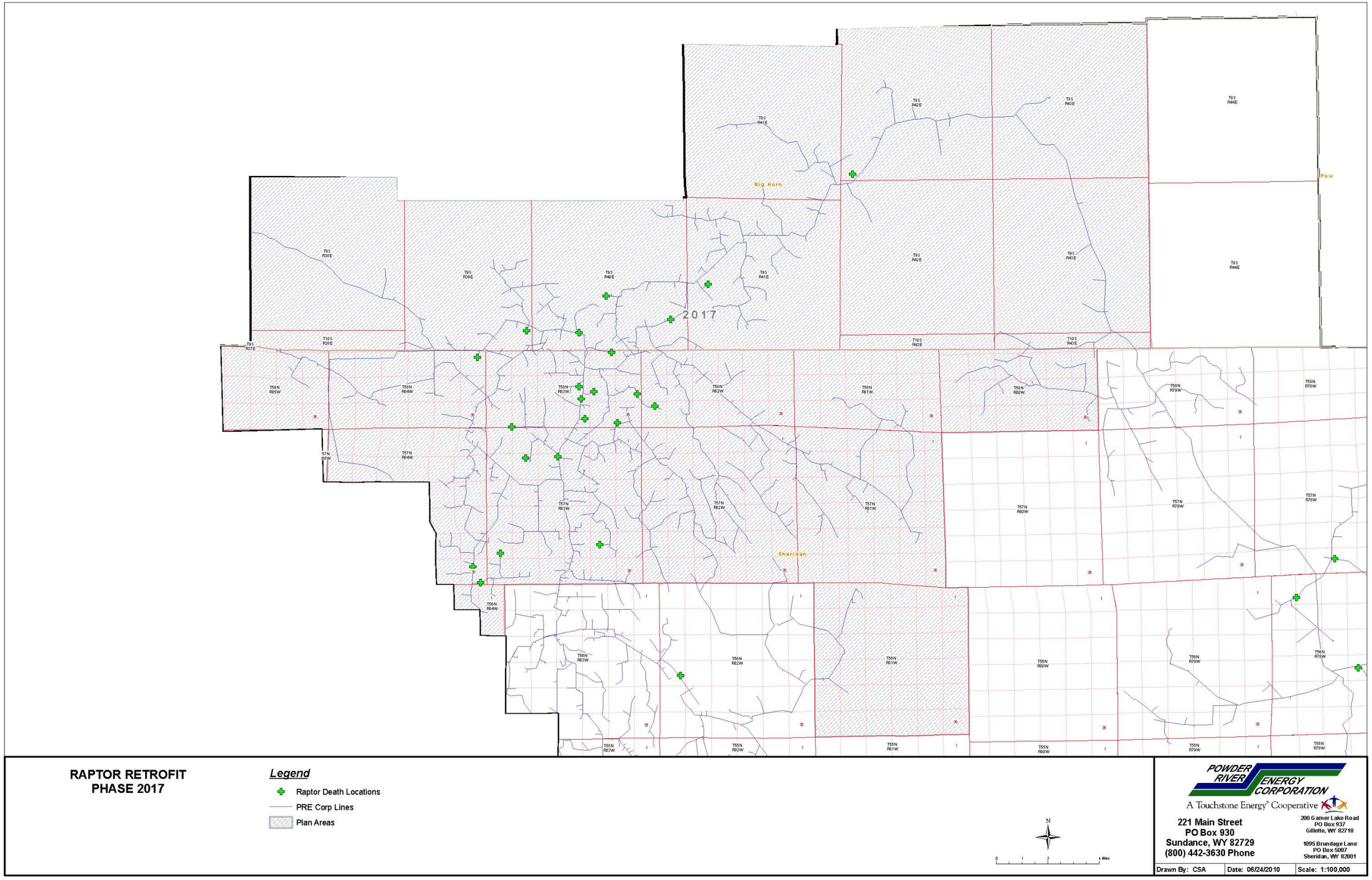


Figure 14-7 2017 Schedule of Avian Electrocution Retrofitting

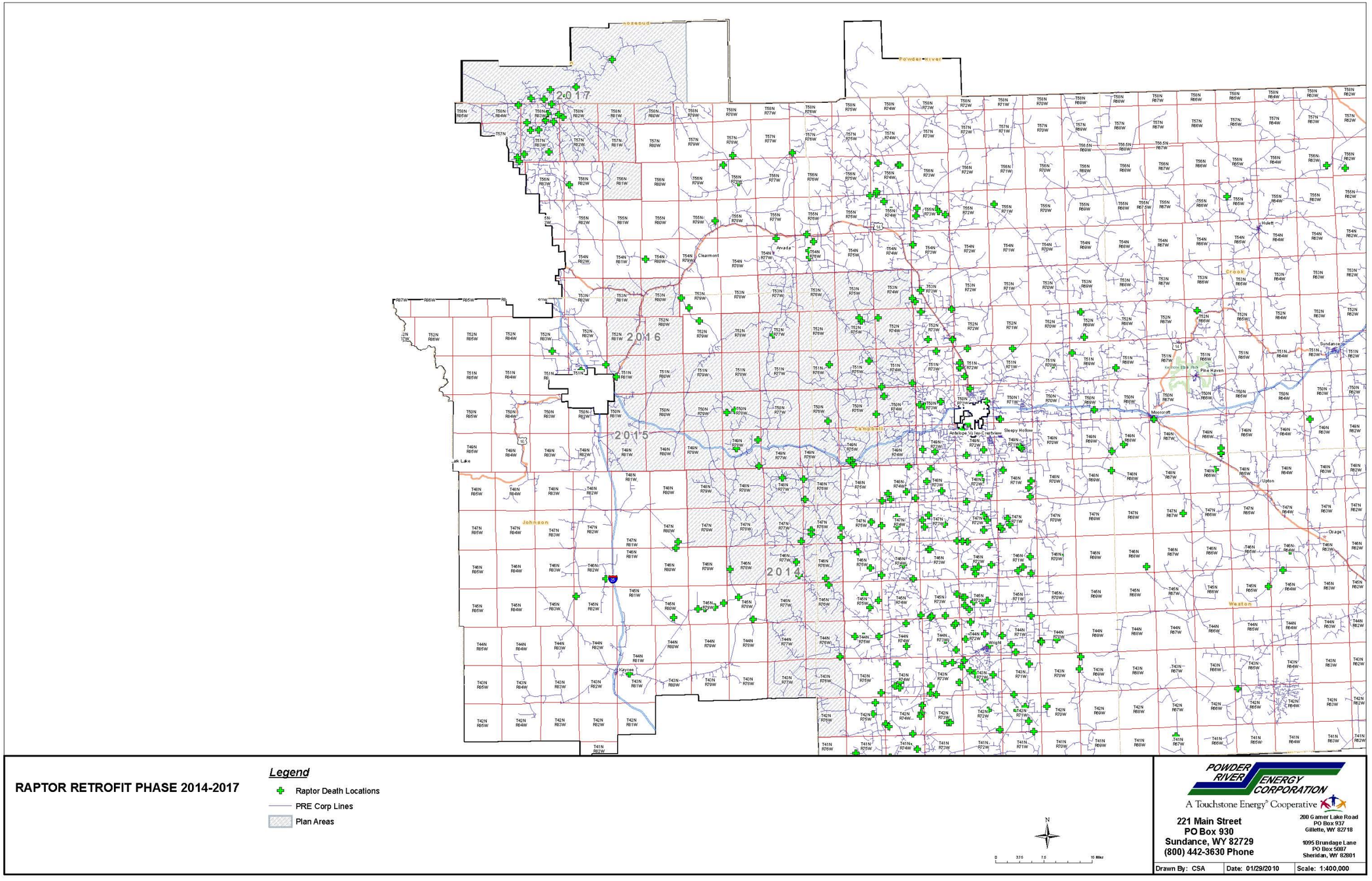


Figure 14-8 2014–2017 Schedule of Avian Electrocution Retrofitting

14.4 Current and Future Budget Considerations

A successful APP includes both a properly funded reactive *and* proactive component. PRECorp is committed to implementing avian-friendly construction standards in their new construction, plus PRECorp has developed a proactive program for retrofitting problematic structures. Additionally, it is important to note in tandem with these efforts, PRECorp continually rebuilds multiple line segments incorporating avian-safe standards.

Constructing new lines in a raptor-friend manner is more predictable in costs and often significantly less expensive than retrofitting. For example, according to the North American Wood Pole Coalition (Harness 2000) constructing a three-phase tangent pole as raptor-safe may add as little as a 4% increase in labor and material. In contrast, retrofitting can run thousands of dollars depending on the pole configuration and location. Accordingly, each year PRECorp will evaluate the level of funding required to accomplish the annual retrofitting goals presented in Table 14-1. This process will ensure that sufficient funding and man power is allocated for future phases.

15.0 TRAINING IN AVIAN PROTECTION

15.1 Personnel Training

New employees are informed of PRECorp's corporate policy, which includes a commitment to reducing avian interactions with utility structures. New hires are instructed on pertinent APP sections and are required to watch a 30-minute training video on raptor electrocutions, the laws protecting birds, and measures to mitigate problems. They also are given instruction on how to complete and submit the PRECorp Bird Incident/Mitigation Form. Refer to Appendix K for the Training Syllabus and *Raptors at Risk* DVD.

The APP Coordinator's office provides training on USFWS, Wyoming GFD and Montana FWP permits held by PRECorp and the various permitting responsibilities. All personnel receive updated training on avian issues at least once each calendar year.

Contractors working on PRECorp's system are informed of company policies and procedures relevant to avian protection.

15.2 Useful Publications

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994.

This document contains biological and ecological information on birds and bird behavior relevant to collisions; information on habitat, land use, and power line modifications; and an extensive bibliography.

APLIC. 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.

This document contains biological and ecological information on birds and bird behavior relevant to electrocution; information on habitat, land use and power line modifications; and an extensive bibliography.

The Institute of Electrical and Electronic Engineers. 1993. Guide for Animal Deterrents for Electric Power Supply Substations.

This document provides information regarding animals and the problems they cause at electric power supply substations. The guide presents methods and designs used to mitigate interruptions and equipment damage resulting from animal access into substations.

Southern Engineering Company. 1996. Animal-Caused Outages.

This book focuses on understanding and preventing animal-caused outages. It describes common problems for transmission, distribution, and substation systems; the animals involved; and available products and techniques for mitigating outages. This book includes information on mammals as well as birds.

This was published by the National Rural Electric Cooperative Association and is presently under revision.

New Mexico Avian Protection Working Group. 2006. Lineman's Guide to Avian Diseases.

This report provides an overview of diseases and bird-handling procedures. A copy of this report is presented in Appendix I of this APP, and can be found at www.nmavianprotection.org/downloads/Guide_to_Avian_Disease.pdf.

New Mexico Avian Protection Working Group. 2006. Guide to Common Raptors and Other Large Birds of New Mexico.

This guide includes information on 20 common species of raptors most likely to become electrocuted by power lines. Information is presented on species identification, habitat, nesting, and diet. Although this guide describes birds of New Mexico, most of these species also occur in Wyoming. This guide can be found at http://www.nmavianprotection.org/Download.html.

National Wildlife Health Center. 2007. Avian Influenza (HPAI) H5N1.

The global spread of H5N1 increases the likelihood that it will eventually be detected in North America. There are a number of pathways through which the virus could be brought to this continent including introduction by wild migratory birds. Updated information is available at www.nwhc.usgs.gov/.

16.0 AVIAN MORTALITY REDUCTION METHODS

An effective avian protection program requires three key components. The first component uses avian-friendly construction standards to minimize risks to birds on newly constructed facilities; this is a proactive approach. Another component is a reactive process to respond effectively to new problems by retrofitting structures. Lastly, it is important to have a proactive risk assessment process in place.

Using a combination of proactive and reactive components (e.g., building new lines in an avian-friendly manner and retrofitting problematic structures) reduces mortality while improving service reliability. PRECorp implements both proactive and reactive methods to effectively and economically minimize bird fatalities, which are described below.

16.1 Measures to Reduce Avian Mortality

16.1.1 Construction Design

PRECorp developed bird-friendly new-construction design standards that adhere to the APLIC 2006 guidelines or approved modifications thereof. These bird-friendly standards are presented in Appendix J.

PRECorp is a RUS utility member and is, therefore, subject to adhering to the National Environmental Policy Act (NEPA) review process for new construction projects. This review process includes an evaluation of potential effects to birds from project construction, operation, and maintenance activities. These actions encompass both bird electrocutions and collisions, following the applicable recommendations from APLIC (2006). As part of the NEPA process, the environmental document (with its proposed construction) is reviewed by RUS and the applicable regulatory and/or land management agencies, depending on the scope of the project and location.

16.1.2 Retrofitting

Existing power lines may require retrofitting to make them avian friendly. When possible, lines will be retrofitted to meet PRECorp's current new-construction standards presented in Appendix J. Sometimes, however, it is not possible to reframe poles to achieve proper separation without violating the NESC. In these situations, it is more efficient to fit the structures with a variety of after-market insulating or isolating products. Refer to Chapter 10.0, Standards to Reduce Electrocutions, for guidance on how to retrofit existing poles to reduce the risk of electrocution to birds and other wildlife. PRECorp will complete its retrofitting standards by December 2010. In addition to retrofitting energized power lines, PRECorp is committed to retrofitting idle services when they are re-energized.

16.1.3 Avian Mortality and Injury Tracking

PRECorp tracks avian mortality and injury to identify problem areas. When PRECorp personnel encounter injured or dead birds, they contact the APP Coordinator's office and complete a Bird Incident/Mitigation Report Form (Appendix H). The APP Coordinator's office contacts the USFWS and initiates an internal review to identify the retrofitting measures needed to prevent future incidents. Corrective measures are documented and follow-up inspections conducted. These measures and associated company protocol are discussed in detail in Chapter 8.0, Management Procedures.

16.1.4 Risk Assessment

Chapter 13.0, Risk Assessment, discusses how to approach both electrocution and collision risk assessments. A risk assessment involves sampling key areas to acquire information for identifying and assigning a priority to poles in need of retrofitting to minimize electrocution risks and identifying and assigning a priority to line spans to be marked to minimize collision risks to birds. When birds are killed or injured, PRECorp addresses the offending pole or span, and conducts a risk assessment of nearby poles.

17.0 ENVIRONMENTAL ENHANCEMENT

In keeping with PRECorp's commitment to a healthy environment, PRECorp invests in a number of reclamation approaches, following the applicable federal and state regulations. Wildlife and plant life typically benefit from these efforts, as the sites are returned to similar or, in some cases, better condition than before power line construction. Reclaimed lands result in wildlife habitat improvements, stream channel stabilization, woody plant establishment, and increased livestock carrying capacity.

PRECorp strives to accommodate raptor nests, rather than remove them. This approach helps ensure that bird populations will not decline from nest removals, and reduces the likelihood that the birds will simply rebuild their nests in a different problem area on the same or nearby structure. PRECorp's nest management procedures adhere to the appropriate state and federal regulations discussed in Chapter 6.0, Species Protection, and Chapter 7.0, Permits.

There may be situations where new power lines provide additional raptor foraging sites and opportunities on species of special concern (e.g., golden eagle preying on greater sage-grouse, common ravens preying on federally threatened piping plover chicks). For new construction projects, PRECorp coordinates with the applicable federal and state agencies, when required. During such reviews, depredation issues raised by agencies regarding species of concern are considered, and applicable mitigation measures developed. These measures may include the use of perch discouragers in certain locations, but the decision and approach used should be based on the best available science, economic impacts to PRECorp, and potential operational issues.

18.0 QUALITY CONTROL

PRECorp has developed processes to monitor the effectiveness of its avian protection practices.

18.1 Periodic Inspection

PRECorp routinely reviews its facilities to determine how well its environmental practices match regulatory requirements. Periodically, PRECorp personnel or contractors conduct a general inspection of power line facilities. At that time, the following steps are taken:

- The area is checked for injured birds, bird carcasses, or nests, which will be handled in accordance with Section 8.1, Injured Birds; Section 8.2, Carcass Management; and Section 8.3, Nest Management, respectively.

- At mortality poles, the pole number, Global Positioning System location, and configuration are noted. Poles not up to raptor-friendly standards will be upgraded to the appropriate configuration, if possible. If not, the configuration will be retrofitted as described in Chapter 10.0, Standards to Reduce Electrocutions.

- The area around the pole will be cleaned in accordance with Section 9.4, Site Cleanup.

18.2 Internal Tracking

As discussed in Chapter 8.0, Management Procedures, avian interactions with PRECorp's system are reported to the APP Coordinator's office on a Bird Incident/Mitigation or Nest Form (Appendix H). Corrective measures are documented and follow-up inspections conducted. The APP Coordinator's office reviews reports of all dead or injured birds. Mortality poles are field checked to ensure that proper upgrades or retrofitting have been implemented. Furthermore, EDM will review 10% of all avian mortalities. In the event of a mortality occurring on a retrofitted pole, staff from the APP Coordinator's office will look at the offending structure to determine the problem. If no obvious deficiency is present, PRECorp will consult with EDM to correct the problem. These internal processes are designed to ensure incidents are properly documented and that the appropriate agency contacts and/or permits are obtained in a timely manner (see Chapter 7.0, Permits). This process also ensures existing mitigating measures are installed and working.

18.3 Training

PRECorp conducts regular personnel training (see Chapter 15.0, Training in Avian Protection).

19.0 TERMS, DEFINITIONS, AND SCIENTIFIC NAMES

19.1 Terms and Definitions

Chapter 33 Permit – a permit issued by the Wyoming GFD that allows the permittee to take, capture, handle, and transport Wyoming wildlife and nests. The permit is required by the state of Wyoming in addition to federal permits.

Depredation Permit (MBTA) – a permit issued by the USFWS that allows the permittee to take, transport, and temporarily possess migratory birds and active nests under approved situations.

Disturb – To agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

In addition to immediate impacts, this definition also covers impacts that result from human caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

Eagle Nest Take Permit (BGEPA) – a permit issued by the USFWS that allows the permittee to relocate or remove a golden or bald eagle nest. The removal or relocation of a golden eagle or bald eagle nest is addressed on a case-by-case basis and requires close coordination with both the federal USFWS and state Wyoming GFD.

Endangered Species – the classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Human Health and Safety Emergency – a situation where human health or safety is at risk and immediate corrective action is necessary. Some outages may fall into this category.

Listed Species – a species, subspecies, or distinct vertebrate population segment that has been added to the federal lists of Endangered and Threatened Wildlife and Plants as they appear in sections 17.11 and 17.12 of Title 50 of the Code of Federal Regulations (50 CFR 17.11 and 17.12).

Migratory Bird – any bird, whatever its origin and whether or not raised in captivity, which belongs to a species listed in 50 CFR § 10.13, or which is a mutation or a hybrid of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof. The

majority of bird species in the U.S. are considered to be migratory and protected under the MBTA, except for introduced species (e.g., house sparrow, European starling, rock pigeon, monk parakeet, Eurasian collared-dove) and some game birds (e.g., wild turkey, grouse, quail, ring-necked pheasant). Refer to Federal Register 12710 Volume 70, No. 49 for a list of all species not covered by the MBTA.

Nest – any readily identifiable structure built, maintained, or occupied for incubating and rearing of protected species offspring. Nests can be found on the ground, in trees, or on structures.

- **Active Nest** – nest that contains either eggs or young.
- **Inactive Nest** – nest that does not contain eggs or young.

Possession – detention and control of a protected species. This includes picking up or handling of any migratory bird, as defined above. Possession also may include moving or transporting.

Protected Species – any bird either federally or state protected by regulatory statute. Federally protected species include any federally endangered or threatened species found in 50 CFR § 17.11 and § 17.12, bald or golden eagle found in 16 U.S.C. 668-668d 54 Stat. 250 and Amendments, or migratory bird found in 50 CFR 10.13.

Raptor – any bird that kills with its feet (e.g., hawks, eagles, falcons, osprey, owls). Also known as "bird of prey."

Recovery Permit (ESA) – a permit issued by the USFWS that authorizes the permittee to relocate the nest of a federally listed species.

Salvageable Eagle – a carcass that is intact and in good condition, not having incurred significant decomposition or scavenging.

Special Purpose Relocate Permit (MBTA) – a permit issued by the USFWS that authorizes the permittee to relocate the active or inactive nest of a migratory species.

Special Purpose Salvage Permit (MBTA) – a permit issued by the USFWS that authorizes the permittee to pick up dead birds, abandoned nests, nonviable eggs, and their parts from the wild. All salvaged birds must be tagged and transferred to a designated holding facility.

Take (Eagles) – to pursue, hunt, shoot, shoot at, wound, kill, trap, capture, collect, or molest or disturb (alive or dead), or to attempt to engage in such conduct. The USFWS published a final rule in the Federal Register defining the term “disturb” (FR 31132 Volume 72, No. 107 June 5, 2007). Under the BGEPA the term disturb means “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering

behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Take (Federally Endangered or Threatened Birds) – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect (alive or dead), or to attempt to engage in such conduct. Take includes habitat degradation.

Take (Incidental) – to harm or harass as a result of an otherwise lawful activity where the harm or harassment is not the purpose of the activity.

Take (Migratory Birds) – to pursue, hunt, shoot, wound, kill, trap, capture (alive or dead), or to attempt to engage in such conduct.

Terrestrial Scientific Collector's Permit – a permit issued by Montana FWP that allows the permittee to take, capture, handle, and transport Montana wildlife and nests. The permit is required by the state of Montana in addition to federal permits.

Threatened Species – the classification provided to an animal or plant likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

19.2 Scientific Names

The list below contains the common and scientific names of bird species mentioned in this APP.

Common Name	Scientific Name
American Crow	*Corvus brachyrhynchos*
American Kestrel	*Falco sparverius*
Bald Eagle	*Haliaeetus leucocephalus*
Barn Owl	*Tyto alba*
Black-Billed Magpie	*Pica hudsonia*
Common Raven	*Corvus corax*
Cooper's Hawk	*Accipiter cooperii*
Eurasian Collared-Dove	*Streptopelia decaocto*
European Starling	*Sturnus vulgaris*
Ferruginous Hawk	*Buteo regalis*
Golden Eagle	*Aquila chrysaetos*
Great Blue Heron	*Ardea herodias*
Great Horned Owl	*Bubo virginianus*
Greater Sage-Grouse	*Centrocercus urophasianus*
House Sparrow	*Passer domesticus*
Interior Least Tern	*Sterna antillarum athalassos*
Monk Parakeet	*Myiopsitta monachus*
Mourning Dove	*Zenaida macroura*
Osprey	*Pandion haliaetus*
Peregrine Falcon	*Falco peregrinus*
Piping Plover	*Charadrius melodus*
Prairie Falcon	*Falco mexicanus*
Red-Tailed Hawk	*Buteo jamaicensis*
Ring-Necked Pheasant	*Phasianus colchicus*
Rock Pigeon	*Columba livia*
Rough-Legged Hawk	*Buteo lagopus*
Sandhill Crane	*Grus canadensis*
Sharp-Shinned Hawk	*Accipiter striatus*
Swainson’s Hawk	*Buteo swainsoni*
Trumpeter Swan	*Cygnus buccinator*
Turkey Vulture	*Cathartes aura*
Western Kingbird	*Tyrannus verticalis*
Whopping Crane	*Grus americana*
Wild Turkey	*Meleagris gallopavo*

20.0 LITERATURE CITED

Anderson, M. 2001. Department of Agriculture, Land Reform, Environment, and Conservation, South Africa. Personal communication with R. Harness, EDM International, Inc.

Anderson, R. J. and A. M. Bruce. 1980. A Comparison of Selected Bald and Golden Eagle Nests in Western Washington. Pages 117-120 *In* R. L. Knight, ed. Proceedings of the Washington Bald Eagle Symposium, Washington Department of Game, Seattle, Washington, USA.

Andrews, R. and R. Righter. 1992. Colorado Birds: A Reference to Their Distribution and Habitat. Published by Denver Museum of Natural History. 442 pp.

Ansell, A. R. and W. E. Smith. 1980. Raptor Protection Activities of the Idaho Power Company. R. P. Howard and J. F. Gore, eds. Proceedings of a workshop on raptors and energy developments. Idaho Chapter - The Wildlife Society, Boise, ID. 12:56-70.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Edison Electric Institute. Washington D.C.

_____. 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute/Raptor Research Foundation. Washington, D.C. 125 pp.

_____. 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.

Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service (APLIC and USFWS). 2005. Avian Protection Plan (APP) Guidelines. April 2005.

Baccari, L. D. 2006. Underground cable installation in Powder River Energy Corporation's electrical distribution system. Unpublished internal report. Baccari and Associates, February 1, 2006.

Beaulaurier, D. L. 1981. Mitigation of Bird Collisions with Transmission Lines. Bonneville Power Administration. Portland, OR.

Bechard, M. J. and J. K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/172.

Bechard, M. J. and T. R. Swem. 2002. Rough-Legged Hawk (*Buteo lagopus*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/641.

Behle, W. H. 1981. The Birds of Northeastern Utah. Utah Museum of Natural History, Occasional Publication Number 2. 136 pp.

Benson, P. C. 1981. Large Raptor Electrocution and Power Line Utilization: A Study in Six Western States. Ph.D. Dissertation. Brigham Young University, Provo, UT. 98 pp.

Blue, R. 1996. Documentation of Raptor Nests on Electric Utility Facilities through a Mail Survey. Pages 87-95 *In* D. M. Bird, D. E. Varland, and J. J. Negro, eds. Raptors in Human Landscapes: Adaptations to Built and Cultivated Environments. Academic Press, Inc. San Diego, CA.

Boarman, W. I. and B. Heinrich. 1999. Common Raven (*Corvus corax*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/476.

Boeker, E. L. 1972. Power Lines and Bird Electrocutions. Unpublished report. U.S. Fish and Wildlife Service, Denver Wildlife Research Center. Denver, CO. 8 pp.

Brown, W. M. and R. C. Drewien. 1995. Evaluation of Two Power Line Markers to Reduce Crane and Waterfowl Collision Mortality. Wildlife Society Bulletin 23(2):217-227.

Code of Federal Regulations. 2009. Title 50: Wildlife and Fisheries, Part 17 - Endangered and Threatened Wildlife and Plants. Available online: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr;sid=2576b6966dcbdca372cbe541a154fe25;rgn=div6;view=text;node=50%3A2.0.1.1.1.2;idno=50;cc=ecfr.

Colson and Associates. 1995. Investigation of Bird Electrocutions at the Kenetech Windpower, Altamont Pass Windplant. Preliminary report.

Coues, E. 1876. The Destruction of Birds by Telegraph Wires. American Naturalist 10(12):734-736.

Crowder, M. R. 2000. Assessment of Devices Designed to Lower the Incidence of Avian Power Line Strikes. M.S. Thesis, Purdue University, IN.

Dille, P. 2007. Tri-State Generation and Transmission Association, Denver, Colorado. Personal communication with L. Nielsen, EDM International, Inc. June 2007.

EDM International, Inc. 2005. Avian Protection Plan: Powder River Energy Corporation. EDM International, Inc., Fort Collins, CO. 124 pp.

EDM International, Inc. 2007. Perch Management Review: Powder River Energy Corporation. EDM International, Inc., Fort Collins, CO. Unpublished Report. 17 pp.

Fischer, D. L., K. L. Ellis, and R. J. Meese. 1984. Winter Habitat Selection of Diurnal Raptors in Central Utah. Raptor Res. 18:98-102.

Glinski, R. L. (ed.) 1998. The Raptors of Arizona. University of Arizona Press and the Arizona Game and Fish Department, Tucson and Phoenix, AZ.

Grubb, T. G. 1976. A Survey and Analysis of Bald Eagle Nesting in Western Washington. M.S. Thesis., Univ. of Washington, Seattle, WA. 87 pp.

Harness, R. E. 1997. Raptor Electrocutions Caused by Rural Electric Distribution Power Lines. MS Thesis. Colorado State University, Fort Collins, CO. 110 pp.

Harness, R. 2000. Raptor electrocutions and distribution pole types. North American Wood Pole Coalition October:1-19. (http://www.wwpinstitute.org/pdffiles/techbullitons/TechBulletin{IOct}00.pdf (6/14/01))

Hayden, S. L. 1984. Winter Food Habits and Ecology of Golden and Bald Eagles in Northeastern Wyoming. MS Thesis. Univ. of Wyoming, Laramie.

Heinrich, B. 1989. Ravens in Winter. Summit Books of Simon & Schuster, New York.

Hurst, N. 2004. Corona Testing Devices Used to Mitigate Bird Collisions. EDM International, Inc., California Energy Commission, PIER Energy-Related Environmental Research. #500-04-086F.

Kingery, H. E. 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife. 636 pp.

Kirk, D. A. and M. J. Mossman. 1998. Turkey Vulture (*Cathartes aura*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/339.

Knight, R. L., J. B. Athearn, J. J. Brueggeman, and A. W. Erickson. 1979. Observations on Wintering Bald and Golden Eagles on the Columbia River, Washington. Murrelet 60:99-105.

Knight, R. C. and M. W. Call. 1980. The Common Raven. Technical Note, U.S. Dept. Interior Bur. Land Management. U.S. Government Printing Office, Washington, D.C.

Kreithen, M. L. 1996. Development of an Optically Painted Pattern Designed to Reduce Avian Collisions with Obstacles. 2nd International Conference on Raptors. Urbino, Italy. Raptor Research Foundation and University of Urbino.

Lewis, J. C. 1997. Alerting the Birds. Endangered Species Bulletin - March/April XXII: 2.

Mañosa, S. 2001. Strategies to Identify Dangerous Electricity Pylons for Birds. Abstracts from the 4th Eurasian Congress on Raptors. Seville, Spain. 25-29 September 2001. Raptor Research Foundation.

McKee, Gwyn. 2005. Thunderbird Wildlife Consulting, Gillette, Wyoming. Personal communication, April 13, 2005.

Montana Fish, Wildlife & Parks (FWP). 2009. Montana Field Guide. Available online: http://fieldguide.mt.gov/displayFamily.aspx?class=Aves.

_____. 2010a. Great Blue Heron — *Ardea herodias*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNGA04010.aspx.

_____. 2010b. Turkey Vulture — *Cathartes aura*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKA02010.aspx.

_____. 2010c. Osprey — *Pandion haliaetus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC01010.aspx.

_____. 2010d. Bald Eagle — *Haliaeetus leucocephalus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC10010.aspx.

_____. 2010e. Swainson's Hawk — *Buteo swainsoni*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC19070.aspx.

_____. 2010f. Red-tailed Hawk — *Buteo jamaicensis*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC19110.aspx.

_____. 2010g. Ferruginous Hawk — *Buteo regalis*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC19120.aspx.

_____. 2010h. Rough-legged Hawk — *Buteo lagopus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC19130.aspx.

_____. 2010i. Golden Eagle — *Aquila chrysaetos*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKC22010.aspx.

_____. 2010j. Peregrine Falcon — *Falco peregrinus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKD06070.aspx.

_____. 2010k. Prairie Falcon — *Falco mexicanus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNKD06090.aspx.

_____. 2010l. Barn Owl — *Tyto alba*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNSA01010.aspx.

_____. 2010m. Great Horned Owl — *Bubo virginianus*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABNSB05010.aspx.

_____. 2010n. Black-billed Magpie — *Pica hudsonia*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABPAV09010.aspx.

_____. 2010o. American Crow — *Corvus brachyrhynchos*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABPAV10010.aspx.

_____. 2010p. Common Raven — *Corvus corax*. Montana Field Guide. Available online: http://FieldGuide.mt.gov/detail_ABPAV10110.aspx.

Morkill, A. E. 1990. Effectiveness of Markers in Reducing Sandhill Crane Collisions with Power Lines. Master thesis. University of Wyoming, Laramie, WY.

Morkill, A. E. and S. H. Anderson. 1991. Effectiveness of Marking Power Lines to Reduce Sandhill Crane Collisions. Wildl. Soc. Bull, 19, 442-449.

_____. 1993. Effectiveness of Yellow Aviation Balls in Reducing Sandhill Crane Collisions with Power Lines. *In* Proc. International Workshop on Avian Interactions with Utility Structures (pp. 21-1 to 21-17). Pleasant Hill, CA: Elect. Power Res. Institute.

Nelson, M. W. 1977. Preventing Electrocution Deaths and the Use of Nesting Platforms on Power Poles. Hawk Trust Annual Report. 8:30-33.

_____. 1979a. Update on Eagle Protection Practices. Unpublished eport. Boise, ID. 14 pp.

_____. 1979b. Power Lines Progress Report on Eagle Protection Research. Unpublished report. Boise, ID. 13 pp.

Nelson, M. W. and P. Nelson. 1976. Power Lines and Birds of Prey. Idaho Wildlife Review 28(5):3-7.

New Mexico Avian Conservation Partners. 2009. Prairie Falcon (*Falco mexicanus*). New Mexico Avian Conservation Partners. Available online: http://www.nmpartnersinflight.org/prairiefalcon.html.

Olendorff, R. R. 1993. Eagle Electrocution. *In* Proceedings: Avian Interactions with Utility Structures. International Workshop. Electric Power Research Institute, Technical Report 103268, Palo Alto, CA.

Olendorff, R. R., A. D. Miller, and R. N. Lehman. 1981. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1981. Raptor research report No. 4. Raptor Research Foundation, University of Minnesota, St. Paul, MN. 111 pp.

Olendorff, R. R. and R. N. Lehman. 1986. Raptor Collisions with Utility Lines: An Analysis Using Subjective Field Observations. Final report. Pacific Gas and Electric Co., Research and Development, San Ramon, CA.

Owling.com. 2001a. Barn Owl Biology – A Reference to North and Central American Owls. Available online: http://www.owling.com/Barn_nh.htm.

_____. 2001b. Great Horned Owl Biology – A Reference to North and Central American Owls. Available online: http://owling.com/GHO_nh.htm.

Pandey, A., R. E. Harness, and M. K. Schriner. 2007. Bird Strike Indicator Field Deployment at the Audubon National Wildlife Refuge in North Dakota – Final Report. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-076.

Platt, C. M. 2005. Patterns of Raptor Electrocution Mortality on Distribution Power Lines in Southeast Alberta. M.S. Thesis, University of Alberta, Edmonton, Alberta, Canada.

Poole, A. F. 1989. Ospreys: A Natural and Unnatural History. Cambridge University Press, Cambridge, MA. 246 pp.

Powder River Energy Corporation. 2008. Sage-Grouse Protection Plan. Unpublished Report. Powder River Energy Corporation, Sundance, WY.

Rasmussen, P. J. 2009. Permitting Analyst, Xcel Energy, Northern States Power. Personal communication with L. Nielsen, EDM International, Inc. July 2009.

Sharpe, R. S., W. R. Silcock, and J. G., Jorgensen. 2001. Birds of Nebraska: Their Distribution and Temporal Occurrence. University of Nebraska Press.

Sibley, D. A. 2000. National Audubon Society: The Sibley Guide to Birds. New York: Alfred A. Knopf. 544 pp.

Smith, J. C. 1985. Perching and Roosting Patterns of Raptors on Power Transmission Towers in Southeast Idaho and Southwest Wyoming. Journal of Raptor Research 19:135-138.

Stalmaster, M. V. and J. R. Newman. 1979. Perch Site Preference of Wintering Bald Eagles in Northwest Washington. Journal of Wildlife Management 73(1):221-224.

Steenhof, K. 1976. The Ecology of Wintering Bald Eagles in Southeastern South Dakota. M. S. Thesis. University of Missouri, Columbia, MO. 149 pp.

_____. 1998. Prairie Falcon (*Falco mexicanus*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/346.

Stehn, T. V. and T. Wassenich. 2005. Draft Whooping Crane Collisions with Power Lines: An Issue Paper. December 22, 2005.

Terres, J. K. 1991. The Audubon Society Encyclopedia of North American Birds. Alfred A. Knopf, Inc., New York, New York. 1,109 pp.

The Peregrine Fund. 2009. Swainson's Hawk (*Buteo swainsoni*). Available online: http://www.peregrinefund.org/explore_raptors/hawks/swainson.html.

Trost, C. H. 1999. Black-Billed Magpie (*Pica hudsonia*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/389.

U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. Available online: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

_____. 2009. Endangered Species Program: Species Reports. Available online: http://ecos.fws.gov/tess_public/SpeciesReport.do?groups=B&listingType=L&mapstatus=1.

van Rooyen, C. 2000. Endangered Wildlife Trust, South Africa. Personal communication with R. Harness, EDM International, Inc.

Verbeek, N. A. and C. Caffrey. 2002. American Crow (*Corvus brachyrhynchos*), *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/647.

Vian, W. E. 1971. The Wintering Bald Eagle (*Haliaeetus leucocephalus*) on the Platte River in Southcentral Nebraska. M.S. Thesis, Kearney State College, Kearney, NE. 60 pp.

Wheeler, B. and W. Clark. 1995. A Photographic Guide to North American Raptors. San Diego: Academic Press Limited

White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*). *In* The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available online: http://bna.birds.cornell.edu/bna/species/660.

Wyoming Game and Fish Department (WGFD). 2004. Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming. Compiled and edited by: A. O. Cerovski, M. Grenier, B. Oakleaf, L. Van Fleet, and S. Patla. Available online: http://gf.state.wy.us/downloads/pdf/nongame/WYBirdMammHerpAtlas04.pdf.

_____. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Available online: http://www.wildlifeactionplans.org/pdfs/action_plans/wy_action_plan.pdf.

_____. 2009. Official State List of the Common and Scientific Names of the Birds, Mammals, Amphibians, and Reptiles in Wyoming. Available online: http://gf.state.wy.us/wildlife/nongame/SpeciesList/index.asp.

APPENDICES

APPENDIX A
ENVIRONMENTAL NOTIFICATION CONTACT LIST

Powder River Energy Corporation
221 Main Street
P.O. Box 930
Sundance, WY 82729

Contact Tracy Jones or the next contact on the list if he is not available.

PRECorp Name	OFFICE	CELL
Tracy Jones	307-283-4950	307-290-0038
Darice Hodge	307-283-4951	

Environmental Contractors

Gwyn McKee, Wildlife Biologist
Thunderbird Wildlife Consulting, Inc.
5303 Van Ripper St.
Gillette, WY 82718
Phone: 307-686-6178

Tom Maechtle
Bighorn Environmental Consultants
P.O. Box 207
Sheridan, WY 82801
Phone: 307-673-7571
Cell: 307-751-2526

Richard E. Harness, Certified Wildlife Biologist
EDM International, Inc.
4001 Automation Way
Fort Collins CO 80525
Phone: 970-204-4001
Cell: 970-217-1580

APPENDIX B
AGENCY CONTACT LIST

Federal Contacts

USFWS Region 6

U.S. Fish and Wildlife Service
Division of Law Enforcement
P.O. Box 113
Casper, WY 82602-0113
Phone: 307-261-6365

U.S. Fish and Wildlife Service
Buffalo Field Office
1425 Fort Street
Buffalo, WY 82834
Phone: 307-684-1046

U.S. Fish and Wildlife Service
Ecological Services
Wyoming Field Office
5353 Yellowstone Road, Suite 308A
Cheyenne, WY 82009
Phone: 307-772-2374

U.S. Fish and Wildlife Service
Office of Law Enforcement
P.O. Box 25486 DFC
Denver, CO 80225
Phone: 303-236-7540
Fax: 303-236-7901

U.S. Fish and Wildlife Service
Ecological Services
Billings Suboffice
2900 4th Avenue North, RM 301
Billings, MT 59102
Phone: 406-247-7366

U.S. Fish and Wildlife Service
Migratory Bird Permit Office
P.O. Box 25486 DFC (60154)
Denver, CO 80225-0486
Phone: 303-236-8171
Fax: 303-236-8017
E-mail: permitsR6MB@fws.gov
http://www.fws.gov/permits/

State Contacts

Wyoming

Wyoming Game and Fish Department
5400 Bishop Boulevard
Cheyenne, WY 82006
307-777-4600
http://gf.state.wy.us/

Irah Leonetti
Game and Fish Game Warden (Gillette)
908 Apricot St.
Gillette, WY 82716-2632
307-687-7157

Sheridan Regional Office
700 Valley View
P.O. Box 6249
Sheridan, WY 82801
307-672-7418

Montana

Montana Fish, Wildlife & Parks
1420 East Sixth Avenue
Helena, MT 59620
406-444-4039
http://fwp.mt.gov

Harold Guse
Game Warden Captain (Billings)
2300 Lake Elmo Drive
Billings, MT 59105
406-247-2940

Licensed Bird Rehabilitators

Wyoming

Diane Lambert
Northeastern Wyoming Raptor Center
332 Cook Road
Gillette, WY
Phone: 307-689-6483
Fax: 307-682-2532

Montana

Montana Raptor Conservation Center
Box 4061
Bozeman, MT 59772
Phone: 406-585-1211
Fax: 406-585-1339

E-mail: mrcc960@aol.com
www.montanaraptor.org

APPENDIX C
RUS ITEMS OF ENGINEERING INTEREST

UNITED STATES

DEPARTMENT OF AGRICULTURE

RURAL UTILITIES SERVICE

SUMMARY OF

ITEMS OF ENGINEERING INTEREST

AUGUST 2003

Some borrowers may need to modify their engineering and accounting computer programs and databases to accommodate the proposed new and revised assemblies. These modifications may cause problems to those borrowers who do not have the flexibility in their software to make the necessary changes. **RUS recommends that borrowers examine all existing and potential new engineering and accounting software to ascertain that it will allow easy addition and change to the RUS standard construction assembly numbers and materials.**

If you would like more information or have any questions, please contact James Bohlk, Electrical Engineer, Distribution Branch, at 720-1967 or at Jim.Bohlk@usda.gov.

Narrow Profile Construction Assemblies

New Proposed Narrow Profile Assemblies Developed: RUS has developed a complete set of narrow profile construction assemblies for use by borrowers. The set of 89 proposed new assemblies (depicted on 59 drawings) incorporates three different "styles" of pole-top assembly configurations. Sample drawings for the three styles are shown on Exhibits 1, 2 and 3 on the following pages. If a RUS borrower has a need for narrow profile construction, RUS recommends that one of new proposed styles developed by RUS be used for the following reasons:

- The proposed vertical and horizontal conductor spacing allows relatively long spans, comparable to crossarm construction, and thus is economically favorable;
- The proposed 2-foot vertical spacing of conductors of the first two styles minimizes the need for taller poles for narrow profile construction and thus is also economically favorable;
- The first style can be used to convert existing RUS standard single-phase lines to three-phase narrow profile without changing out existing poles and materials;
- All three proposed styles are relatively raptor friendly;
- Each proposed new assembly complies with the requirements of the National Electrical Safety Code (NESC);
- Each proposed new assembly can be constructed with materials presently listed in RUS Informational Publication 202-1, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers;" and,
- The assemblies coincide with RUS' proposed new standard design narrow profile assemblies.

Narrow Profile is Non-Standard Construction: Presently, narrow profile distribution construction is considered by RUS to be non-standard construction because the assemblies needed for construction are not published in RUS' distribution construction specifications and drawings. RUS may approve narrow profile construction (similar to other non-standard

Whom Should I Contact if I Want More Information?

If you have questions regarding the U.S. EPA, SPCC Program, please call or write:

U.S. EPA Headquarters Director, Oil Program (5203G) Ariel Rios Building 1200 Pennsylvania Avenue Washington, DC 20460 703-603-8760	SPCC/FRP Coordinator U.S. EPA Region IV 61 Forsyth Street Atlanta, GA 30365-3415 404-562-8768 AL, FL, GA, KY, MS, NC, SC, and TN	Oil Program Coordinator U.S. EPA Region VIII (8EPR-SA) 999 18th Street, Suite 500 Denver, CO 80202-2466 303-312-6839 CO, MT, ND, SD, UT, and WY
SPCC/FRP Coordinator U.S. EPA Region I (HBR) One Congress Street, Suite 1100 Boston, MA 02114-2023 617-918-1265 CT, ME, MA, NH, RI, and VT	Oil Program Section Chief U.S. EPA Region V (SE5J) 77 West Jackson Boulevard Chicago, IL 60604-3590 312-353-8200 IL, IN, MI, MN, OH, and WI	Oil Team/SPCC Coordinator U.S. EPA Region IX (SFD1-4) 75 Hawthorne Street San Francisco, CA 94105 415-972-3075 AZ, CA, HI, NV, AS, and GU
SPCC Coordinator U.S. EPA Region II (MS211) 2890 Woodbridge Avenue Building 209 Edison, NJ 08837-3679 732-321-6654 NJ, NY, PR, and USVI	SPCC/FRP Coordinator U.S. EPA Region VI (6SF-RO) 1445 Ross Avenue Dallas, TX 75202-2733 214-665-6489 AR, LA, NM, OK, and TX	SPCC/FRP Coordinator U.S. EPA Region X (ECL-116) 1200 6th Avenue Seattle, WA 98101 206-553-1671 AK, ID, OR, and WA
SPCC Coordinator U.S. EPA Region III (3HS32) 1650 Arch Street Philadelphia, PA 19103-2029 215-814-3292 DE, DC, MD, PA, VA, and WV	Oil/SPCC Coordinator U.S. EPA Region VII (SUPRER+R) 901 North 5th Street Kansas City, KS 66101 913-551-7050 IA, KS, MO, and NE	Alaska SPCC/FRP Coordinator U.S. EPA Alaska Operations Office 222 West 7th Avenue, #19 Anchorage, AK 99513-7588 907-271-5083

U.S. Fish and Wildlife Service National Wind Turbine Guidance

On July 2, 2003, the Department of the Interior cleared the U.S. Fish and Wildlife Service's (USFWS) voluntary national guidance for use on land-based wind turbines and wind farms for public release. The divisions of Federal Program Activities and Migratory Bird Management and the Wind Turbine Working Group announced the availability of interim voluntary wind turbine guidelines. The document is available at:

http://www.fws.gov/r9dhcbfa/windenergy.htm

From this site, click on the "Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines" (in adobe format). A Notice of Availability and Request for

Comments was published in the *Federal Register* on July 10, 2003. Public comments on the guidelines will be solicited from the public over the next two years. The guidance provides a detailed process for evaluating and ranking potential wind turbine sites, provides recommendations for pre- and post-construction monitoring, contains suggestions for construction and operation, addresses future research needs, and contains a detailed bibliography. The USFWS is encouraging industry to use these guidelines. Based partly on feedback from industry, consultants, and researchers, the guidance in major part is due to the efforts of the Service's Wind Turbine Siting Working Group that produced an initial draft in July 2002.

If you would like more information or have any questions, please contact Dennis Rankin, Environmental Protection Specialist, Engineering and Environmental Staff, at 202-720-1953 or at Dennis.Rankin@usda.gov.

Generic Environmental Reports

A typical Four-Year Construction Work Plan (CWP) contains a mixture of projects falling within one of the following categories:

- Facilities where locations or routes can be specified.
- Facilities where locations or routes cannot be identified because construction will begin well after the beginning of the period covered by the CWP and precise location (i.e., substations and transmission lines) or need cannot yet be determined.

A generic presentation **should be used for only a compelling reason**. In a sense, generic treatment is a last resort where the alternative of a more detailed presentation is administratively or environmentally impractical. For example, while the precise route of a line to be built two years after the grant of RUS assistance may not be ascertainable at the outset, it may be possible to narrow the potential corridor or area sufficiently to permit environmental clearance. It is the intent of RUS that the maximum practicable amount of site-specific environmental review be accomplished prior to the grant of financial assistance.

The generic presentation should include the following:

- Project description
- Purpose
- Approximate location (state, county)
- Type of construction (overhead/underground)
- Right-of-way description (new/existing)
- Commitments:
    * As soon as the final location/route has been determined, a site-specific environmental report will be prepared.

In several instances RUS did not provide financing assistance for projects because the Borrower did not receive environmental approval prior to the start of construction. These situations included:

- The environmental report was completed, but not submitted to RUS for review. Construction was started without RUS environmental approval.

- The project was included in an RUS approved loan. A generic Environmental Report (ER) was completed. Final environmental approval was contingent on the review and approval of a site-specific ER for the project. Construction was started and the site-specific ER report was never completed.

- The project was not included in an RUS approved loan and the environmental review was not done. The project was constructed and the borrower decided to request reimbursement from a loan.

Borrowers must receive written environmental approval from RUS prior to the start of project construction. Failure to receive RUS environmental approval will jeopardize the eligibility of the project for loan funds or future reimbursement.

If you would like more information or have any questions, please call Dennis Rankin, Environmental Protection Specialist, Engineering and Environmental Staff at 202-720-1953 or at Dennis.Rankin@usda.gov, or Steven M. Slovikosky, Chief, Power Delivery and Transmission Assessment Branch at 202-720-1396 or at Steven.Slovikosky@usda.gov.

Avian Protection Plans

Several Federal laws, including the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act and the Endangered Species Act, protect raptors and other migratory birds. In recent years, the U.S. Fish and Wildlife Service (USFWS) has been promoting the development of Memorandums of Understanding (MOU) that will partner the USFWS and electric utilities in an effort to eliminate/minimize avian mortality. The MOU is a pro-active approach to protect raptors and other migratory birds and eliminate /minimize unlawful deaths. It establishes a written policy for bird protection and procedures to follow by utility personnel. One of the components and an integral part of an MOU are the establishment of an Avian Protection Plan. The Avian Protection Plan (APP) is designed to protect and minimize risks resulting from interactions with a utility's facilities.

The USFWS is currently considering allowing electric utilities to develop an APP in lieu of the implementation of MOU's. It appears that the USFWS will only require the establishment of an MOU if a utility is not cooperating with the USFWS or the USFWS is forced to take legal action against a utility.

The USFWS is working with the Avian Power Line Interaction Committee to develop a template for an APP. Each utility would develop its own APP depending on its particular needs or

situations. For example, some utilities may have an APP that consists of a plan of action if avian electrocution/collision problems develop.

Components of an APP may include the following elements:

- Representative Birds/Habitats (Service Territory)
  - Birds At Risk/Habitats
  - Bird Concentration Areas
  - Potential Collision Areas
  - Other Problem Areas/High Risk Areas
- Summary of Laws and Regulations
  - Endangered Species Act
  - Eagle Protection Act
  - Migratory Bird Treaty Act
  - Other Applicable State Laws/Requirements
- Procedures
  - Permit Compliance
  - Nest Management
  - Reporting System (Form)
  - Reporting Procedures (Dead and Live Birds)
- Risk Assessment Methodology
- Construction Design Standards/Mitigation Plan
  - Current Structure Configurations
  - Potential Problem Structures
  - Potential Retrofit/Mortality Reduction Measures
  - Raptor Friendly Designs
- Training
  - Training Program For Utility Personnel
  - Development of A Public Awareness Program
  - References
- Corporate Policy

If you would like more information or have any questions, please call Dennis Rankin, Environmental Protection Specialist, Engineering and Environmental Staff at 202-720-1953 or at Dennis.Rankin@usda.gov.

NRECA T&D ENGINEERING COMMITTEE

Transmission and Distribution Engineering Committee

In 1991, the National Rural Electric Cooperative Association (NRECA) Board of Directors established the Transmission and Distribution Engineering Committee (T&DEC) to assist RUS in the development, analysis, and updating of RUS standards, guidelines and specifications. The

UNITED STATES
DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT

RURAL UTILITIES SERVICE

SUMMARY OF ITEMS OF ENGINEERING INTEREST SEPTEMBER 2005

New Mexico Avian Protection Working Group

The New Mexico Avian Protection Working Group (NMAP) was formed in February 2002. The purpose of NMAP is to:

- Address avian mortalities and inquiries due to electrocution and collision with power lines in New Mexico.
- Work with electric utilities to heighten the awareness of avian issues.
- Develop an affordable framework for a statewide avian protection plan.

The founding members include Hawks Aloft, Inc., New Mexico Department of Fish and Game, Public Service Company of New Mexico, Rural Utilities Service, U.S. Fish and Wildlife Service and The New Mexico Falconer's Association. Other participants in the working group have included Excel Energy, The Hurd Museum, Forest Service, Bureau of Land Management, Bureau of Indian Affairs and Florida Power and Light.

Each year, the U.S. Fish and Wildlife Service (USFWS) and NMAP present an award(s) to utilities for their work in aviation protection. Previous winners of the award include:

USFWS Avian Conservation Award

Central New Mexico Electric Cooperation (2003)

- The award was presented for prompt response to a USFWS request to save a corvid species from electrocution near a dairy in Moriarty, New Mexico.

Northern Rio Aribba County Electric cooperative (2004)

- The award was presented for the construction of nesting platforms for osprey and helping this species throughout their service territory.

Navajo Tribal Utility Authority (2004)

- The award was presented for retro fitting a distribution line used by golden eagles.

Public Service of New Mexico Foundation (2005)

- The award was presented for its outstanding contributions to conservation through avian protection, environmental education, and habitat environment.

NMAP Golden Eagle Award

Socorro Electric Cooperative, Inc. and Bosque Del Apache National Wildlife Refuge (2005)

- The award was presented in recognition of their joint partnership with the U.S. fish and Wildlife Service to remove electric lines crossing the Bosque Del Apache National Wildlife Refuge.

Farmers' Electric Cooperative, Inc. of New Mexico (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the development and implementation of an Avian Protection Plan.

Springer Electric Cooperative, Inc. (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the development and implementation of an Avian Protection Plan.

Central Valley Electric Cooperative, Inc. (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the installation of devices and deterrents to protect birds.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

New Mexico Avian Protection Working Group Workshops

The New Mexico Avian Protection Working Group (NMAP) holds an annual workshop to increase awareness of avian problems in New Mexico, provide state of the art knowledge of raptor protection measures and promote collaboration between Federal, State and local agencies and the industry. It is anticipated that the next workshop will be held in March 2006 in Albuquerque, New Mexico. Attendees include representatives of Federal, state and local agencies, investor owned utilities, cooperatives, engineering consultants and conservation organizations.

Agenda topics have included:

- Overview of avian interaction issues
- Laws, mandates and liabilities
- Avian collisions with utility structures
- Concrete and steel poles
- Problem structures and retrofits
- Avian protection plans
- Wind energy
- Permits
- Factors influencing electrocutions and collisions
- Live bird demonstrations

Workshop products have included:

- Bird Identification Guide (raptors)
- Feather Identification Guide (raptors)
- New Mexico Avian Concentration Map
- Skull/Bones Identification Guide (raptors)
- List of New Mexico Wildlife Rehabilitators
- Procedures For What To Do When Finding An Injured Bird

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

RUS APLIC Membership

This past year, the Rural Utilities Service (RUS) became a member of the Avian Power Line Interaction Committee (APLIC). APLIC's mission is to lead the electric utility industry in the protection of avian resources while enhancing reliable energy delivery. RUS recommends that borrowers and all the many businesses which work with or for RUS borrowers visit the APLIC Web site for a more detailed presentation of APLIC's functions and offerings. The APLIC site can be visited at:

http://www.aplic.org/

One of APLIC's many valuable resources for electric utilities is its publication, "Suggested Practices for Raptor Protection of Power Lines: The State of the Art in 1996" (Suggested Practices). Suggested Practices summarizes the history and relative success of more than two decades of work on bird electrocution problems related to electric lines. The document covers the bird electrocution issue, biological aspects of raptor electrocution, and provides insight on problem electric structure types as well as provides recommended measures to use in new designs and modifications of existing designs to make facilities safer to raptors and other birds. 7 CFR 1724.52 of RUS' regulations, provide RUS borrowers with the authority to deviate from RUS standards to provide an extra measure of safety to electric structures in areas frequented by birds that could come into contact with energized line hardware. The regulation conditions the authority on several provisions, one of which is that the structure used in lieu of a standard RUS structure be compliant with the APLIC Suggested Practices document.

With becoming a member of APLIC, RUS has volunteered and is assisting APLIC and many other electric utility APLIC members in revising the Suggested Practices publication to bring the document up-to-date with improved designs and materials available today.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Avian Power Line Interaction Committee

The Avian Power Line Interaction Committee (APLIC) was formed in the late 1980s to deal with crane collisions with power lines in southern Colorado. It was originally composed of ten utilities nationwide, the Edison Electric Institute (EEI), the U.S. Fish and Wildlife Service (USFWS) and the Audubon Society. Today it includes 23 utilities, Edison Electric Institute, U.S. Fish and Wildlife Service, Bonneville Power Administration, National Rural Electric Cooperative Association, Rural Utilities Service, Western Area Power Administration and the Electric Power Research Institute.

Items of Engineering Interest
September 2005

APLIC is a leader in the electric utility industry in the protection of avian resources while enhancing energy delivery. It works in partnership with utilities, resource agencies and the public to:

- Develop and provide educational resources
- Identify and fund research
- Develop and provide cost-effective management options
- Serve as a focal point for avian interaction utility issues

APLIC meets twice a year and deals with avian interactions with utility structures to include electrocution and collision issues. APLIC has produced:

- Training videos
- State-of-the art manuals on bird collisions and raptor electrocutions
- Short course on collision and electrocution issues
- Other educational materials

Current APLIC activities include:

- Research
- Web site development
- Spanish translation of raptor protection manual
- Short courses
- Guidance and advice to other utilities

APLIC with the U.S. Fish and Wildlife Service has developed Avian Protection Plan Guidelines and is currently working on an update/revision of "Suggested Practices For Raptor Protection On Power Lines: The State Of The Art In 1996." The revised document should be available in the fall of 2005.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

New Avian Protection Plan Guidelines

New guidelines have been developed by the U.S. Fish and Wildlife Service (USFWS) in partnership with the Avian Power Line Interaction Committee. The guidelines are designed to help utilities to prepare an Avian Protection Plan to reduce avian mortalities with electric facilities. Refer to the news release below.

> *"The U.S. Fish and Wildlife Service in partnership with the Avian Power Line Interaction Committee (APLIC) recently released voluntary guidelines designed to help electrical utilities protect and conserve migratory birds. Working with the*

guidelines, a utility can use the latest technology and science to tailor a voluntary Avian Protection Plan that meets specific utility needs at its facilities.

"The voluntary guidelines for protecting birds from electrocution and collisions with power lines will improve safeguards for migratory birds," said Acting Service Director Matt Hogan. "We value our partnership with APLIC and the electric utility industry, and encourage electric power companies to take advantage of the new guidelines."

An Avian Protection Plan is utility-specific and is designed to reduce avian and operational risks that result from avian interactions with electric utility facilities.

Electrocutions are a particular threat to birds with large wingspans, such as eagles, hawks, and owls? All species protected under the Migratory Bird Treaty Act. Wire strikes are a problem for many different bird species. Birds also can cause power outages and fires, resulting in increased costs and inconvenience for electric utilities and their customers.

"Last week's signing of the Avian Protection Plan Guidelines is a shining example of what can be accomplished when industry and the Fish and Wildlife Service roll up their sleeves and work together on a project," said Florida Power & Light Principal Biologist and APLIC Chair Jim Lindsay.

The guidance document, which will be available by the week of April 18, 2005 at

http://migratorybirds.fws.gov/,

references the latest industry standards for preventing avian power line interactions.

"Voluntary industry cooperation has long been essential to our conservation efforts, and many electric power companies have already taken steps to protect migratory birds," Hogan said. "The new guidelines build on and strengthen that tradition."

The Service and APLIC have a long history of working together on avian power line issues. In 1983, an ad hoc group began addressing whooping crane collisions with power lines in the Rocky Mountains. APLIC was officially formed in 1989 as a partnership involving the Service, the National Audubon Society, and 10 electric utilities.

Today APLIC members include representatives from the Edison Electric Institute (representing the Nation's investor-owned electric utilities), the National Rural Electric Cooperative Association (which represents nearly 1,000 consumer-owned electric utilities), 23 individual electric utilities, two Federal utility agencies, the Electric Power Research Institute, the Rural Utilities Service and the U.S. Fish and Wildlife Service."

Items of Engineering Interest
September 2005

RUS has created a link on its website

http://www.usda.gov/rus/electric/engineering/index.htm

to either the National Rural Electric Association's website
http://www.nreca.coop/nreca/Policy/Regulatory/OtherEnviroissues

or the USFWS's web site

http://migratorybirds.fws.gov/

A copy of the guidelines can be obtained at these sites.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

RUS Raptor Protection Guide Drawings

Raptor electrocution continues to be one of the major wildlife concerns of the U.S. Fish and Wildlife Service (USFWS), especially in states west of the Mississippi River. However, raptor electrocutions/collisions reporting is increasing in the eastern United States. Raptors (birds of prey) are a group of birds, which includes eagles, falcons, owls, kites, hawks, osprey and vultures. These birds of prey are protected through several laws, which include the Endangered Species Act, the Eagle Protection Act and the Migratory Bird Treaty Act. Violations of these laws can result in fines and/or imprisonment. Disturbed by the continuing large numbers of raptors, particularly eagles, electrocuted along power lines, the USFWS is continuing to step up enforcement of these laws.

RUS has been receiving requests for guide drawings for raptor electrocution prevention measures/designs for standard RUS distribution structures. In accordance with 7 CFR 1724.52 of the Code of Federal Regulations Borrowers are permitted to use structures designed for raptor protection that are in accordance with "Suggested Practices for Raptor Protection on Power Lines – The State of the Art in 1996," (Suggested Practices), published by the Edison Electric Institute/Raptor Research Foundation. Suggested Practices is currently being revised by the Avian Power Line Interaction Committee. Such structures must be in accordance with the National Electrical Safety Code unless a specific waiver has been granted by the authority having jurisdiction in the area where the structure is located.

Any deviation from the RUS construction standards for the purpose of raptor protection, which is not in accordance with Suggested Practices, must be approved by RUS prior to construction."

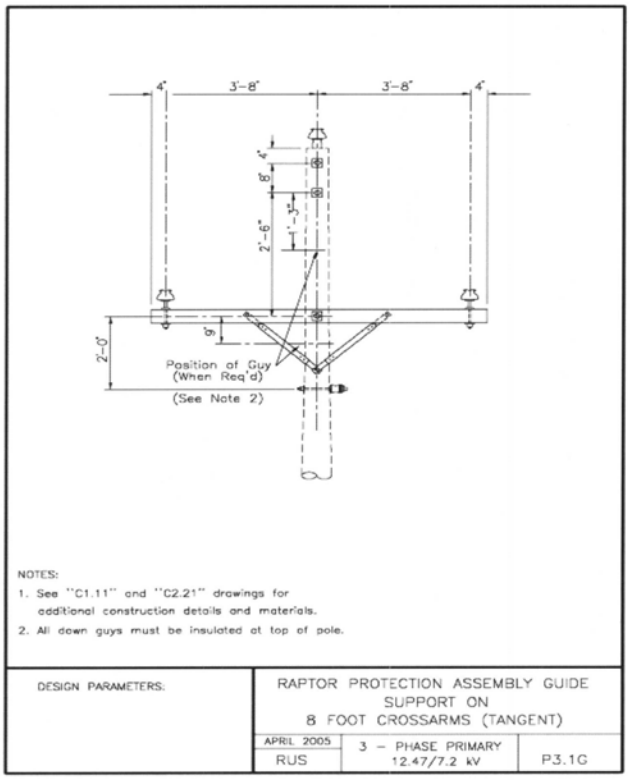
Suggested Practices advocates the following measures to curtail raptor electrocutions on distribution pole top structures:

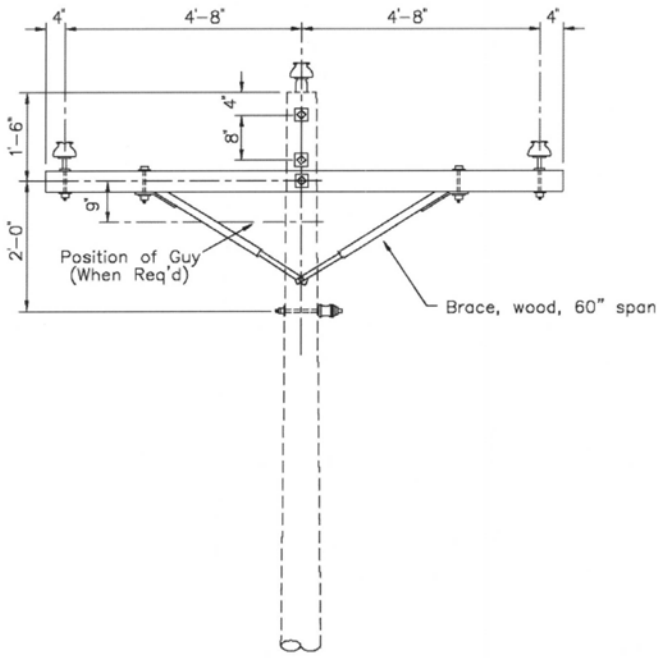
- A minimum of 60 inch horizontal and 12 inch vertical separation of conductors;
- The use of covered/insulated coverings over bare conductors at structure;
- The use of armless construction or undergrounding lines when the above measures are not feasible.

Suggested Practices states that "95 percent of all eagle electrocutions could be eliminated by correcting 2 percent of all the poles". Of particular concern are "preferred poles" which are poles frequently used by eagles as perches for hunting. These poles, more than any others, need to be identified and modified to be made raptor safe.

Standard raptor protection drawings have been incorporated into RUS Bulletins 1728F-803 and 804, "Specifications and Drawings for 24.9/14.4 kV Line Construction, and14.4/12.45 kV Line Construction." The recommended assemblies in these revised bulletins are attached. It is noted that the materials used for these modified assemblies are virtually the same as the corresponding standard assemblies. The choice of which modification to employ is an economic decision, based on such factors as ground clearances, age of facilities and cost of materials and labor.

Installing distribution lines underground for the purpose of raptor protection is an economic decision that must be studied and justified by the borrower. The use of armless construction, which may be more costly and less reliable than RUS's preferred standard crossarm construction, is discouraged.

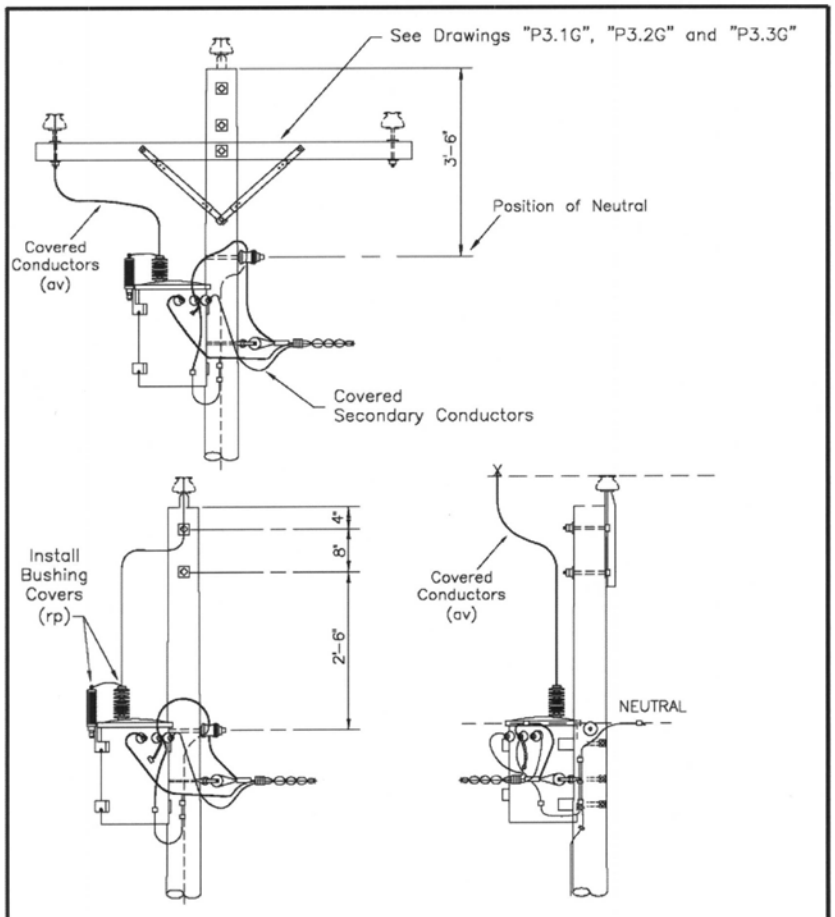




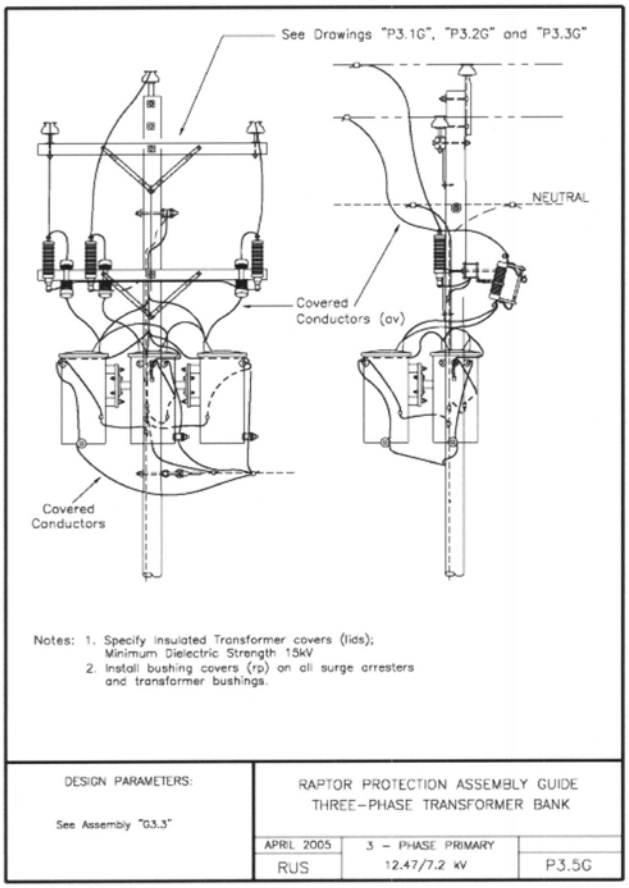
NOTE:

1. See "C1.11" and "C2.21" drawings for additional construction details and materials.

DESIGN PARAMETERS:	RAPTOR PROTECTION ASSEMBLY GUIDE SUPPORT ON 10 FOOT CROSSARMS (TANGENT)		
	APRIL 2005	3 – PHASE PRIMARY 12.47/7.2 kV	P3.2G
	RUS		



DESIGN PARAMETERS:	RAPTOR PROTECTION SINGLE–PHASE, CSP TRANSFORMER (TANGENT POLE)	
See Assembly "G1.2"	APRIL 2005	
	RUS	12.47/7.2 kV	P3.4G



If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

International Migratory Bird Day

International Migratory Bird Day is held annually on the second Saturday in May. It is an invitation to celebrate and support migratory bird conservation. International Migratory Bird Day focuses on a specific theme. In the past, themes have included importance of wetland

habitats, the effects of home owners on bird conservation, the peregrine falcon and its recovery, important bird areas and colonial bird conservation issues. The theme of the 2005 International Migratory Bird Day was Collisions: Clear the Way for Birds. Materials focused on human-created obstacles that birds may encounter including: communication towers, power lines, wind turbines and buildings and glass windows. Ways that agencies, industries and citizens may use to minimize the impacts these obstacles have on bird populations were explored. Information on the 2005 International Migratory Bird Day activities may be found at

http://birds.fws.gov/imbd

or

http://www.BirdDay.org.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Raptor Protection Mitigation Website

The California Energy Commission - Public Interest Energy Research Program (PIER) in partnership with the Santa Cruz Predatory Bird Research Group and EDM International, Inc. have developed an interactive web site to address raptor electrocutions on distribution power lines. This project was conducted as part of the PIER Avian-Transmission System Mitigation Program.

This site describes typical problems associated with avian electrocution and provides potential solutions and products. These solutions include various options such as perch management, isolation and insulation. For each retrofit a list of products are provided along with photos and interactive links to manufacturers. The web site also includes a product selector where 172 products are provided along with photos and vendor information. Feedback on various products is included along with installation tips and common misapplications.

The list of mitigating products will be updated at regular intervals as new products become available. The web site also has a secure section for utility testimonials on the effectiveness of particular product. You are encouraged to share your knowledge on various products. Additionally if you are having problems with a pole configuration not shown, please submit it for future inclusion.

The secure web site is located at

http://bems.edmlink.com

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

UNITED STATES
DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT
UTILITIES PROGRAMS

ELECTRIC PROGRAMS

SUMMARY OF
ITEMS OF ENGINEERING INTEREST
SEPTEMBER 2006

Many poles removed from service retain enough of their original structure and characteristics to make them usable in other treated wood applications. When poles can be reused in a manner compatible with their original purpose, such as for shorter poles, fence posts, retaining walls and landscape timbers, such reuse does not constitute "disposal" and these poles are not classified as "solid waste" subject to federal or state regulation.

However, poles removed from service that have no other useful application as a product are considered solid waste. Nonetheless, these poles have not been classified as hazardous waste under the federal Resource Conservation and Recovery Act (RCRA) program. Extensive testing on Penta and creosote treated wood reveals that these poles do not test hazardous. Poles treated with CCA are exempt from hazardous waste regulation.

In summary, treated wood removed from service that is not destined for reuse is not a hazardous waste and can be disposed of as solid waste. State and local jurisdictions may have particular guidelines which the user should be aware of and follow.

If you would like more information or have any questions, please contact Robert Lash, Transmission Branch, of the Electric Staff Division, at (202) 720-0486 or at Bob.Lash@wdc.usda.gov.

ENVIRONMENTAL

IEEE Wildlife Protective Device Testing Guide

The Transmission and Distribution Committee of the IEEE Power Engineering Society has sponsored a working group to create a testing guide for wildlife protective devices. The Wildlife Protective Products Working Group is made up of various representatives from the utility industry including equipment manufacturers, utility engineers, and testing laboratories. All of which have extensive knowledge of the issues surrounding wildlife caused outages and various methods of mitigating such occurrences.

The working group has been working on a draft guide, IEEE P1656™/D6, *Draft: Guide for Testing the Electrical, Mechanical, and Durability Performance of Wildlife Protective Devices Installed on Overhead Power Distribution Systems Rated up to 38 kV*. The guide is intended to guide engineers on standard testing procedures and criteria for wildlife guards to ensure that these products do not compromise the electric systems on which they are to be installed. The guide draws on existing material testing standards which are referenced in the guide as well as the experience of those who currently manufacture and use these items.

The IEEE P1656™/D6 should make it easier for utilities to specify wildlife protective products that work well within their respective systems and foster a sense of standardization within this growing industry sector.

For more information please contact Norris W. Nicholson, Electrical Engineer, Transmission Branch, Rural Development Utilities Programs at (202) 720-1924 or e-mail at Norris.Nicholson@wdc.usda.gov.

Raptor Electrocution/Collision Prevention Information

Revised Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. The Avian Power Line Interaction Committee (APLIC) has revised and updated Suggested Practices For Raptor Protection On Power Lines: The State of the Art in 1996. The new revised document should be available in late August or September 2006. It will be available in both hard-copy and CD format. Information on availability and how to obtain a copy will be found on http://www.aplic.org.

Several other publications/videos concerning raptor electrocution prevention, bird collision mitigation and animal caused outages are available. These publications include:

- Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions With Power Lines: The State of the Art in 1994. Edison Electric Institute. Washington, D.C.

  (Available from the Edison Electric Institute, 701 Pennsylvania Avenue, NW, Washington, D.C. 2004-2696. Cost is $40.00 plus $6.50 handling for non-members and $32.00 plus $6.50 handling for members.) APLIC has also developed a video, which complements the above publication. The video is available through the Edison Electric Institute.

- Raptors at Risk Video

  This is a 30 minute video describing laws protecting birds and materials used to prevent electrocutions. The video is available in VHS format ($12) or as a DVD ($25). It is available from the following web site: http://www.edmlink.com/raptorvideo.htm or by contacting EDM International at (970) 204-4001.

- Wildlife Control and Protection – DSTAR Project 10-3

  This report is an update of the NRECA 1996 Animal-Caused Outages manual. Contact Lavelle Freeman at lavelle.freeman@ps.ge.com for availability.

- The Guide to Raptor Remains

  In order to address avian fatalities, many utilities now check equipment for potential areas that may pose hazards for birds. A common method is to look under power lines for dead birds. Identifying species for these fatalities is important for a number of reasons. When decomposed carcasses, bone pieces, feathers or pellets are found under electrical structures, it can be difficult to identify the species. This guide provides a resource for identifying partial remains of selected avian species. The color guide ($55)

is available from the following web site:
http://www.edmlink.com/guide_to_raptor_remains.htm or by contacting EDM International at (970) 204-4001.

- Bird Electrocution Mitigation Web Site

  This web site was developed by the California Energy Commission – PIER Group in partnership the Santa Cruz Predator Bird Research Group and EDM International. This site provides problem configurations and solutions. This site is unique in that it includes a product selector search engine allowing the user to review all available products used to mitigate raptor electrocutions. Here is also a utility feed back section. The web site address is: http://bems.edmlink.com/

- Avian Protection Plan Guidelines

  The guidelines are designed to help utilities to prepare an Avian Protection Plan to reduce avian mortalities with electric facilities. An Avian Protection Plan is utility-specific and is designed to reduce avian and operational risks that result from avian interactions with electric utility facilities. RUS has created a link on its website (http://www.usda.gov/rus/electric/engineering/index.htm) to either the National Rural Electric Association's website (www.nreca.coop/nreca/Policy/Regulatory/OtherEnviroissues), or the U. S. Fish and Wildlife Service's website (http://www.migratorybirds.fws.gov/). A copy of the guidelines can be obtained at these sites.

If you would like more information or have any questions, please call Dennis Rankin, Environmental Protection Specialist, Engineering and Environmental Staff at (202) 720-1953 or E-mail: dennis.rankin@wdc.usda.gov.

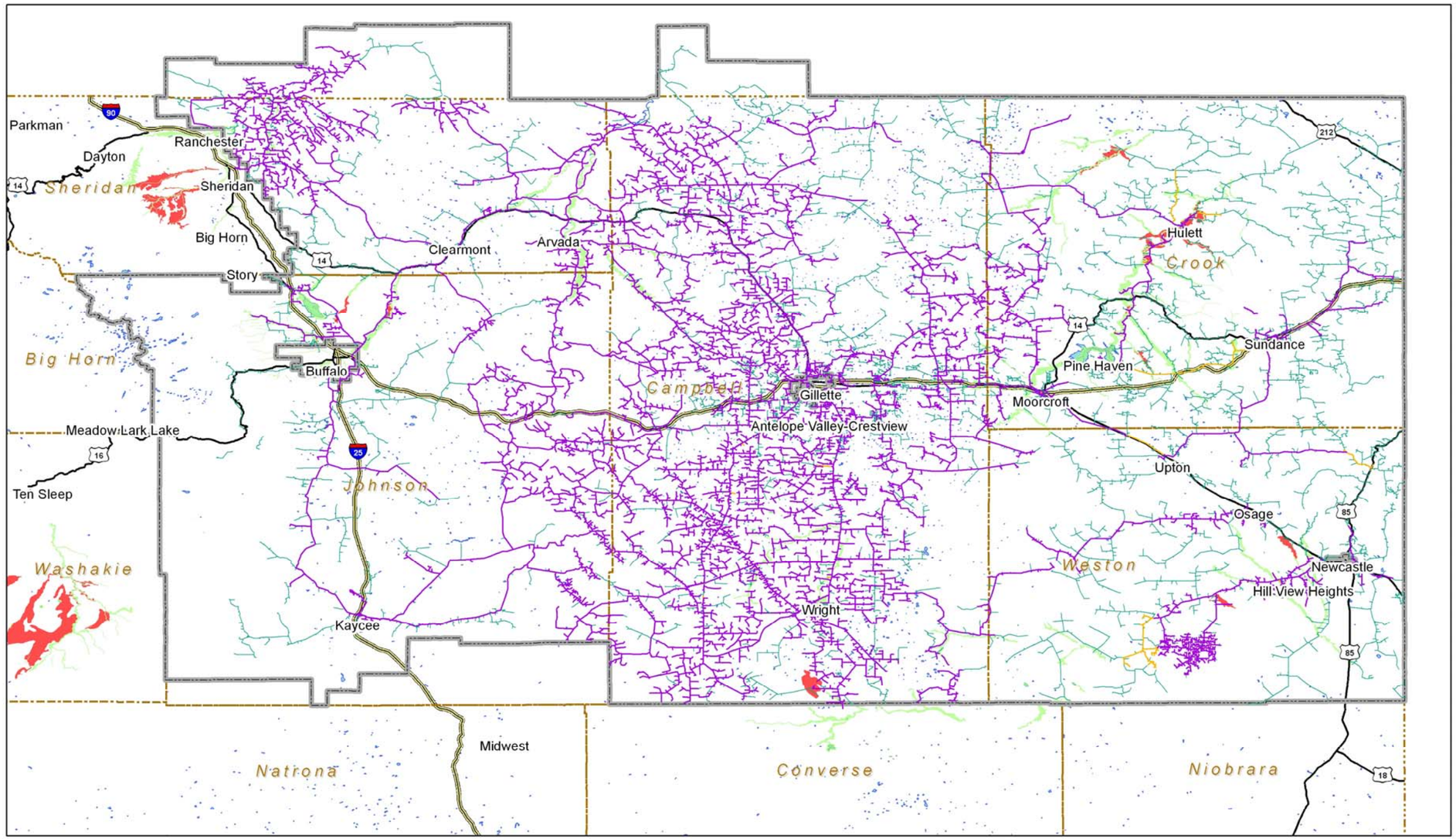
RENEWABLE ENERGY

The Status of Wind Energy in the United States

Wind energy (WE) was originally used for sailing ships, grinding grain, and pumping water. Technology advanced to where WE can be used to charge batteries and whole lot of other uses that can convert kinetic energy of the wind. The first windmills were developed in Persia in 500-900 AD for pumping water and grinding grain. In 1888, Charles Brush used the first large windmill to generate electricity in Cleveland, Ohio. In 1979 new types of two-bladed turbines were rated over one Megawatt developed, tested and began operation. In 1990 more than half of worlds WE capacity was installed in California. The Federal tax credit for WE reached 25% in 1980 and rewarded businesses choosing to use renewable energy. Today, WE is mainly used to generate electricity. Wind machines generate electricity in 30 different states. The states with the most wind production are California, Texas, Iowa, Minnesota, and Wyoming.

APPENDIX D
SPECIES DISTRIBUTION MAPS

Wyoming GAP Predicted Habitat for American White Pelican



POWDER RIVER ENERGY CORPORATION
A Touchstone Energy® Cooperative

Service Territory

Overhead Distribution

- Single Phase
- Two Phase
- Three Phase

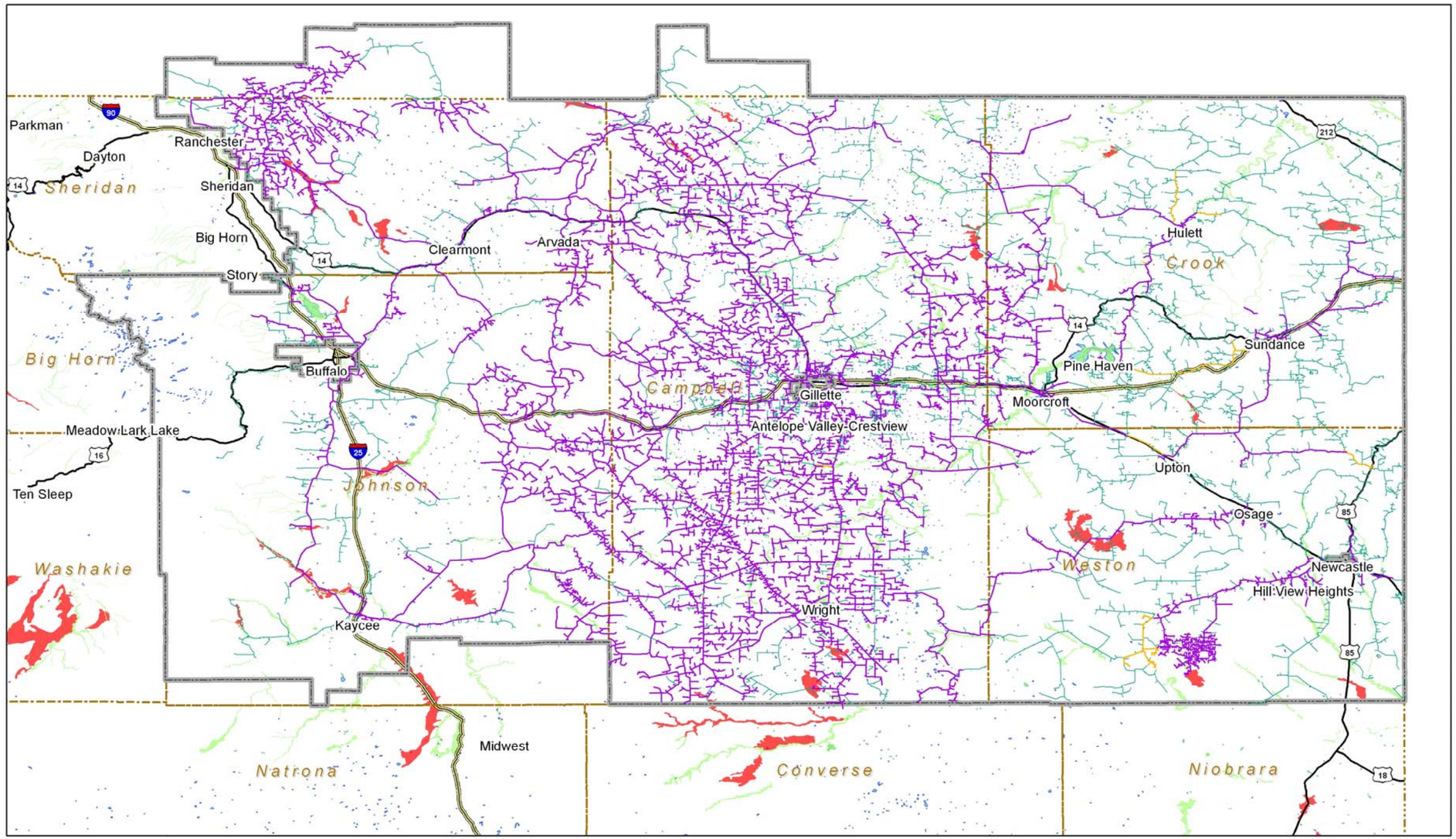
GAP Predicted Habitat

- Primary Habitat: primary landcover in area is suitable habitat
- Secondary Habitat: secondary landcover in area is suitable habitat

0 12.5 25 50
Miles

N

Wyoming GAP Predicted Habitat for Great Blue Heron



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0 12.5 25 50
Miles

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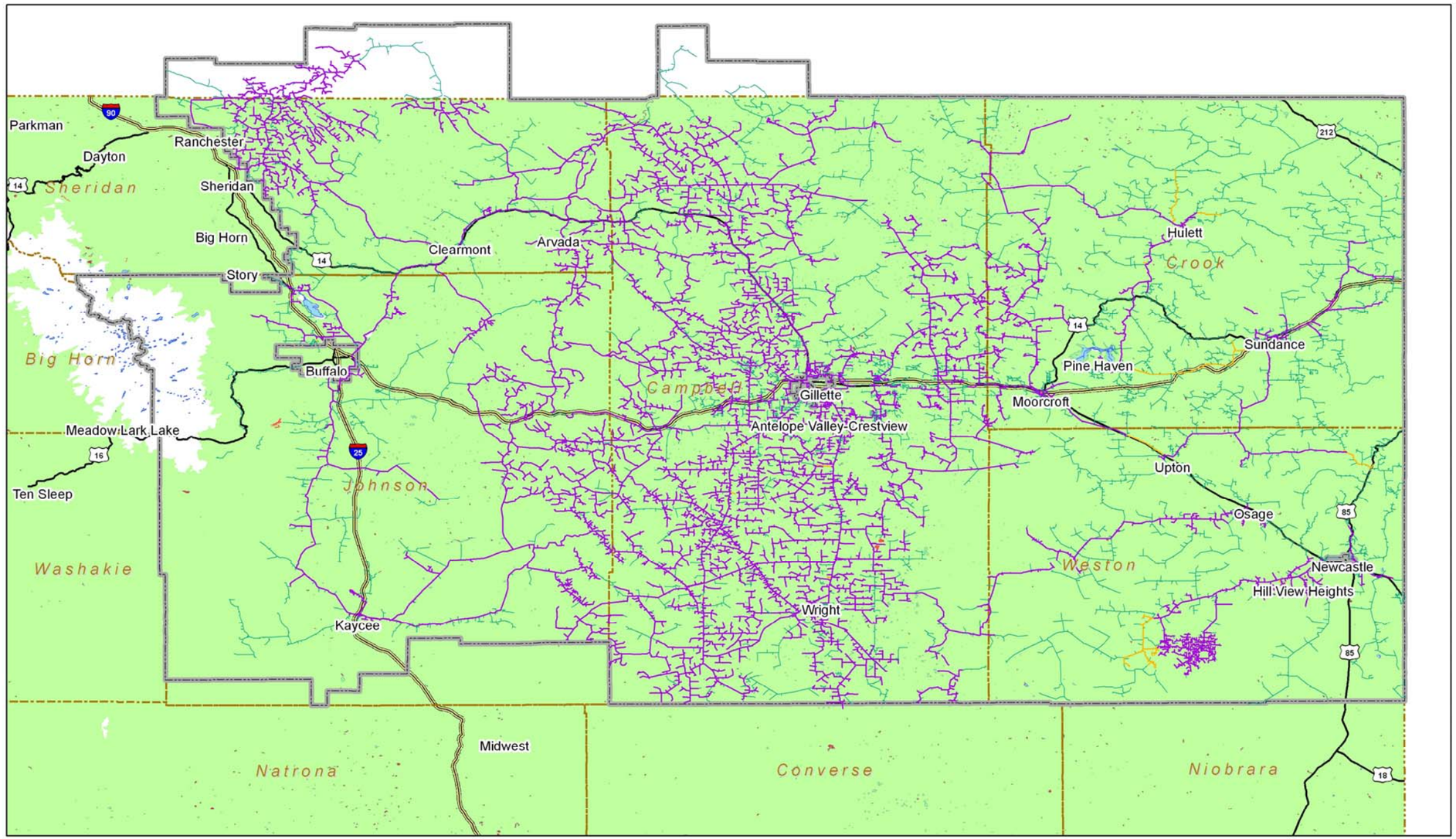
Wyoming GAP Predicted Habitat for Turkey Vulture



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0 12.5 25 50
Miles

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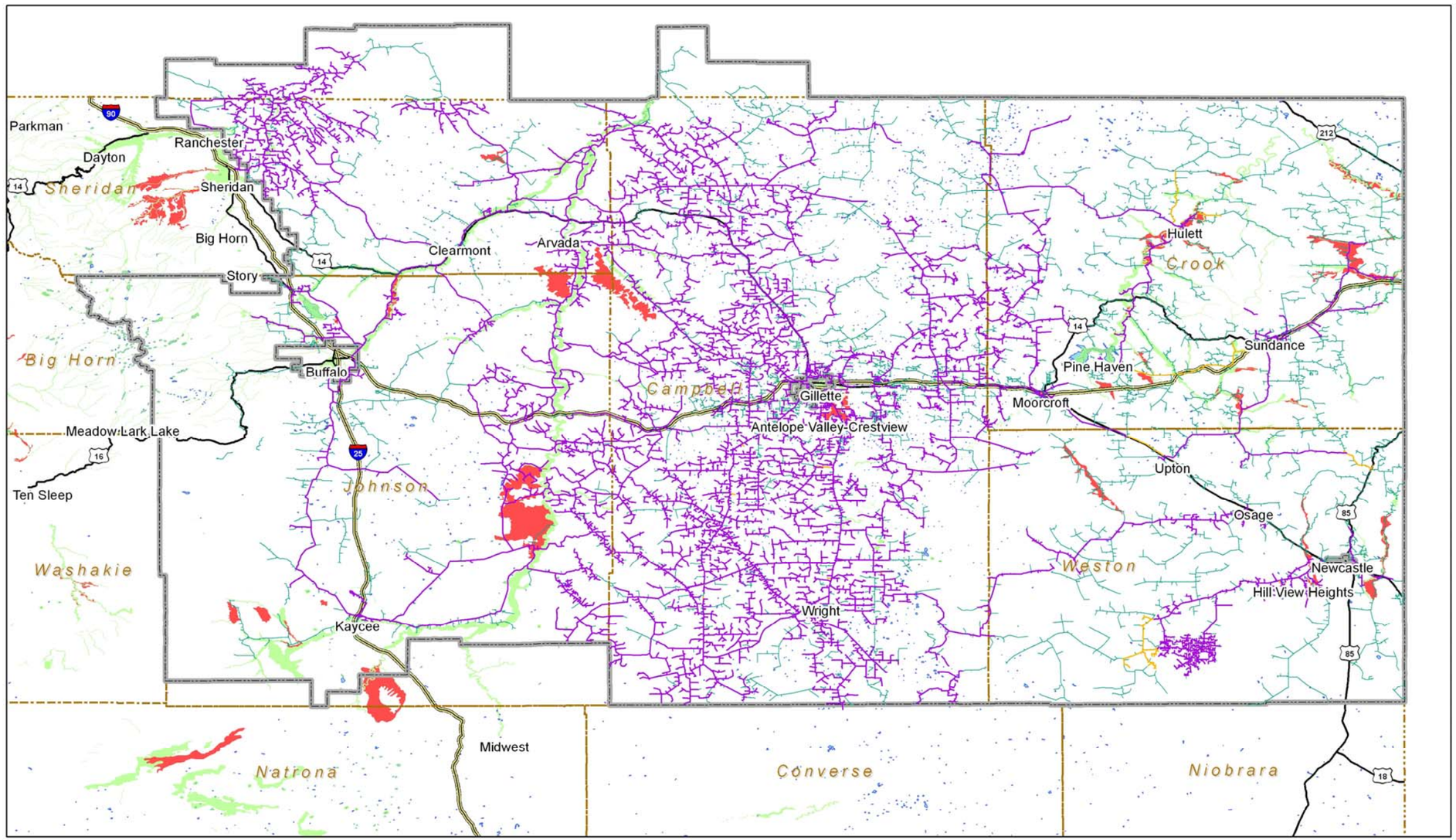
Wyoming GAP Predicted Habitat for Osprey



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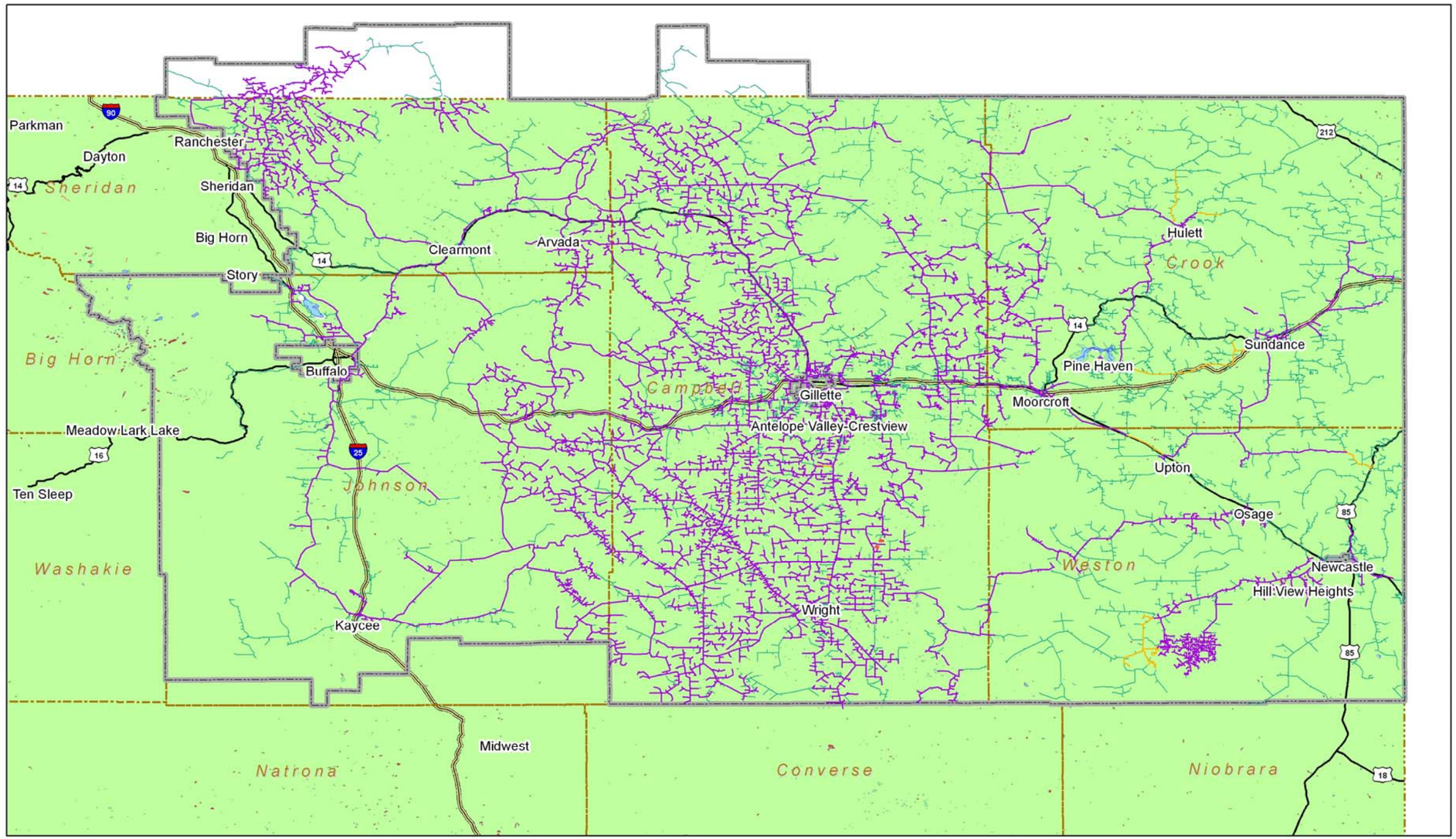
Wyoming GAP Predicted Habitat for Bald Eagle



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0 12.5 25 50
Miles

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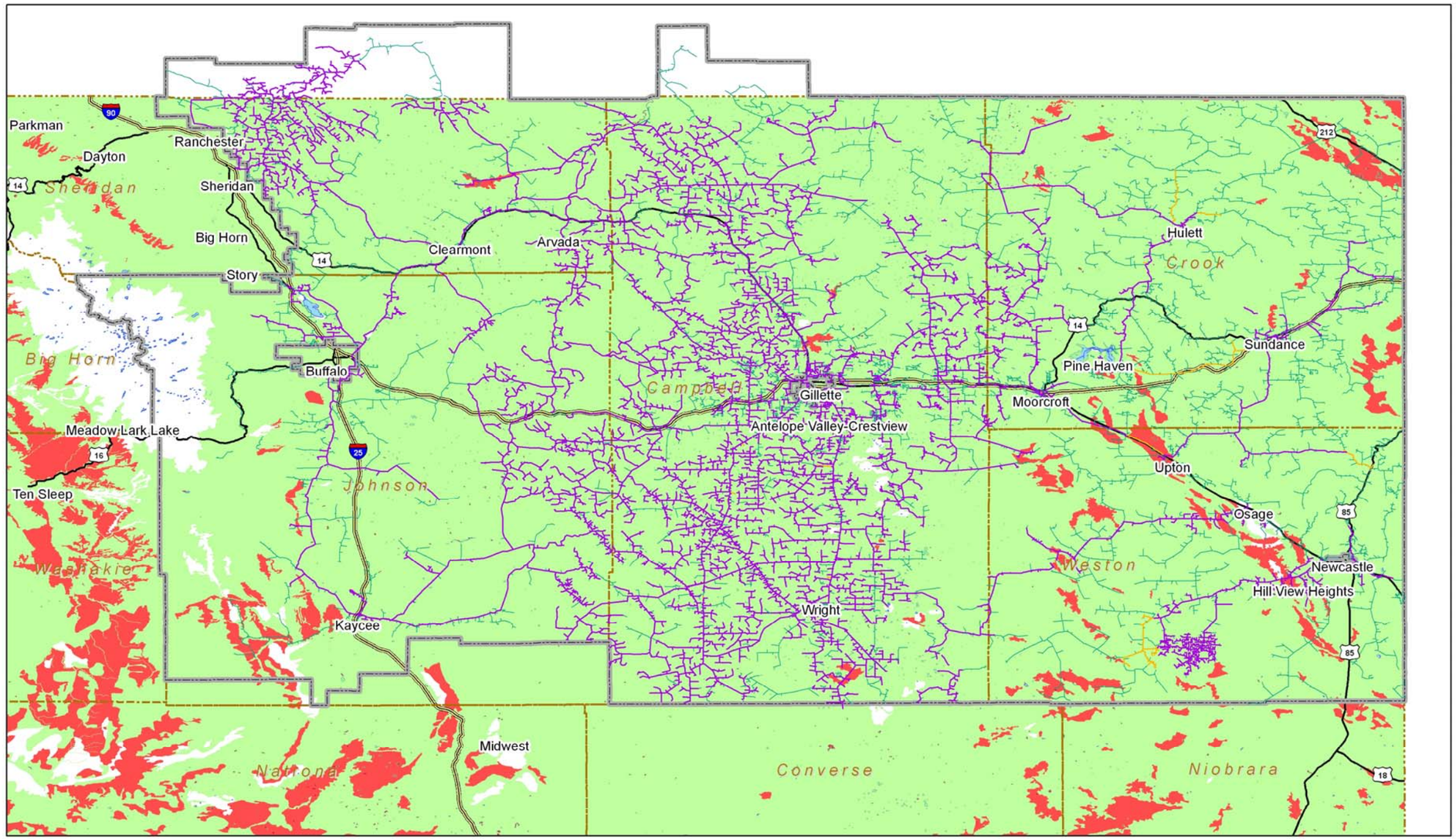
Wyoming GAP Predicted Habitat for Swainson's Hawk



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Miles

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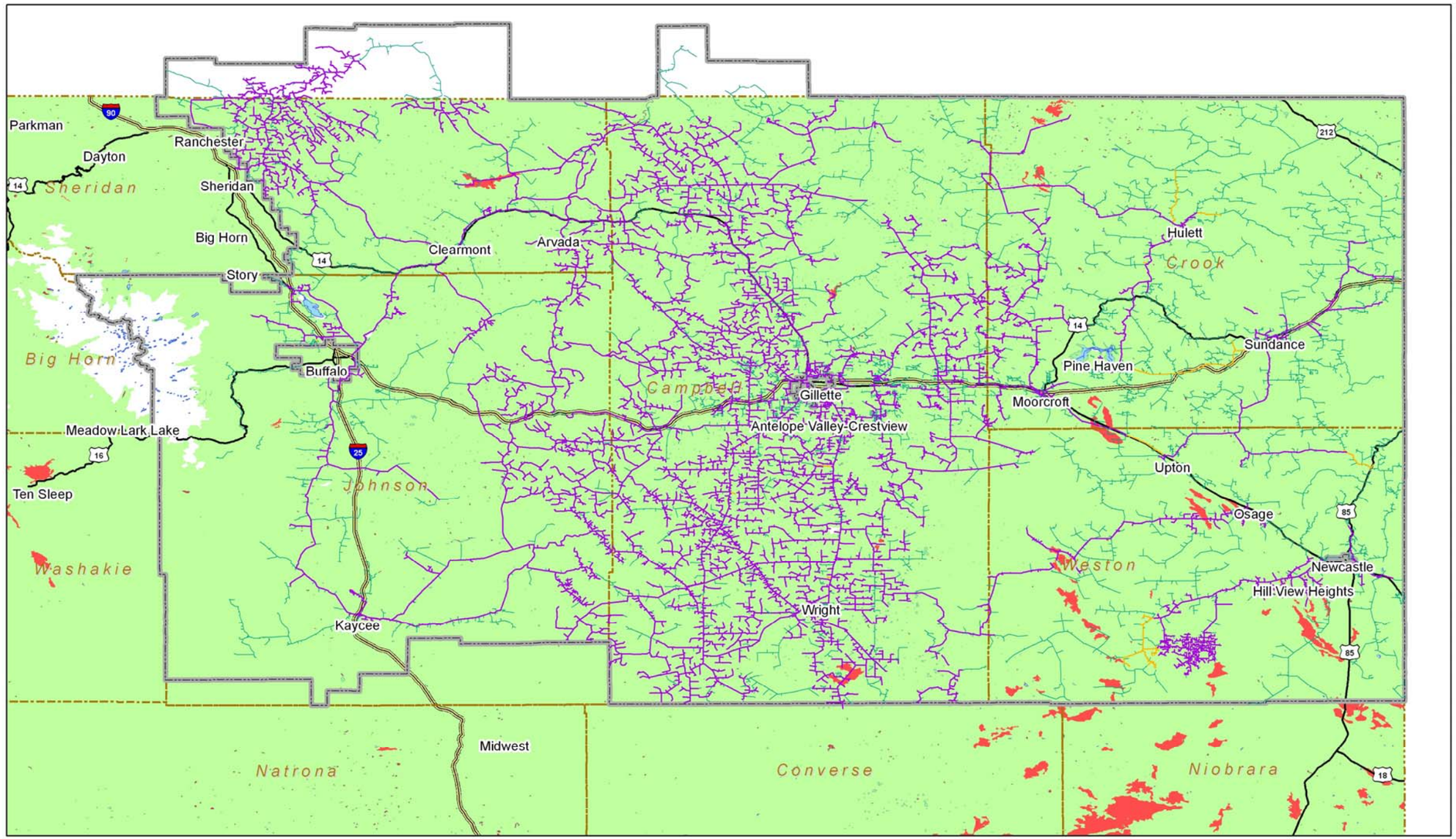
Wyoming GAP Predicted Habitat for Red-tailed Hawk



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Miles

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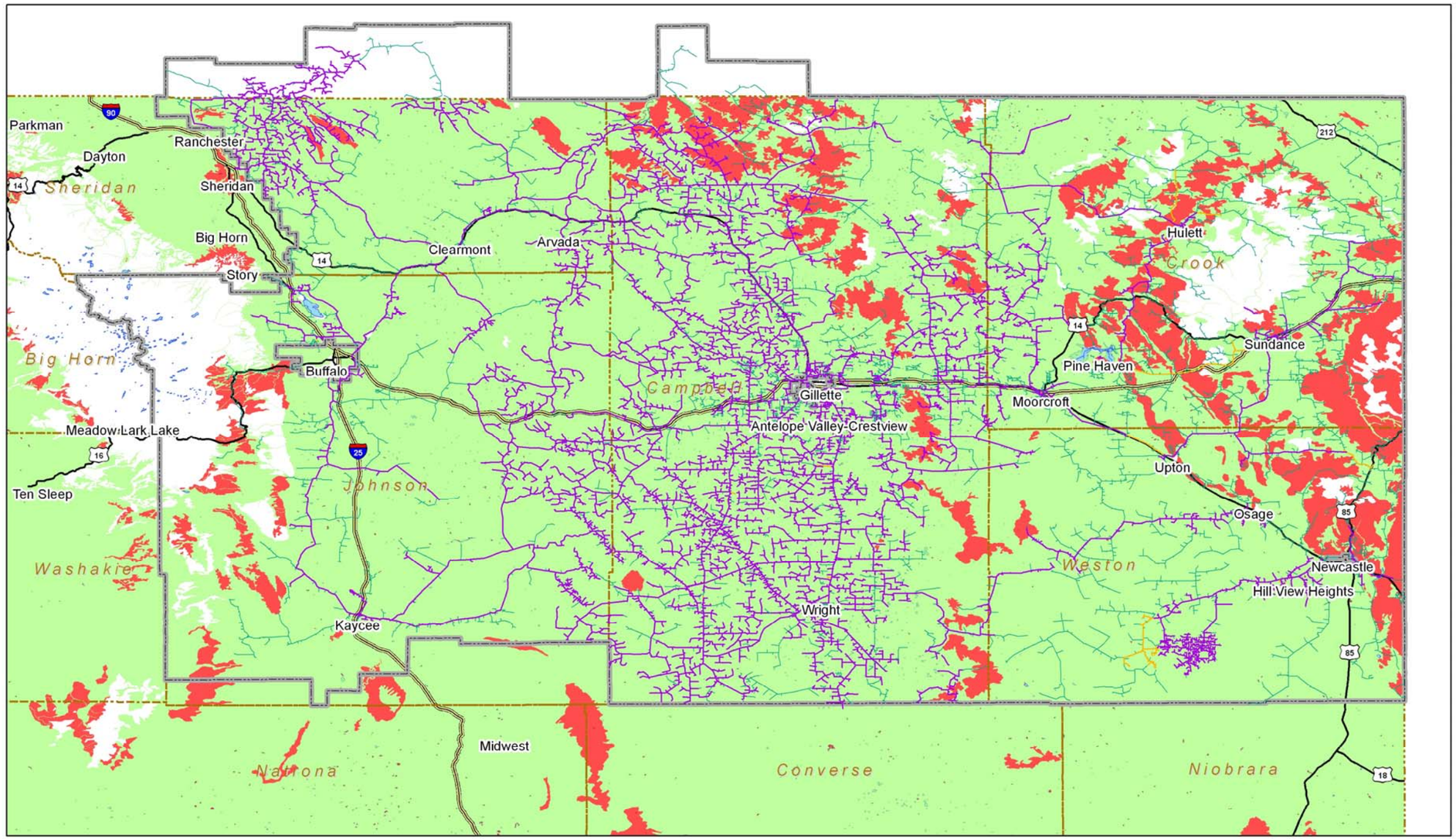
Wyoming GAP Predicted Habitat for Ferruginous Hawk



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0 12.5 25 50
Miles

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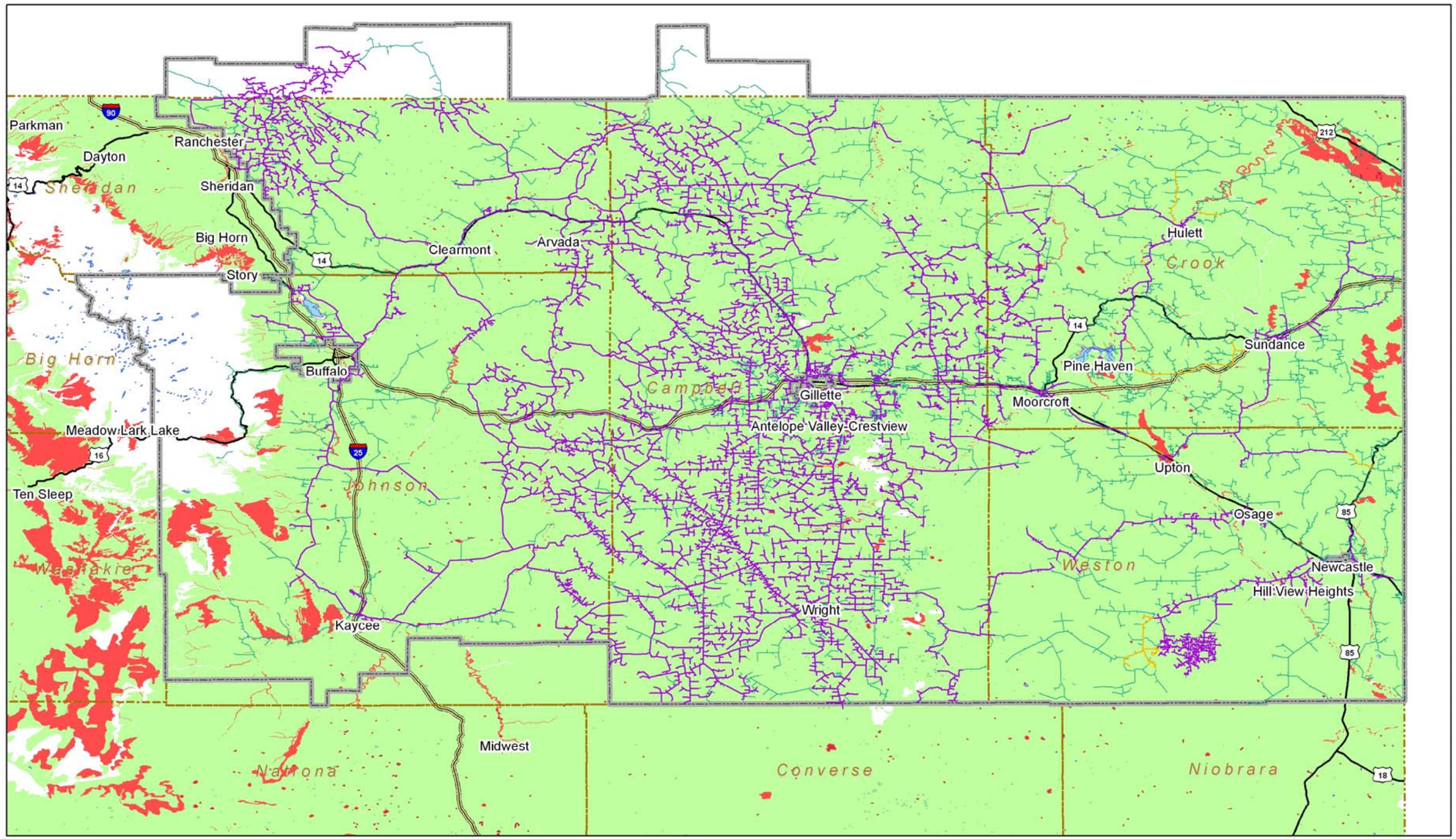
Wyoming GAP Predicted Habitat for Rough-legged Hawk



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Miles

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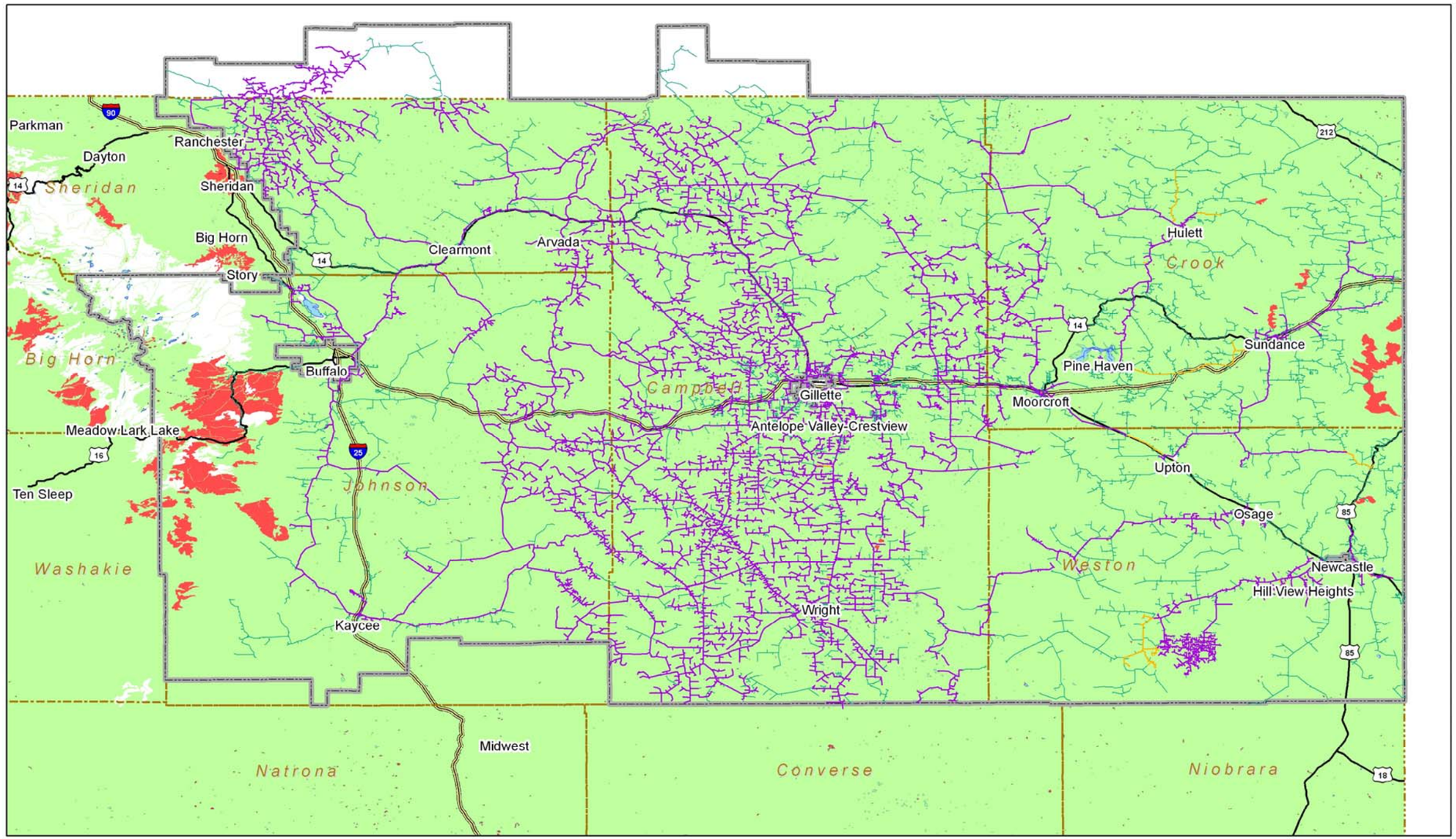
Wyoming GAP Predicted Habitat for Golden Eagle



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0 12.5 25 50
Miles

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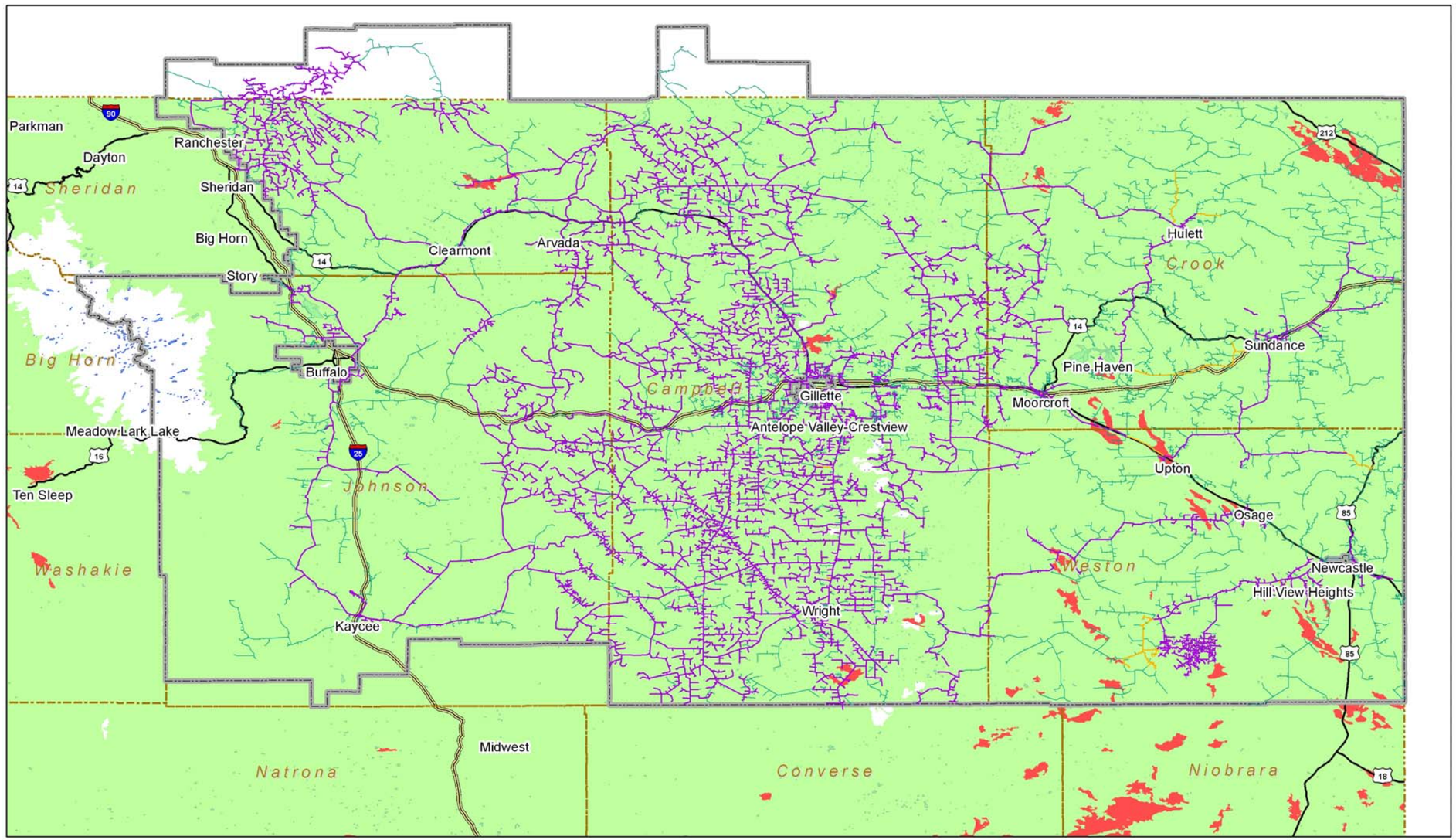
Wyoming GAP Predicted Habitat for Peregrine Falcon



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0 12.5 25 50
Miles

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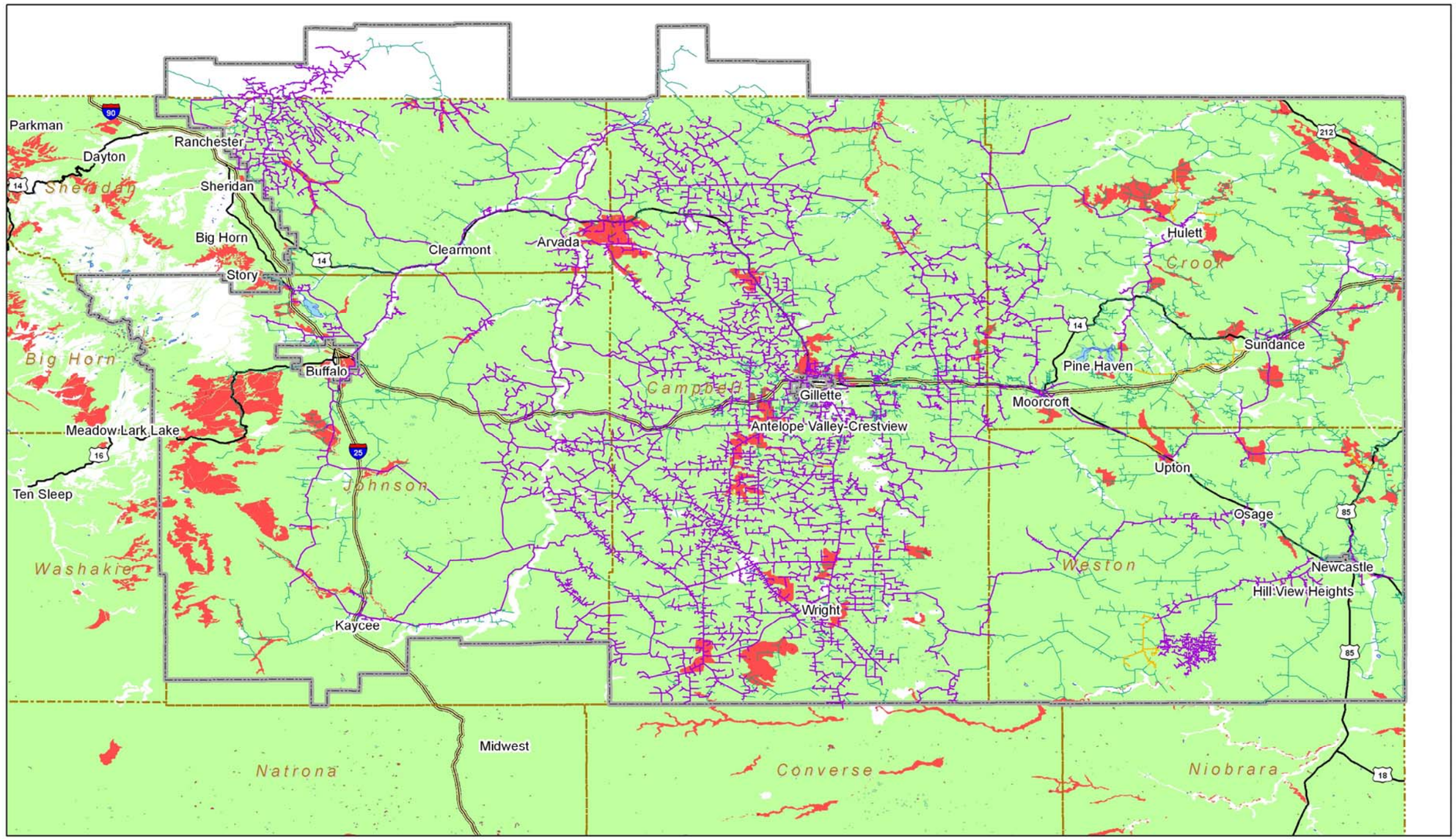
Wyoming GAP Predicted Habitat for Prairie Falcon



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0 12.5 25 50
Miles

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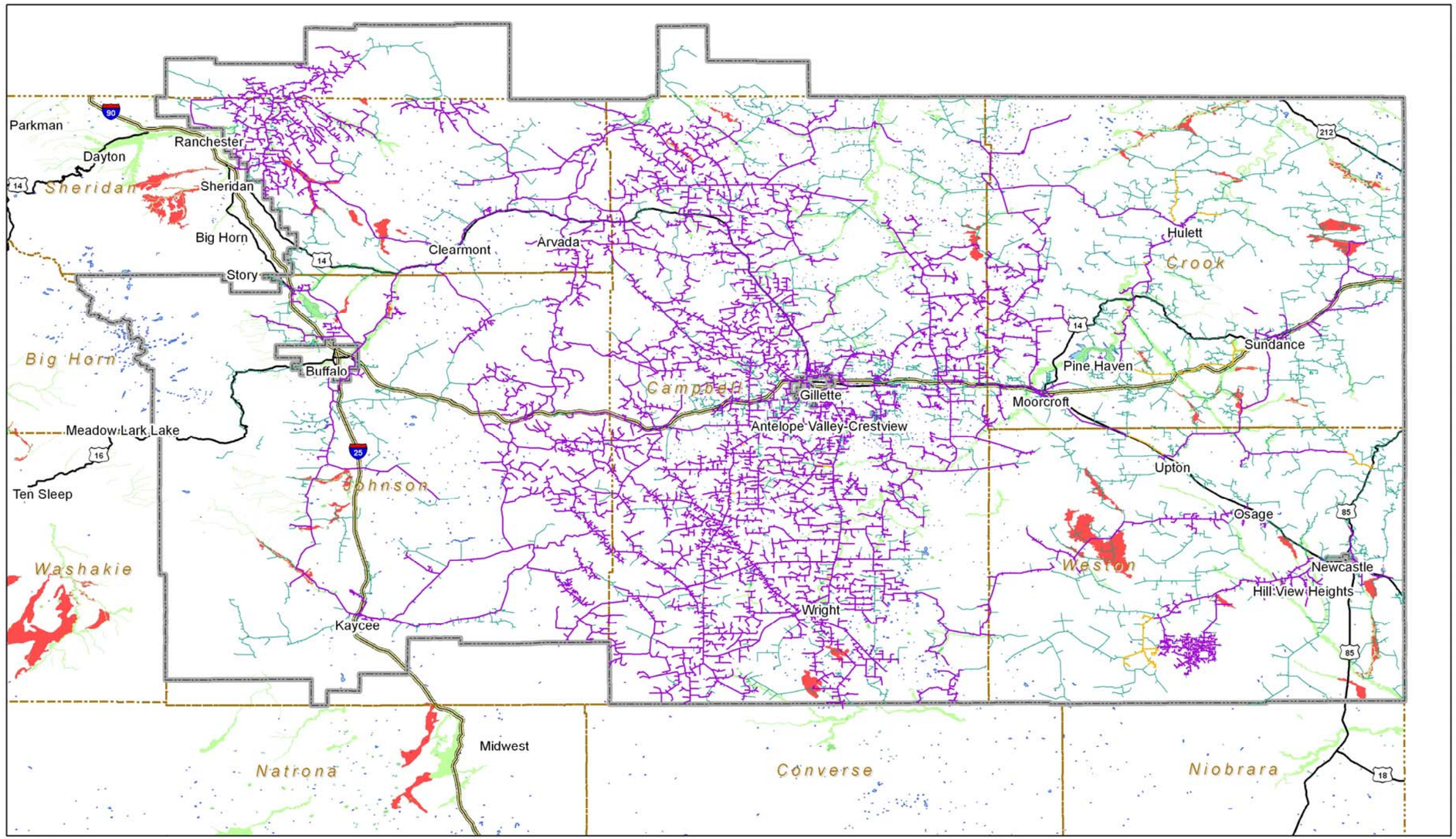
Wyoming GAP Predicted Habitat for Sandhill Crane



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0 12.5 25 50
Miles

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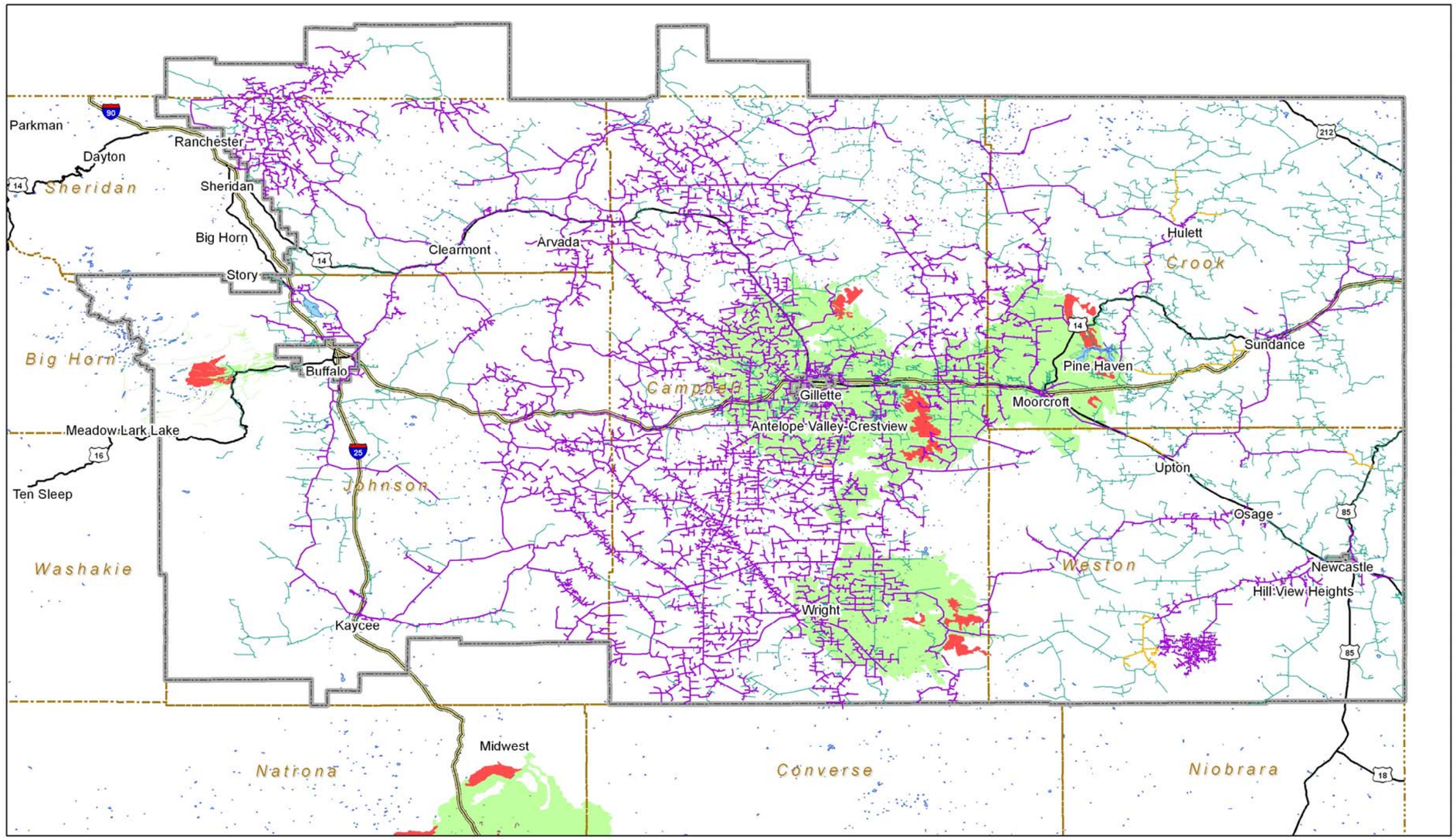
Wyoming GAP Predicted Habitat for Barn Owl



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Miles

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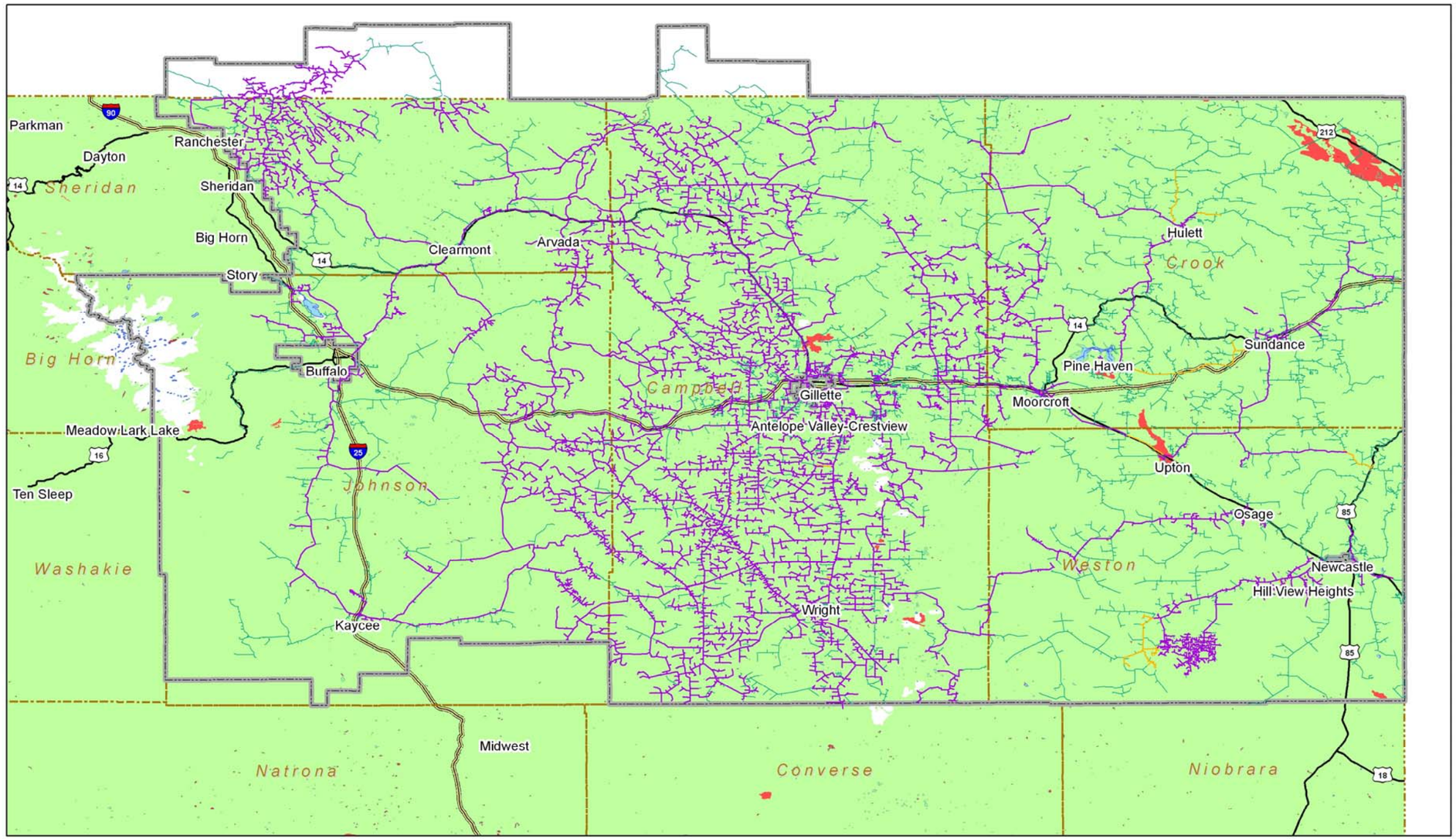
Wyoming GAP Predicted Habitat for Great Horned Owl



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Miles

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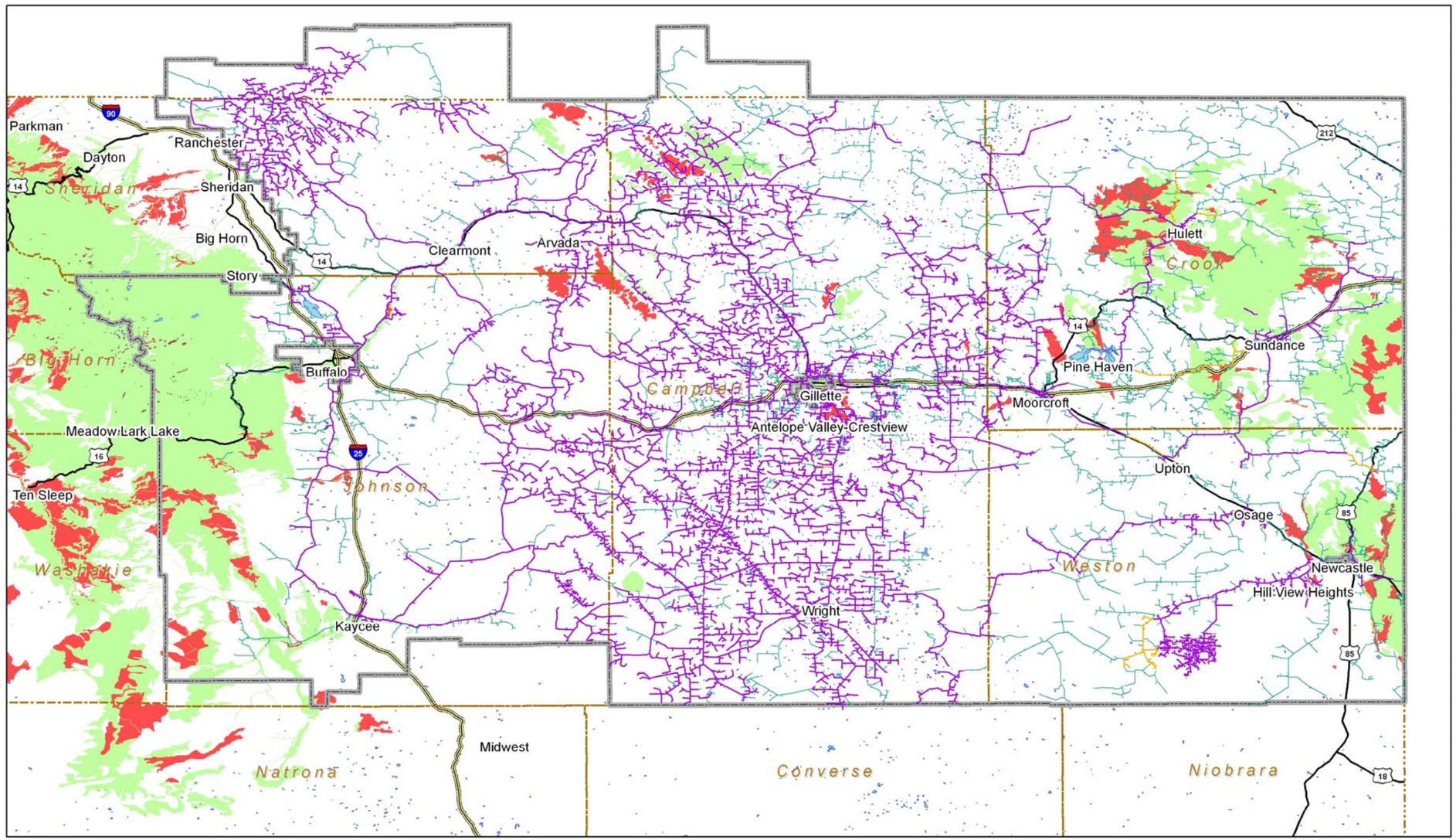
Wyoming GAP Predicted Habitat for Black-billed Magpie



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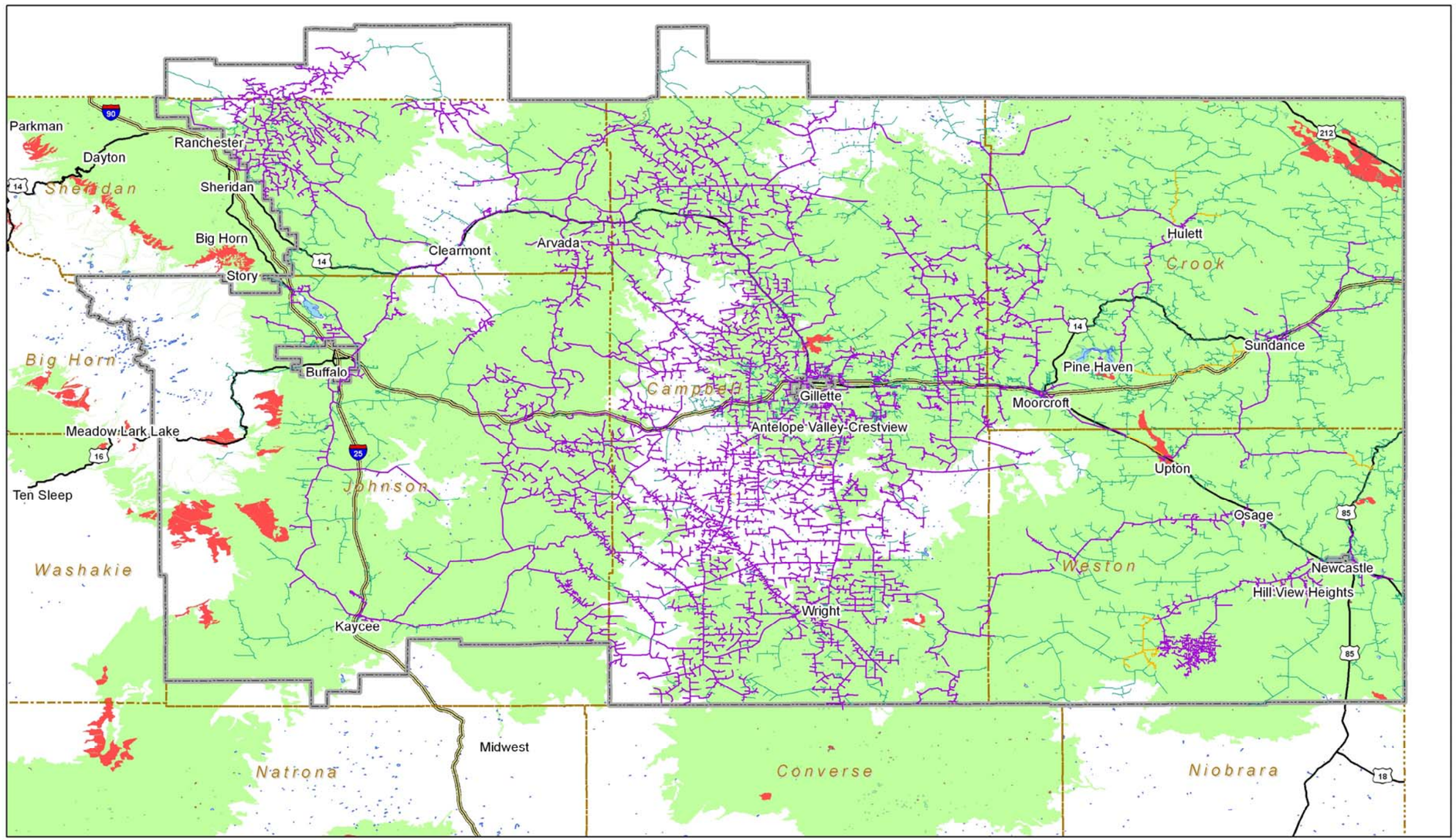
0 12.5 25 50
Miles

N

Wyoming GAP Predicted Habitat for American Crow



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Service Territory

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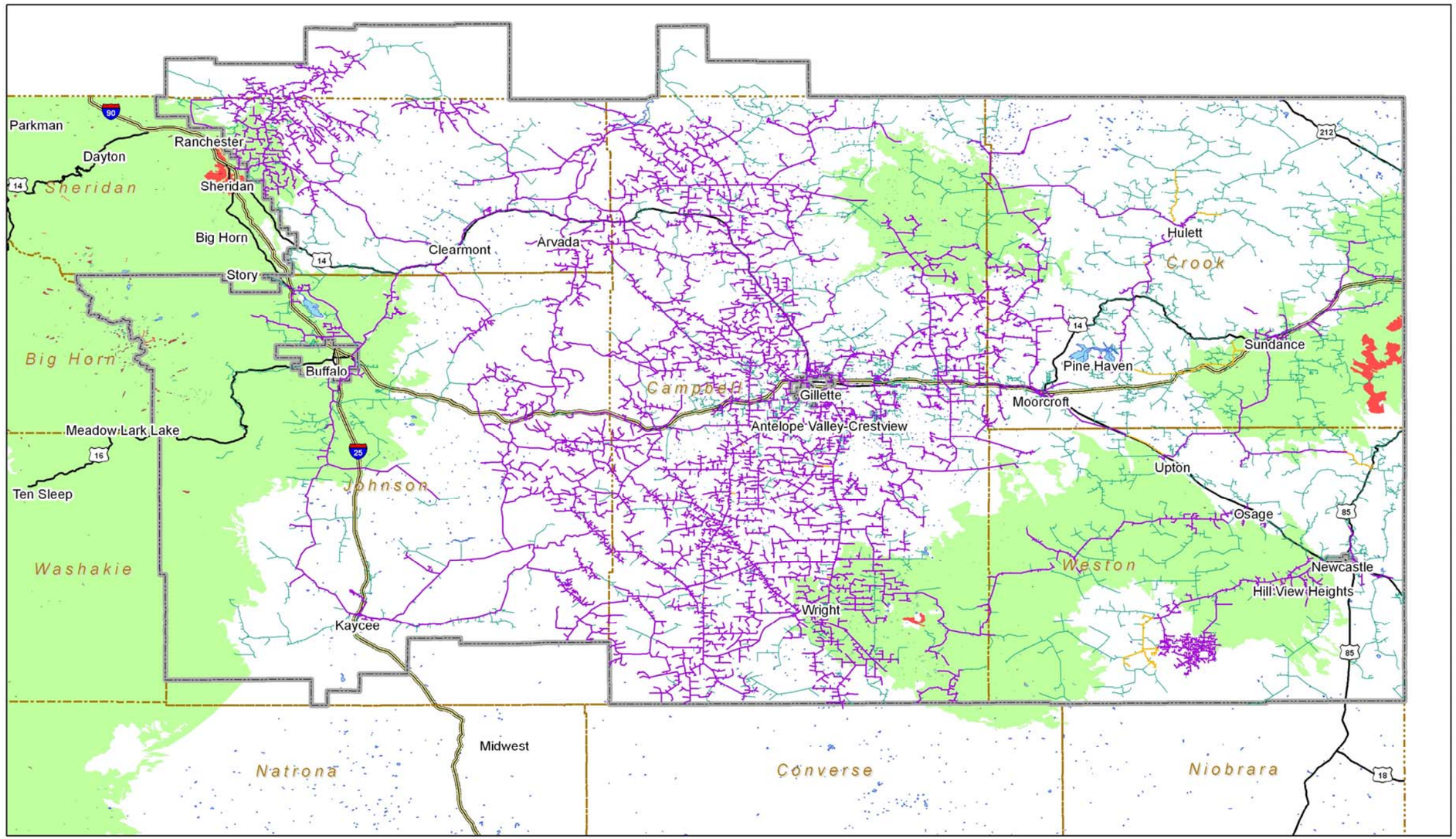
0 12.5 25 50
Miles

N

Wyoming GAP Predicted Habitat for Common Raven



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0 12.5 25 50
Miles

N

APPENDIX E
AVIAN PROTECTION GUIDELINES

Great Blue Heron

Great Horned Owl

Turkey Vulture

Rough-legged Hawk

Rough-legged Hawk

American Crow

Swainson's Hawk

Swainson's Hawk

Ferruginous Hawk

Black-billed Magpie

Bald Eagle

Ferruginous Hawk

Powder River Energy Corporation

AVIAN PROTECTION FIELD GUIDELINES

Golden Eagle

June 2010

Prepared by

EDM International, Inc.

4001 Automation Way
Fort Collins, Colorado 80525-3479 USA
970/204-4001 — Fax: 970/204-4007
Email: rharness@edmlink.com
www.edmlink.com

PURPOSE

To assure that personnel comply with federal and state requirements for migratory birds (including threatened and endangered birds). This guidance will help to assure that no project is unnecessarily delayed due to failure by personnel to comply with the requirements.

RESPONSIBILITY

All affected personnel shall be responsible for knowing and complying with this guidance.

REGULATIONS

The Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) protects the vast majority of birds with the exception of a few species such as the introduced house sparrow, European starling, and rock pigeon. The purpose of the MBTA is to afford protection to migratory birds, their parts, nests, and eggs. The list of protected birds is broad; for example, the PRECorp service territory has approximately 500 confirmed species of protected birds. The MBTA states that, unless permitted by the regulation, it is unlawful to pursue, hunt, take, capture, kill, possess, sell, barter, purchase, ship, export, or import any migratory birds, or any part, nests, eggs, or products thereof. For misdemeanors, the penalties include fines up to $5,000 per individual/$15,000 per organization and up to six months imprisonment.

Bald and Golden Eagle Protection Act of 1940

Bald and golden eagles, eggs, and their nests receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). This law states that no person shall kill or possess any bald or golden eagle, or any part, nests or eggs, without a valid permit to do so. The Act also protects eagles from human disturbance. Culpability for violations is knowingly or with wanton disregard for consequences. Maximum penalties for misdemeanor violations of the BGEPA include up to $200,000 fine per organization and up to one year of imprisonment.

Endangered Species Act of 1973 (amended)

Special protection is afforded to threatened and endangered species under the Endangered Species Act (ESA). The ESA makes it unlawful to import, export, "take," transport, sell, purchase, or receive in interstate or foreign commerce any species listed as endangered or threatened alive or dead. The ESA increases protection to habitat and prohibits the harassment of threatened and endangered birds. An Incidental Take Permit allows for otherwise prohibited take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Maximum penalties for misdemeanor violations include fines up to $200,000 per organization, as well as up to one year of imprisonment.

RESPONSIBILITIES (continued)

Permits and Record Keeping – The Avian Protection Plan Coordinator 's Office will be responsible for making arrangements with the USFWS and the state to obtain necessary permits or guidance.

If you have questions, comments, or need additional information, contact:

PRECorp Contact	Phone
Tracy Jones Powder River Energy Corporation 221 Main Street Sundance, WY 82729	307-283-4950—Main 800-442-3630—Toll Free 307-290-0038—Cell

DEFINITIONS

Depredation Permit – a permit issued by the USFWS that allows the permittee to take, transport, and temporarily possess birds/nests under approved situations.

Migratory Bird – any bird, whatever its origin and whether or not raised in captivity, which belongs to a species listed in 50 CFR § 10.13, or which is a mutation or a hybrid of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof.

Nest – any readily identifiable structure built, maintained, or occupied for incubating and rearing of protected species off-spring. Nests can be found on the ground, in trees, or on structures.

Possession – detention and control of a protected species. This includes picking up or handling of any migratory bird, as defined above. This may also include moving or transporting.

Protected Species – any bird listed as an endangered or threatened species found in 50 CFR § 17.11 and § 17.12, on the list of migratory birds found in 50 CFR 10.13.

Raptors – birds of prey including eagles, hawks, falcons, accipiters, kites, ospreys, owls, and vultures.

Salvage Permit – a permit issued by the USFWS that authorizes the permittee to retrieve birds found dead in which the permittee had no part in the killing or death.

USFWS – the United States Fish and Wildlife Service.

RESPONSIBILITIES (continued)

Injured Wildlife – PRECorp discourages its employees from handling any injured bird species but particularly species such as hawks, owls, eagles, falcons, egrets, herons, etc. These species have powerful and potentially dangerous defenses such as talons and piercing beaks that can result in serious harm to employees, including eye injuries. PRECorp personnel should contact the Avian Protection Plan Coordinator's Office when encountering any injured wildlife. If the Coordinator cannot be reached, contact one of the following:

Organization	Phone
Wyoming Game and Fish Department (Cheyenne) Wyoming Game and Fish Department (Gillette)	307-777-4600 307-687-7157
Northeastern Wyoming Raptor Center (Gillette)	307-689-6483
Montana Fish, Wildlife & Parks (Helena) Montana Fish, Wildlife & Parks (Billings)	406-444-4039 406-247-2940
Montana Raptor Conservation Center (Bozeman)	406-585-1211

Any contact with a federal or state officer should be handled as a regulatory inspection.

A **Bird Incident/Mitigation Report Form** must be completed for each injured bird found under power lines or at a PRECorp location. This form includes the date and location of the bird, species, the name of the person who found the bird, and if applicable, the unit configuration of the pole and the specific retrofitting steps to be taken to prevent future bird fatalities on the structure. Poles must be retrofitted to raptor-friendly standards and records kept on the action taken.

European Starling

Monk Parakeet

Eurasian Collared-dove

Rock Pigeon (Common Pigeon)

Ring-necked Pheasant

Examples of bird species that are <u>not</u> protected by the Migratory Bird Treaty Act (MBTA)

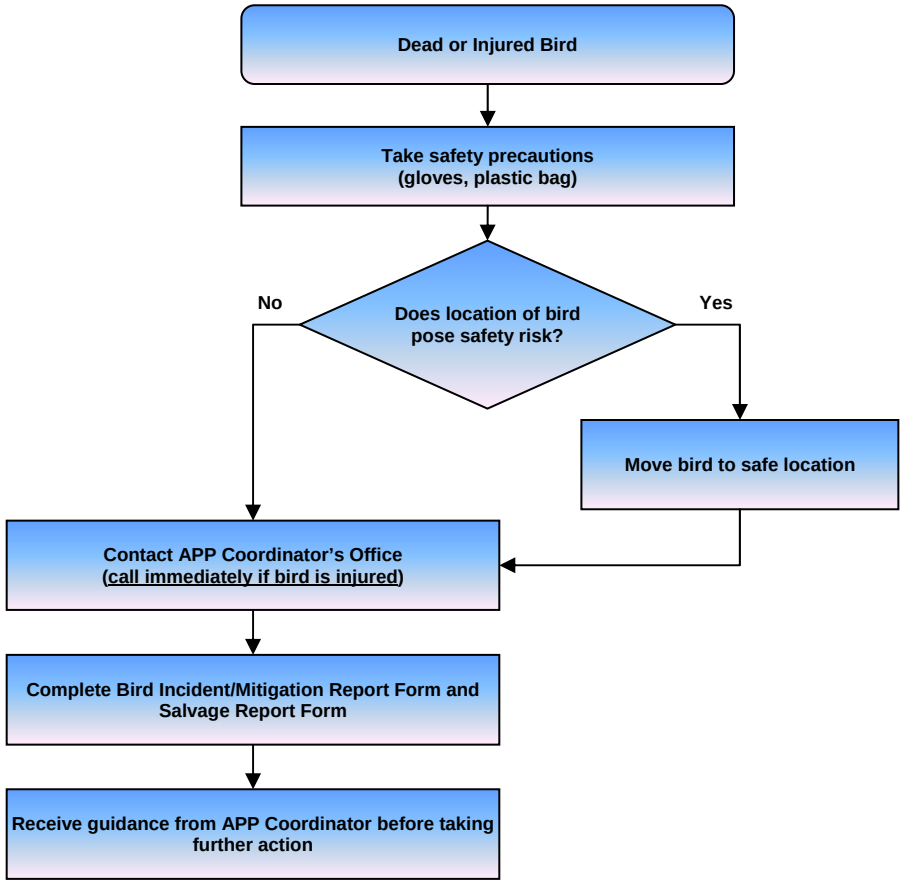
House Sparrow

RESPONSIBILITIES

Dead or Injured Birds – A USFWS permit is required to authorize the removal of migratory bird carcasses. Personnel must not take possession of any bird (live or dead), portion of a bird, an egg or portion of an egg without first contacting the Avian Protection Plan Coordinator's Office for guidance. A PRECorp Bird Incident/Mitigation Report Form and Salvage Report Form must be completed for all birds discovered.

Note: Personnel should be aware that there are many diseases that can be transmitted by contact with wildlife (including nests), and should wear gloves or use an inverted plastic bag to pick up dead wildlife.

Dead or Injured Bird on PRECorp Company Property or Facilities Procedures for Field Personnel



RESPONSIBILITIES (continued)

Nest Management – Personnel must not take possession of a nest without first contacting the Avian Protection Plan Coordinator's Office for guidance on proper procedures. The federal government protects all migratory birds and their active nests. A USFWS permit is required to authorize the removal of active nests. An additional state permit may also be required, depending on the species. A copy of each permit must be carried whenever exercising this authority.

When nests are removed in extreme emergency situations threatening human health and safety (which includes potential electric outages), the nest must not be disposed of until the USFWS is properly notified. Permits require record keeping, which includes the date and location of each nest removed, species, the name of the person who removed the nest, and the permit number under which the nest was removed.

Note: Personnel should be aware that many diseases can be transmitted by contact with nests, and should wear gloves or use an inverted plastic bag to pick up nests. Breathing filters are also required because moving nests will often disperse dried bird feces into the air.

Immature Golden Eagle

Barn Owl

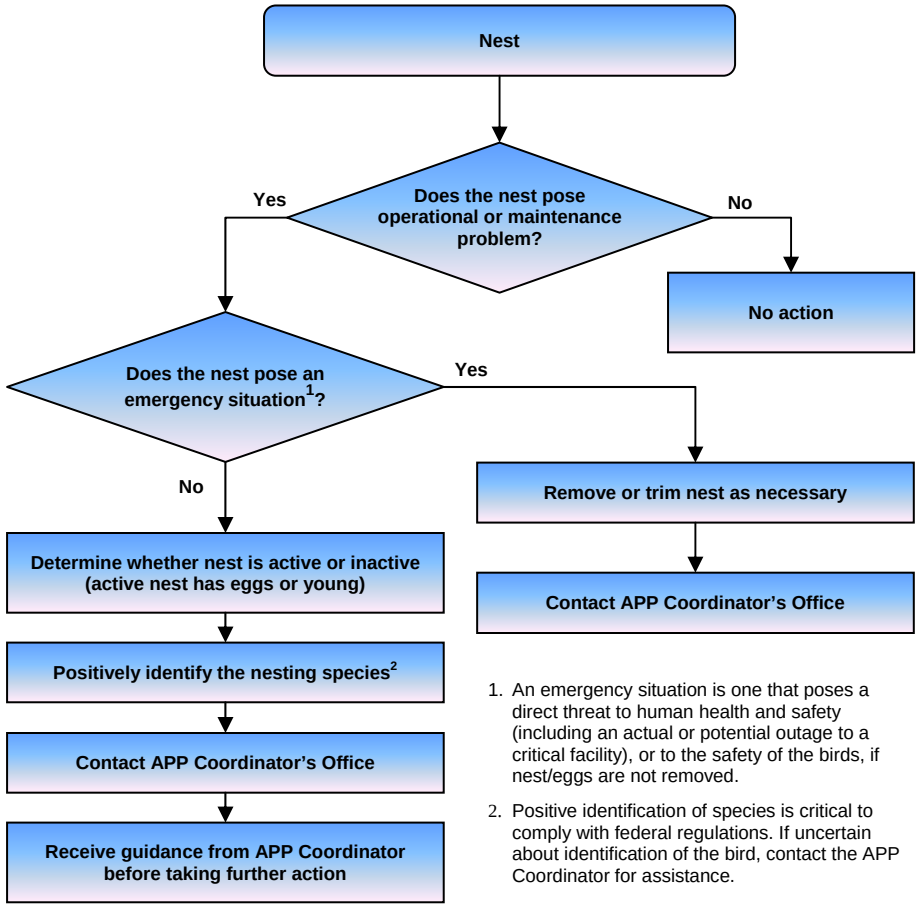
Swainson's Hawk

Red-tailed Hawk

Red-tailed Hawk

RESPONSIBILITIES (continued)

Nests on PRECorp Company Property or Facilities Procedures for Field Personnel



1. An emergency situation is one that poses a direct threat to human health and safety (including an actual or potential outage to a critical facility), or to the safety of the birds, if nest/eggs are not removed.
2. Positive identification of species is critical to comply with federal regulations. If uncertain about identification of the bird, contact the APP Coordinator for assistance.

Red-tailed Hawk Nest on Pole

Say's Phoebe Nest on Disconnect

APPENDIX F
PERMIT APPLICATION FORMS
(excerpts from permits, copies of PRECorp's permits)

Department of the Interior
U.S. Fish and Wildlife Service

Expires 11/30/2010
OMB No. 1018-0022

Federal Fish and Wildlife Permit Application Form

Return to: U.S. Fish and Wildlife Service *Click here for addresses.*
Migratory Bird Regional Permit Office

Type of Activity:
Special Purpose - Salvage

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A.	**Complete if applying as an individual**		
1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix
2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)
6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address

B.	**Complete if applying on behalf of a business, corporation, public agency or institution**		
1.a. Name of business, agency, or institution	1.b. Doing business as (dba)		
2. Tax identification no.	3. Description of business, agency, or institution		
4.a. Principal officer Last name	4.b. Principal officer First name	4.c. Principal officer Middle name/ initial	4.d. Suffix
5. Principal officer title	6. Primary contact		
7.a. Business telephone number	7.b. Alternate telephone number	7.c. Business fax number	7.d. Business e-mail address

C.	**All applicants complete address information**			
1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)				
1.b. City	1.c. State	1.d. Zip code/Postal code:	1.e. County/Province	1.f. Country
2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	2.c. State	2.d. Zip code/Postal code:	2.e. County/Province	2.f. Country

D.	**All applicants MUST complete**
1.	Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $75**. Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – *attach documentation of fee exempt status as outlined in instructions.* (50 CFR 13.11(d))
2.	Do you currently have or have you ever had any Federal Fish and Wildlife permits? Yes ☐ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____ No ☐
3.	Certification: I hereby certify that I have read and am familiar with the regulations contained in *Title 50, Part 13 of the Code of Federal Regulations* and the other *applicable parts in subchapter B of Chapter I of Title 50*, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001. _____ Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) Date of signature (mm/dd/yyyy)

Please continue to next page

Department of the Interior
U.S. Fish and Wildlife Service

Expires 11/30/2010
OMB No. 1018-0022

Federal Fish and Wildlife Permit Application Form

Return to: U.S. Fish and Wildlife Service *Click here for addresses.*
Migratory Bird Regional Permit Office

Type of Activity:
Special Purpose - Miscellaneous - Relocate

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A.	**Complete if applying as an individual**		
1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix
2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)
6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address

B.	**Complete if applying on behalf of a business, corporation, public agency or institution**		
1.a. Name of business, agency, or institution	1.b. Doing business as (dba)		
2. Tax identification no.	3. Description of business, agency, or institution		
4.a. Principal officer Last name	4.b. Principal officer First name	4.c. Principal officer Middle name/ initial	4.d. Suffix
5. Principal officer title	6. Primary contact		
7.a. Business telephone number	7.b. Alternate telephone number	7.c. Business fax number	7.d. Business e-mail address

C.	**All applicants complete address information**			
1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)				
1.b. City	1.c. State	1.d. Zip code/Postal code:	1.e. County/Province	1.f. Country
2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	2.c. State	2.d. Zip code/Postal code:	2.e. County/Province	2.f. Country

D.	**All applicants MUST complete**
1.	Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $100**. Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – *attach documentation of fee exempt status as outlined in instructions.* (50 CFR 13.11(d))
2.	Do you currently have or have you ever had any Federal Fish and Wildlife permits? Yes ☐ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____ No ☐
3.	Certification: I hereby certify that I have read and am familiar with the regulations contained in *Title 50, Part 13 of the Code of Federal Regulations* and the other *applicable parts in subchapter B of Chapter I of Title 50*, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001. _____ Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) Date of signature (mm/dd/yyyy)

Please continue to next page

Department of the Interior
U.S. Fish and Wildlife Service

Expires 11/30/2010
OMB No. 1018-0022

Federal Fish and Wildlife Permit Application Form

Click here for addresses.

Return to: U.S. Fish and Wildlife Service (USFWS)
Migratory Bird Regional Permit Office

Type of Activity: Migratory Bird Depredation Permit

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A. Complete if applying as an individual

1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix

2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)

6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address

B. Complete if applying on behalf of a business, corporation, public agency or institution

1.a. Name of business, agency, or institution	1.b. Doing business as (dba)

2. Tax identification no.	3. Description of business, agency, or institution

4.a. Principal officer Last name	4.b. Principal officer First name	4.c. Principal officer Middle name/ initial	4.d. Suffix

5. Principal officer title	6. Primary contact

7.a. Business telephone number	7.b. Alternate telephone number	7.c. Business fax number	7.d. Business e-mail address

C. All applicants complete address information

1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)				
1.b. City	**1.c. State**	**1.d. Zip code/Postal code:**	**1.e. County/Province**	**1.f. Country**

2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	**2.c. State**	**2.d. Zip code/Postal code:**	**2.e. County/Province**	**2.f. Country**

D. All applicants MUST complete

1. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount of $100.00 if you are applying for a new permit or $50.00 if you are requesting a substantaive amendment to your existing permit. If you are a homeowner requesting a permit for damage to your personal residence or property, attach $50.00.** Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – *attach documentation of fee exempt status as outlined in instructions.* (50 CFR 13.11(d))

2. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☐ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____
   No ☐

3. Certification: I hereby certify that I have read and am familiar with the regulations contained in *Title 50, Part 13 of the Code of Federal Regulations* and the other *applicable parts in subchapter B of Chapter I of Title 50*, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

_____ _____
Signature (**in blue ink**) of applicant/person responsible for permit (No photocopied or stamped signatures) Date of signature

Department of the Interior
U.S. Fish and Wildlife Service

Expires Nov. 30, 2010
OMB No. 1018-0094

Federal Fish and Wildlife Permit Application Form

Click here for addresses.

Return to: U.S. Fish and Wildlife Service (USFWS)

Type of Activity: Native Endangered and Threatened Species –

Scientific Purposes, Enhancement of Propagation or Survival Permits (i.e., Recovery Permits) & Interstate Commerce Permits

Complete Sections A or B, and C, D, and E of this application. U.S. address may be required in Section C, see instructions for details.
See attached instruction pages for information on how to make your application complete and help avoid unnecessary delays.

A.	**Complete if applying as an individual**		
1.a. Last name	1.b. First name	1.c. Middle name or initial	1.d. Suffix
2. Date of birth (mm/dd/yyyy)	3. Social Security No.	4. Occupation	5. Affiliation/ Doing business as (see instructions)
6.a. Telephone number	6.b. Alternate telephone number	6.c. Fax number	6.d. E-mail address

B.	**Complete if applying on behalf of a business, corporation, public agency or institution**		
1.a. Name of business, agency, or institution	1.b. Doing business as (dba)		
2. Tax identification no.	3. Description of business, agency, or institution		
4.a. Principal officer Last name	4.b. Principal officer First name	4.c. Principal officer Middle name/ initial	4.d. Suffix
5. Principal officer title	6. Primary contact		
7.a. Business telephone number	7.b. Alternate telephone number	7.c. Business fax number	7.d. Business e-mail address

C.	**All applicants complete address information**			
1.a. Physical address (Street address; Apartment #, Suite #, or Room #; no P.O. Boxes)				
1.b. City	1.c. State	1.d. Zip code/Postal code:	1.e. County/Province	1.f. Country
2.a. Mailing Address (include if different than physical address; include name of contact person if applicable)				
2.b. City	2.c. State	2.d. Zip code/Postal code:	2.e. County/Province	2.f. Country

D. All applicants MUST complete

1. Attach check or money order payable to the U.S. FISH AND WILDLIFE SERVICE **in the amount indicated on page 2**. Federal, tribal, State, and local government agencies, and those acting on behalf of such agencies, are exempt from the processing fee – *attach documentation of fee exempt status as outlined in instructions.* (50 CFR 13.11(d))

2. Do you currently have or have you ever had any Federal Fish and Wildlife permits?
   Yes ☐ If yes, list the number of the most current permit you have held or that you are applying to renew/re-issue: _____
   No ☐

3. Certification: I hereby certify that I have read and am familiar with the regulations contained in *Title 50, Part 13 of the Code of Federal Regulations* and the other *applicable parts in subchapter B of Chapter I of Title 50*, and I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

_____
Signature (in blue ink) of applicant/person responsible for permit (No photocopied or stamped signatures) Date of signature (mm/dd/yyyy)

Please continue to next page

** See page 13 for additional instructions on completing the above form. See page 14 for information on the Paperwork Reduction Act, Privacy Act, and Freedom of Information Act aspects of this application form.

Section E. **ALL APPLICANTS COMPLETE SECTION E.** Provide the information outlined in Section E. on the following pages. Be as complete and descriptive as possible. Please do not send pages that are over 8.5"X 11", videotapes, or DVDs.

SCIENTIFIC PURPOSES, ENHANCEMENT OF PROPAGATION OR SURVIVAL PERMITS (i.e., RECOVERY PERMITS) & INTERSTATE COMMERCE PERMITS

What type of permit are you requesting?

- □ Recovery (see instructions and requirements on pp. 2-8 and 13-14 of this application form)
  OR
- □ Interstate Commerce (see instructions and requirements on pp. 2-3, 9-10 and 13-14 of this application form)

Have you obtained all required State, Federal or foreign government approval to conduct the activity you propose? Please be aware that there may be other requirements necessary to conduct this activity such as an import permit, collection permit, permission to work on Federal lands, Federal bird banding permit, Corps of Engineers permits, Environmental Protection Agency NPDES permits, State, county or local permits, etc.

□ Yes. Provide a copy of the approval(s). List the State, Federal or foreign countries involved and type of document required. Include a copy of these documents with the application.

□ I have applied. List the State, Federal or foreign countries involved and type of documents required. Provide the reasons why the permits have not been issued. _____

□ Not required. The proposed activity is not regulated.

Application Processing Fees
The application processing fee for a new Recovery or Interstate Commerce permit, or to renew/re-issue an existing valid permit, is $100. If permit amendment is required at a time other than renewal/re-issuance, the processing fee is $50.

Check the appropriate box below and enclose check or money order payable to the *U.S. Fish and Wildlife Service* in the amount of

□ $100 for a **new** permit

OR

□ $100 to **renew/re-issue** my existing valid permit (with only *minor changes* such as updating my name and address) using my current application package on file.

OR

□ $50 to make a **substantive amendment** (with *major changes*) to my existing valid permit [50 CFR 13.11(d)(2)].

If the information in your current application package on file has changed in a manner that triggers a major amendment or a change not otherwise specified in the permit, then you must apply for an amendment to your valid permit. For example, such major changes may include changes in study plan, location, activity, amount or type of take, or species to be covered by the permit. Please contact the Regional Endangered Species Program located within the U.S. Fish and Wildlife Service Region of your proposed activity for technical assistance. Their contact information can be found on the U.S. Fish & Wildlife Service's Endangered Species web page at http://www.fws.gov/endangered/permits/permitscontacts.html

Please check the **type of amendment** you are requesting --

□ add species (specify) _____

□ add a geographic area □ change in personnel

□ other (specify) _____

Department of the Interior
U.S. Fish and Wildlife Service

Federal Fish and Wildlife Permit Application Form

Expires 08/31/2012
OMB No. 1018-0136

Return to: Migratory Bird Permit Office *Click here for addresses.*
U.S. Fish and Wildlife Service

Type of Activity:
Eagle Nest Take

Complete section A or B, and sections C and D of this application. See attached Permit Application Instructions.

A.	**Complete if applying as an individual**		
1.a. Last name:	1.b. First name:	1.c. Middle name or initial:	1.d. Suffix
1.e Doing business as (dba):	2.a. Mailing Address (line 1):	2.b. Mailing Address (line 2):	
2.c. Mailing Address (line 3):	3.a. City:	3.b County:	3.c Province: / 3.d. State:
3.e. Zip code/postal code :	3.b. Country:	4. Date of birth (mm/dd/yyyy):	5. Social Security No:
6. Occupation:	7. List of any business, agency, organizational, or institutional affiliation associated with the wildlife or plants to be covered by this permit:		
8. Home telephone number:	9. Work telephone number:	10. Fax number:	11. E-mail address:

B.	**Complete if applying as a business, corporation, public agency or institution**		
1.a. Name of business, agency, or institution:	1.b. Doing business as (dba):	2. Tax identification no.:	
3.a. Mailing address (line 1):	3.b. Mailing address (line 2):	3.c. Mailing address (line 3):	
4.a. City:	4.b. County	4.c. State: / 4.d. Zip code:	
5.a. Principal officer - Last name:	5.b. First name:	5.c. Middle name or initial	5.d. Suffix
5.e. Principal officer title:	6. Describe the type of business, agency, or institution and provide state of incorporation:		
7. Home telephone number:	8. Work telephone number:	9. Fax number:	10. E-mail address:

C **All applicants complete**

1. Do you currently have or have you had any federal fish and wildlife permits? (For simplification, all licenses, permits, registrations, and certificates will be referred to as a permit.)
   Yes ☐ If yes, list the number(s) of the most current permit you have held: No ☐

2. Application fee: Enclose a check or money order payable to the U.S. Fish and Wildlife Service in the amount of $500.00 (standard) or $1,000 (programmatic) if you are applying for a new permit and $150.00 (standard) or $500 (programmatic) if you are requesting a substantive amendment of your existing valid permit. Federal, tribal, state, and local government agencies, and individuals and institutions acting on behalf of such agencies, are exempt from the application processing fee upon submission of a letter (on agency letterhead) certifying that the applicant is acting on behalf of the government agency (50 CFR 13.11(d)).

3. **Certification:** I hereby certify that I have read and am familiar with the regulations contained in Title 50, Part 13, of the Code of Federal Regulations and the other applicable parts in subchapter B of Chapter I of Title 50. I certify that the information submitted in this application for a permit is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

_____ _____
Signature (in blue ink) of applicant/person responsible for permit. (No Photocopies or stamped signatures) Date of signature (mm/dd/yyyy)

Please continue to Section D on next page

D. EAGLE NEST TAKE (Eagle Act, 50 CFR 22.27)

An eagle nest take permit authorizes the removal of bald eagle or golden nests for human safety, the safety of eagles, or the public's welfare. Permits may be issued to individuals, agencies, businesses, and other organizations. Please read "What You Should Know About An Eagle Nest Take Permit" and the pertinent regulations at 50 CFR 22.27 before you sign and submit your application.

Provide the following information on a separate sheet of paper. Please be as specific as possible in your responses to the questions. Please do not send pages that are over 8.5"X11", videotapes, or DVDs. Except for immediate safety emergencies, we strongly recommend that you submit your application at least 60 days prior to the date that you need your permit, as required by 50 CFR 13.11(c).

1. A description of the situation that necessitates removal of the eagle nest(s), including:

   (A) 1.The number of nests proposed to be taken;

   2. Whether the nest(s) is a bald eagle or golden eagle nest; and

   3. Whether the nest(s) is active or inactive. (An active nest may only be taken to alleviate an immediate safety emergency.)

   (B) Is the nest take necessary to alleviate safety concerns? ☐ Yes ☐ No

   1. If Yes, describe the safety emergency and why removal of the nest is necessary to alleviate it.

   2. If No, Provide the following:

      a. An explanation for why removal of the nest is necessary to protect the public's welfare. ("Necessary to protect the public's welfare" is defined in the implementing regulations at 50 CFR 22.26(a) as "needed in order to maintain society's well-being in matters of health, safety and order.")

      b. A calculation of the bald eagle or golden eagle area nesting population, including an appropriately scaled map or plat showing the location of each eagle nest used to calculate the area nesting population unless the Service has sufficient data to independently calculate the area nesting population.

      c. A description of the avoidance, minimization, and mitigation measures you will undertake to reduce take and offset the detrimental impact of the permitted activity.

   (C) A description of the property, including maps and digital photographs that show the location of the nest in relation to buildings, infrastructure, and human activities;

   (D) The location of the property, including latitude and longitude;

   (E) The length of time for which the permit is requested, including beginning and ending dates; and

   (F) A statement indicating the intended disposition of the nest, and if active, the nestlings or eggs.

2. You must retain records relating to the activities conducted under your permit for at least 5 years from the date of expiration of the permit. Please provide the address where these records will be kept.

3. Have you obtained all required state, federal or tribal government approval(s) to conduct the activity you propose?
   Yes ☐ If yes, provide a copy of the approval(s). Have applied ☐ Not required ☐

CHAPTER 33
WYOMING GAME AND FISH DEPARTMENT
APPLICATION FOR SCIENTIFIC/EDUCATIONAL PERMIT

Last Year's Permit No. (if applicable): _____

Name of Institution or Entity: _____

Address: _____

Street or P.O. Box City State Zip

Name of person responsible for activities conducted and submitting annual report:

_____

Name Title/Position Address City State Zip

List names of individuals to be listed on permit (attach additional page if necessary):

Name	Title or Position with Institution/Entity

Please complete the following information. Attach additional pages if necessary. Project proposals should also be submitted where applicable. A Chapter 10 application must also be submitted for possession of live wildlife.

Common Name			
Scientific Name			
Number of each species to be collected or possessed			
G&F Region where collections will occur (see map on back)			
Location and method of collection			
Purpose			
Expected benefits to science, research education or Department wildlife management goals			

Pursuant to Game and Fish Commission Regulation, Chapter 33, Section 4(f), a written annual report must be submitted to the Cheyenne office of the Wyoming Game and Fish Department no later than December 31 of the year of issuance of the permit. The application for a permit must be received by the Wyoming Game and Fish Department **at least ten (10) working days prior to** the issuance of the permit in order to allow time for the Department to review and provide consideration to the application. Failure to comply with any part of the permit/regulation may result in immediate revocation of said permit and refusal to issue any future permits. Copies of any required federal permits for the take or possession of wildlife, if applicable, shall accompany the permit application.

Dept Use Only:
Approved ____ Disapproved ____
Initials: _____
Date: _____

Please submit this application to:

Wyoming Game and Fish Department
Permitting Officer
5400 Bishop Blvd.
Cheyenne, WY 82006
(307)777-4579

Montana Fish, Wildlife & Parks
TERRESTRIAL SCIENTIFIC COLLECTOR'S PERMIT
WILDLIFE BUREAU
APPLICATION

Handwritten Applications may take longer to process if they cannot be adequately scanned into the system. **Incomplete Applications will be returned to the applicant.**

Date: _____

Name/Primary Project Contact: _____

Affiliation/ Organization: _____

Address: _____

City: _____

State: _____

Zip: _____

Phone Number: _____

Email Address: _____

Section 1.

What activities is this application requesting authorization for?

- ☐ Scientific Collecting
- ☐ Bird Banding
- ☐ Educational Display
- ☐ Rehabilitation
- ☐ Relocation
- ☐ Salvage

Section 2.

IACUC Number: _____ IACUC Expiration Date: _____

IACUC Institution: _____

If you have applied for, but not yet received IACUC approval, indicate here the date of application and the institution reviewing the application. An incomplete application may delay issuance of this permit.

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(1/97)

FEDERAL FISH AND WILDLIFE PERMIT

U.S. Fish and Wildlife Service
Migratory Bird Permit Office
P.O. Box 25486, DFC (60154)
Denver, Colorado 80225-0486
(303) 236-8171

1. PERMITTEE

POWDER RIVER ENERGY CORP
ATTN: TRACY JONES
PO BOX 930
221 MAIN STREET
SUNDANCE, WY 82729
U.S.A.

2. AUTHORITY-STATUTES
16 USC 703-712

REGULATIONS *(Attached)*
50 CFR Part 13
50 CFR 21.27

3. NUMBER
MB070181-1 AMENDMENT

4. RENEWABLE
☒ YES
☐ NO

5. MAY COPY
☒ YES
☐ NO

6. EFFECTIVE
08/27/2008

7. EXPIRES
03/31/2009

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
MICHAEL E. EASLEY
CHIEF EXECUTIVE OFFICER

9. TYPE OF PERMIT
SPECIAL PURPOSE SALVAGE

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

CAMPBELL, CROOK, WESTON, JOHNSON AND SHERIDAN COUNTIES, WYOMING and BIG HORN COUNTY, MONTANA

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

The following subpermittees are authorized: Tracy Jones* and any other persons under the direct control of, under, contract to, or employed by the permittee only to the extent necessary in accomplishing the purpose authorized below. Submit a list of subpermittees with annual report.

D. You are authorized to salvage migratory birds (except species listed as threatened or endangered under the Endangered Species Act found in 50 CFR 17) found dead that you had no part in the killing or death thereof. Any dead bald eagles or golden eagles salvaged must be reported within 48 hours to the National Eagle Repository at (303) 287-2110 and to the issuing migratory bird permit office at (303) 236-8171. The Repository will provide directions for shipment of these specimens.

For a list of threatened and endangered species in your state, visit the U.S. Fish and Wildlife Service's Threatened and Endangered Species System (TESS) at: www.fws.gov/endangered <http://www.fws.gov/endangered>.

E. You are authorized to salvage abandoned (unoccupied) migratory bird nests and nonviable eggs after the nesting season, except for nests and eggs of bald eagles or golden eagles and threatened or endangered species.

F. All salvaged migratory bird specimens must be deposited at the direction of U.S. Fish and Wildlife Service, Law Enforcement, Casper, Wyoming.

G. You may not salvage and must immediately report to U.S. Fish and Wildlife Service Law Enforcement any migratory birds that appear to have been poisoned, shot, or otherwise injured as the result of criminal activity.

H. You and any subpermittees must comply with the attached Standard Conditions for Special Purpose Salvage Permits. (PERMIT INVALID WITHOUT ATTACHED CONDITIONS)

I. Permit amended to change Item #1 and Item #11C as identified by asterisk.

For suspected illegal activity, immediately contact USFWS Law Enforcement at: (307) 261-6365

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

ANNUALLY BY JANUARY 31 FOR THE PRECEDING CALENDAR YEAR.

ISSUED BY	TITLE	DATE
[signature]	CHIEF, MBPO, REGION 6	08/27/2008

Standard Conditions
Special Purpose - Salvage Permits
50 CFR 21.27

All of the provisions and conditions of the governing regulations at 50 CFR part 13 and 50 CFR 21.27 are conditions of your permit. The standard conditions below are additional provisions and conditions of your permit. Failure to comply with the conditions of your permit could be cause for suspension of the permit. If you have any questions regarding these conditions, refer to the regulations or, if necessary, contact your migratory bird permit issuing office. For copies of the regulations and forms, or to obtain contact information for your issuing office, visit: www.fws.gov/permits/mbpermits/birdbasics.html.

1. This permit does not authorize personal use of any migratory bird(s) salvaged under the authority of this permit.

2. You must tag each migratory bird specimen you salvage. Each tag must include the following information:
   (a) date and location where the specimen was salvaged;
   (b) name of the person who salvaged the specimen; and
   (c) permit number under which the specimen was salvaged.

3. All migratory birds salvaged under this permit must be deposited with the repository designated on the face of this permit within six (6) months of acquisition and/or by December 31 of that calendar year.

4. Salvaged migratory birds, including parts, nests, and nonviable eggs unsuitable for donation must be completely destroyed by burial or incineration.

5. If you encounter a migratory bird with a Federal band issued by the U.S. Geological Survey Bird Banding Laboratory, Laurel, MD, report the band number to 1-800-327-BAND or www.reportband.gov.

6. This permit does not authorize salvage of specimens on Federal lands without additional prior written authorization from the applicable Federal agency.

7. This permit does not authorize salvage of specimens on State lands or other public or private property without prior written permission or permits from the landowner or custodian.

8. Subpermittees must be at least 18 years of age. As the permittee, you are legally responsible for ensuring that your subpermittees are adequately trained and adhere to the terms of your permit. You are responsible for maintaining current records of who you have designated as a subpermittee, including copies of letters you have provided.

9. You and any subpermittees must carry a legible copy of this permit and display it upon request when exercising its authority. Subpermittees must also carry your written subpermittee designation letter.

10. You must maintain records as required by 50 CFR 13.46 and 50 CFR 21.27. All records relating to the permitted activities must be kept at the location indicated in writing by you to the migratory bird permit issuing office.

11. Acceptance of this permit authorizes the U.S. Fish and Wildlife Service to inspect any wildlife held, and to audit or copy any permits, books, or records required to be kept by the permit and governing regulations.

12. You may not conduct the activities authorized by this permit if doing so would violate the laws of the applicable State, county, municipal or tribal government or any other applicable law.

WYOMING GAME AND FISH DEPARTMENT

Chapter 33 Permit

For Scientific Research, Educational/Display, or Special Purposes

ID: 340 Tracy Jones
PO Box 930
Sundance, WY 82729-0930

COMPANY: Powder River Energy Corp.

ISSUED: 1/28/2010

Others Authorized by This Permit:

Others under the direction of Tracy Jones

SPECIES	NUMBER	REGION	EXPIRES
Raptors		Casper/Sheridan	12/31/2010

PURPOSE: To salvage and transport dead raptors found near power lines maintained by Powder River Energy Corporation. Collections shall be turned over to Wyoming Game and Fish Department or U.S. Fish and Wildlife Service personnel. Permittee shall also be authorized to move nesting platforms to more suitable locations when necessary. An annual report summarizing permit activities must be submitted to the Permitting Officer in Casper no later than January 31, 2011.

Unless otherwise indicated above, this permit does not include those species of wildlife defined as protected by W.S. 23-1-101 or those species of wildlife listed as threatened or endangered by federal regulation.

Permittee(s) must carry a copy of this permit when conducting the above-mentioned activities and agree to the inspection of all collections, gear and materials by any authorized enforcement personnel of the Wyoming Game and Fish Department or US Fish and Wildlife Service.

The permittee will furnish a written report to the Wyoming Game and Fish Department of activities and collections made under this permit (refer to Chapter 33 regulation, section 5(g)). In those cases where more than one name occurs on the permit, the first name listed is responsible for submitting the report.

Scott Talbott
Assistant Chief, Wildlife Division

APPENDIX G
USFWS NEST DESTRUCTION POLICY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, Washington, D C 20240

MBPM-2
Date: APR 15, 2003

MIGRATORY BIRD PERMIT MEMORANDUM

SUBJECT: Nest Destruction

PURPOSE: The purpose of the memorandum is to clarify the application of the Migratory Bird Treaty Act (MBTA) to migratory bird nest destruction, and to provide guidance for advising the public regarding this issue.

POLICY: The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. To minimize MBTA violations, Service employees should make every effort to inform the public of how to minimize the risk of taking migratory bird species whose nesting behaviors make it difficult to determine occupancy status or continuing nest dependency.

The MBTA specifically protects migratory bird nests from ***possession, sale, purchase, barter, transport, import,*** and ***export,*** and ***take.*** The other prohibitions of the MBTA – ***capture, pursue, hunt,*** and ***kill*** – are inapplicable to nests. The regulatory definition of ***take,*** as defined by 50 CFR 10.12, ***means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue hunt, shoot, wound, kill, trap, capture, or collect.*** Only ***collect*** applies to nests.

While it is illegal to collect, possess, and by any means transfer possession of any migratory bird nest, the MBTA does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. The MBTA does not authorize the Service to issue permits in situations in which the prohibitions of the Act do not apply, such as the destruction of unoccupied nests. (Some unoccupied nests are legally protected by statutes other than the MBTA, including nests of threatened and endangered migratory bird species and bald and golden eagles, within certain parameters.)

However, the public should be made aware that, while destruction of a nest by itself is not prohibited under the MBTA, nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA.

Due to the biological and behavioral characteristics of some migratory bird species, destruction of their nests entails an elevated degree of risk of violating the MBTA. For example, colonial nesting birds are highly vulnerable to disturbance; the destruction of unoccupied nests during or near the nesting season could result in a significant level of take. Another example involves

ground nesting species such as burrowing owls and bank swallows, which nest in cavities in the ground, making it difficult to detect whether or not their nests are occupied by eggs or nestlings or are otherwise still essential to the survival of the juvenile birds. The Service should make every effort to raise public awareness regarding the possible presence of birds and the risk of violating the MBTA, the Endangered Species Act (ESA), and the Bald and Golden Eagle Protection Act (BGEPA), and should inform the public of factors that will help minimize the likelihood that take would occur should nests be destroyed (i.e., when active nesting season normally occurs).

The Service should also take care to discern that persons who request MBTA permits for nest destruction are not targeting nests of endangered or threatened species or bald or golden eagles, so that the public can be made aware of the prohibitions of the ESA and the BGEPA against nest destruction.

In situations where it is necessary (i.e., for public safety) to remove (destroy) a nest that is occupied by eggs or nestlings or is otherwise still essential to the survival of a juvenile bird, and a permit is available pursuant to 50 CFR parts 13 and 21, the Service may issue a permit to take individual birds.

Steve Williams

Director

APPENDIX H
BIRD/NEST REPORT FORMS
Bird Incident/Mitigation, Nest, and Salvage Report Forms

POWDER RIVER ENERGY CORPORATION					**BIRD INCIDENT / MITIGATION REPORT FORM**
Date discovered (mm/dd/yyyy):					**Discovered by:**
Where found	T	R	Sec	¼	Meter #
Location #:		**Lat/Long (GPS) if available:**			
How found:	☐ Trouble Call ☐ Customer	☐ Line Patrol ☐ Consultant	☐ Meter Reading ☐ Federal or State	☐ Landowner ☐ Other	
Species:	☐ Golden Eagle ☐ Owl	☐ Bald Eagle ☐ Vulture	☐ Hawk ☐ Other		
Condition of bird:	☐ Alive	☐ Dead			
Cause of death or injury:	☐ Electrical contact	☐ Collision	☐ Unknown	☐ Other	
If "Other," explain:					
If electrical contact, did this event cause an outage?	☐ Yes	☐ No			
Visible signs of burns/trauma:	☐ Yes	☐ No			
If yes, please describe in detail:					
If dead, what is the general condition of the carcass (select one)?: ☐ Good condition – recent death ☐ Fair condition ☐ Poor condition – old kill, bones and feathers					
Was eagle carcass salvaged?	☐ Yes	☐ No			
If yes, where is carcass stored?	☐ Gillette ☐ Sheridan	☐ Kaycee ☐ Sundance	☐ Newcastle ☐ Wright		
Is there a band on the bird?	☐ Yes	☐ No	**If yes, band number:**		
Leave band on salvageable bird; send in band with this form if the carcass is decomposed or an old kill (bones and feathers).					
Pole Framing Information					
Primary voltage:	☐ 7.2/12.47	☐ 14.4/24.9	☐ Other		
Structure framing:		**Pole brand date:**			
Other items on pole (check all that apply): ☐ Cutout ☐ Arrester ☐ Transformer ☐ Regulator ☐ Recloser ☐ Capacitor ☐ Switch ☐ Riser ☐ CT/PT ☐ Pole Top Ground					

MITIGATION SECTION

Date given to area operations supervisor for retrofit (corrective measures): _____

Note corrective measures to be taken: check all measures and quantities that apply.
*If measures already exist, enter **E** for existing in the last column "Types/Manufacturers":*

Device	Quantity	Avian Protection	Types / Manufacturers
Arresters		☐ Covers ☐ Perch Discouragers	
Cutouts		☐ Covers ☐ Perch Discouragers	
Transformers		☐ Covers	
Potheads		☐ Covers ☐ Perch Discouragers	
		☐ Covers ☐ Perch Discouragers	
		☐ Covers ☐ Perch Discouragers	
Items		**Avian Protection**	**Types / Manufacturers**
☐ Inadequate Phase Separation		☐ Reframed to 60 Inches ☐ Perch Discouragers ☐ Conductor Cover	
☐ Primary Jumpers		☐ Insulation ☐ Perch Discouragers	
☐ Stinger Wires		☐ Insulation	
☐ Grounded Brackets		☐	
☐ Pole Ground Wire		☐ Removed/Gapped Ground	
☐ Other		☐	
☐ Other		☐	

Retrofit of Structure Completed by:_____ Date:_____

The information from this form is kept in a permanent file and logged on a summary report and mapped. Deliver this form to the Avian Protection Plan Coordinator's Office:

APP Coordinator, 221 Main Street, Sundance, WY 82729
Main: 307-283-4950
Toll Free: 800-442-3630 ext 4950
Email: raptors@precorp.coop
Fax: 307-283-3536

POWDER RIVER ENERGY CORPORATION				NEST REPORT FORM	
Date discovered (mm/dd/yyyy):				**Discovered by:**	
Where found	T	R	Sec	¼	Meter #
Location #:			**Lat/Long (GPS) if available:**		

Nest: ☐ Active* (Eggs, Young, or Sitting Adult) ☐ Unknown* ☐ Inactive**

Species: ☐ Unknown Species ☐ Owl ☐ Crow / Magpie / Raven

☐ Songbird / Small Bird ☐ Hawk / Falcon / Osprey ☐ Eagle

An eagle, threatened/endangered species, or unknown nest should not be removed or disturbed regardless if it is active or inactive.

Are eggs or young birds apparent? ☐ Yes ☐ No

If yes, describe:

Condition of nest: ☐ Scant material (not usable) ☐ Dilapidated ☐ Good ☐ Unknown

Does nest pose threat to human health and safety? ☐ Imminent ☐ Short-term ☐ Long-term

Is nest removal necessary?* ☐ Yes ☐ No

Does pole require retrofitting to make it avian-friendly? ☐ Yes ☐ No

Date nest mitigation concluded:

*If active, or if unable to determine whether active, a nest cannot be moved without obtaining a permit and prior notification of the USFWS and state agency unless it is an extreme emergency threatening human health and safety. If an emergency removal is necessary, USFWS must be notified. Contact APP Coordinator's Office for assistance.

**With the exception of an Eagle or Threatened/Endangered species nest, inactive nests may be removed for destruction. Contact APP Coordinator's Office for assistance.

The information from this form is kept in a permanent file and logged on a summary report and mapped. Deliver this form to the Avian Protection Plan Coordinator's Office:

APP Coordinator, 221 Main Street, Sundance, WY 82729
Main: 307-283-4950
Toll Free: 800-442-3630 ext 4950
E-mail: raptors@precorp.coop
Fax: 307-283-3536

Raptor Salvage Report Form

Operating under:
Federal Fish & Wildlife (USF&WS) Permit # MB070181-1
WGFD Chapter 33 Permit # 340
Montana FWP Certificate # 537

1. Date of Salvage: _____

2. Was this raptor found because of (circle)? **Outage** **Report** **Line Patrol**

3. Type of Raptor (circle): **GOLDEN EAGLE** **BALD EAGLE** **HAWK** **OWL**

4. Assign unique county/date ID to the carcass bag: ___ - ___ - ___ - ___ (Optional)
   Example: 17-01-17-08 found in Campbell County on Jan. 17, 2008
   County ID | Month (mm) | Day (dd) | Year (yy)

5. Salvage Location: T _____ R _____ S _____ 1/4 _____ Meter Loc. _____
   Example: T 49 R 64 S 18 NWNW Ex. 002

   GPS Coordinates: Lat: _____ Long: _____ Meter # _____
   Ex: 44.56785 Ex: 106.54989 Ex: E5454

6. If the bird was not found on a service bank, what was the structure? (circle one)
   Tangent | Lightening Arrestor | Cap /Reg Bank | Other | Takeoff
   If other, please explain/identify: _____

7. Was this a banded or tagged bird? **YES / NO** If yes, TAG # _____

8. Digital Photo Taken? **YES / NO** If yes, file name: _____

9. This bird was taken to the: **WRIGHT** **SHERIDAN** **GILLETTE** **SUNDANCE** freezer location.

Illustration:

Comments/Theory: _____

_____

This specimen was processed by: _____ Date: _____

APPENDIX I
GUIDE TO AVIAN DISEASES

NEW MEXICO AVIAN PROTECTION WORKING GROUP *"Working Cooperatively to Resolve Avian Issues"*

NMAP

www.nmavianprotection.org

Lineman's Guide to Avian Diseases

Table of Contents:

Photo Courtesy of Xcel Energy

As linemen, you may occasionally encounter birds (alive and dead), and may have to handle bird nests during the course of your work. Lately, the media has been full of stories of avian diseases, and their impact on humans. This guide has been put together to inform you of the current state of affairs of those diseases in New Mexico, and the proper procedures to protect yourselves.

Avian Flu – Overview

Although Avian Influenza (flu) viruses are relatively common in wild birds, most do not cause obvious symptoms. These viruses are primarily spread through saliva and feces. Most do not infect humans; however in 1997, a particular strain (called H5N1) was found that could spread directly from birds to humans. This is highly contagious and is deadly to poultry. Despite the ability to infect humans, only about 200 cases of H5N1 in humans have been reported worldwide. However, nearly half of those cases have been fatal. No human or avian cases of H5N1 have been reported in the U.S. at the time of writing.

"Will H5N1 come to the USA?"

There are reports of infected migratory birds in Asia; therefore, there is potential for the virus to be carried to North America. However, there is currently little evidence that migratory birds play a major role in the dispersal of H5N1.

"Will we know if it does arrive?"

Although there is currently little evidence that migrants disperse Avian Flu, this remains the most likely natural route. The virus could be transmitted via birds that come into contact with each other in the arctic, and then disperse south to Asia and North America. The accidental or intentional import of infected birds is a far more likely route to the U.S. Currently, there is a ban on the import of all birds and bird products from H5N1-infected countries. Additionally, the inter-agency National Influenza Pandemic Preparedness Task Force, organized by the U.S. Secretary of Health and Human Services, is monitoring migratory birds for Avian Flu, especially in areas where those birds interact with others from countries where H5N1 is already present.

A Lineman's Guide to Avian Diseases – Page 2

Common Avian Flu Misconceptions

"There is an Avian Flu pandemic right now" – **False**. The current form of H5N1 is not efficient at passing from birds to humans. Therefore, although H5N1 is highly contagious and dangerous to birds, and can be transmitted to humans, the passage is difficult. Because the virus does not appear to spread easily to humans, it cannot spread rapidly among humans, as would be necessary for a pandemic to occur.

"Avian Flu is present in the U.S." – **Partially True**. There are types of Avian Flu present in the U.S. but the H5N1 form has not been detected in either birds or humans.

"All types of Avian Flu are dangerous" – **False**. Very few forms of Avian Flu are dangerous to birds, and even less are dangerous to humans. The majority do not cause visible symptoms in birds and are not transmissible to humans.

"Any bird I come in contact with is likely to have Avian Flu" – **False**. The majority of outbreaks have been in domestic poultry farms. Although wild birds are known to be able to carry Avian Flu, they are less likely to be infected than poultry. In addition, birds in the U.S. do not have H5N1.

"There is no cause for concern about Avian Flu" – **False**. There is some cause for concern, and it is better to be prepared than to be caught unaware. Although H5N1 does not currently transmit easily between birds and humans, nor from human to human, viruses can mutate over time and it is possible that one or both of those factors could change. In the event that the virus changes in a way that increases transmission, H5N1 could spread quickly and become a pandemic.

Avian Flu Links

Center for Disease Control - www.cdc.gov/flu/avian/index.htm
National Wildlife Health Center - www.nwhc.usgs.gov/disease_information/avian_influenza/index.jsp
NWHC Safety Guidelines for Handling Wild Birds www.nwhc.usgs.gov/publications/wildlife_health_bulletins/WHB_05_03.jsp
OSHA - www.osha.gov/dts/shib/shib121304.pdf
World Health Organization - www.who.int/csr/disease/avian_influenza/en/
Federal Government - www.pandemicflu.gov
US Dept of Interior - www.doi.gov/issues/avianflu.html
US Dept of Homeland Security - www.whitehouse.gov/homeland/nspi.pdf
US Dept of Agriculture - www.usda.gov/birdflu

Photo Courtesy of US FWS

A Lineman's Guide to Avian Diseases – Page 3

West Nile Virus (WNV) Overview

WNV has been in the U.S. since 1999 and in New Mexico since 2002. Since then, there have been approximately 330 laboratory-confirmed human cases, and 4 deaths in New Mexico. It is safe to assume that WNV is present in some local birds; however, very few mosquitoes carry the virus. WNV is transmitted when a mosquito that has bitten an infected bird also bites a human. The majority of human cases occur in immune-compromised individuals and the elderly. Occasionally healthy adults will contract WNV.

Mosquito (*Culex tarsalis*) photo courtesy of the CDC

Frequently Asked Questions

"Can I get WNV from human contact, or by contact with dead birds?"

No. WNV is transmitted by mosquito bite. However, it is always a good idea to wear gloves when handling sick or dead animals.

"Do all mosquitoes carry WNV?"

No. Most mosquitoes do not carry WNV. In fact some species of mosquito can't transmit the virus even if they are carriers. Even if you are in a location where you are frequently bitten by mosquitoes, you are still unlikely to become infected with WNV.

"Do all birds carry WNV?"

No. Similarly to mosquitoes, most birds do not carry WNV. Some carriers never exhibit symptoms, others cannot pass it on. WNV only stays active in most birds systems for 3-7 days, making it very difficult to pass on to a mosquito.

"What are the symptoms?"

The majority of people infected with WNV exhibit no symptoms, and never realize they were infected. About 1/5th of those infected will have mild flu-like symptoms (fever, fatigue, headache, etc.). About 1 in 150 people infected progress to West Nile encephalitis which is much more serious. Its symptoms can include: high fever, disorientation, tremors, convulsions, paralysis, coma or even death. Symptoms of WNV usually last for only a few days, although severe symptoms may last for weeks. Some neurological effects may be permanent.

Links

New Mexico Health Department - http://www.health.state.nm.us/wnv.html
Centers for Disease Control - http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
US Geological Survey - http://westnilemaps.usgs.gov/

A Lineman's Guide to Avian Diseases – Page 4

Avian Ectoparasites

"What is an ectoparasite?"

Ectoparasites are parasites that live on the outside of animals, as opposed to endoparasites which live inside animals. Examples include: fleas, ticks, mites, flies, lice etc.

"Where would I encounter them?"

Many ectoparasites live on the bodies of animals and birds, however some also live in the nest material and only feed when the host (the animal or bird) is around. Therefore, if you are handling a bird or nest material, you may be exposed to any number of parasites. Many of these will abandon a dead host, but dead birds may also be infested with flies or ants, eating or laying eggs in the body.

"Are they dangerous?"

The vast majority of avian ectoparasites are host-specific, meaning that they will only live on one particular species or group of birds. Some will travel from bird to bird, but almost none are likely to bother humans, other than the "Ick" factor! Some spiders, which may also inhabit nests, can give a nasty bite, as can ants which may be defending a food supply (e.g. a dead bird).

Bird handling

Although the H5N1 form of Avian Flu has not yet arrived in North America, it is a good idea to take precautions when handling dead or injured birds. **PNM currently recommends that a dust mask and gloves be worn when handling birds. Additionally, some form of eye protection, as well as a long sleeved shirt and pants to reduce skin exposure are all good ideas.**

Viruses are transmitted primarily though oral secretions and feces, so avoid contact with either. If this is not possible, avoid touching your eyes, ears, nose, and mouth after handling any bird or nest, and wash hands thoroughly with antibacterial soap as soon as possible.

Local Contact Numbers

Hawks Aloft Inc. – 505-828-9455
US FWS – 505-248-6911
NM Public Health – 505-827-2613
USDA Wildlife Services – 1-866-487-3297
NM Game & Fish – 505-222-4700

Sponsored in 2006 by:

Hawks Aloft, Inc.
Conservation, Avian Research & Education

U.S. Fish & Wildlife Service

PNM® *A personal commitment to New Mexico*

APPENDIX J
CONSTRUCTION STANDARDS

Construction Standards

PRECorp maintains a comprehensive list of current construction standards on its website at www.precorp.coop/FileStruct.cfm. Standards are regularly reviewed and updated. A notation of “R” on the standards indicates those that are raptor safe. A notation of “RG” (raptor guard) on the standards indicates those where sage-grouse depredation measures are added.

APPENDIX K
TRAINING SYLLABUS AND *RAPTORS AT RISK* DVD

AVIAN ELECTROCUTION SYLLABUS

1. **Opening and Introduction**
   - ❖ Purpose
   - ❖ Scope

2. **Protected Bird Species**
   - ❖ Background
   - ❖ Primary Federal Laws Protecting Birds - MBTA, ESA, BGEPA
   - ❖ Examples of protected and excluded species

3. **The State of the Art in Raptor Protection: A Historical Perspective**
   - ❖ Video: Raptors at Risk

4. **Regulations and Enforcement**
   - ❖ Federal Requirements
   - ❖ State Requirements
   - ❖ Required Permits
   - ❖ Reporting Requirements

5. **Retrofitting and Construction Standards**
   - ❖ Mitigating Products – What's Available?
   - ❖ Collision Problems and Solutions
   - ❖ Raptors and Nesting Problems

6. **Raptors and Other Birds**
   - ❖ Overview of common species
   - ❖ Perching, roosting, and nesting behavior

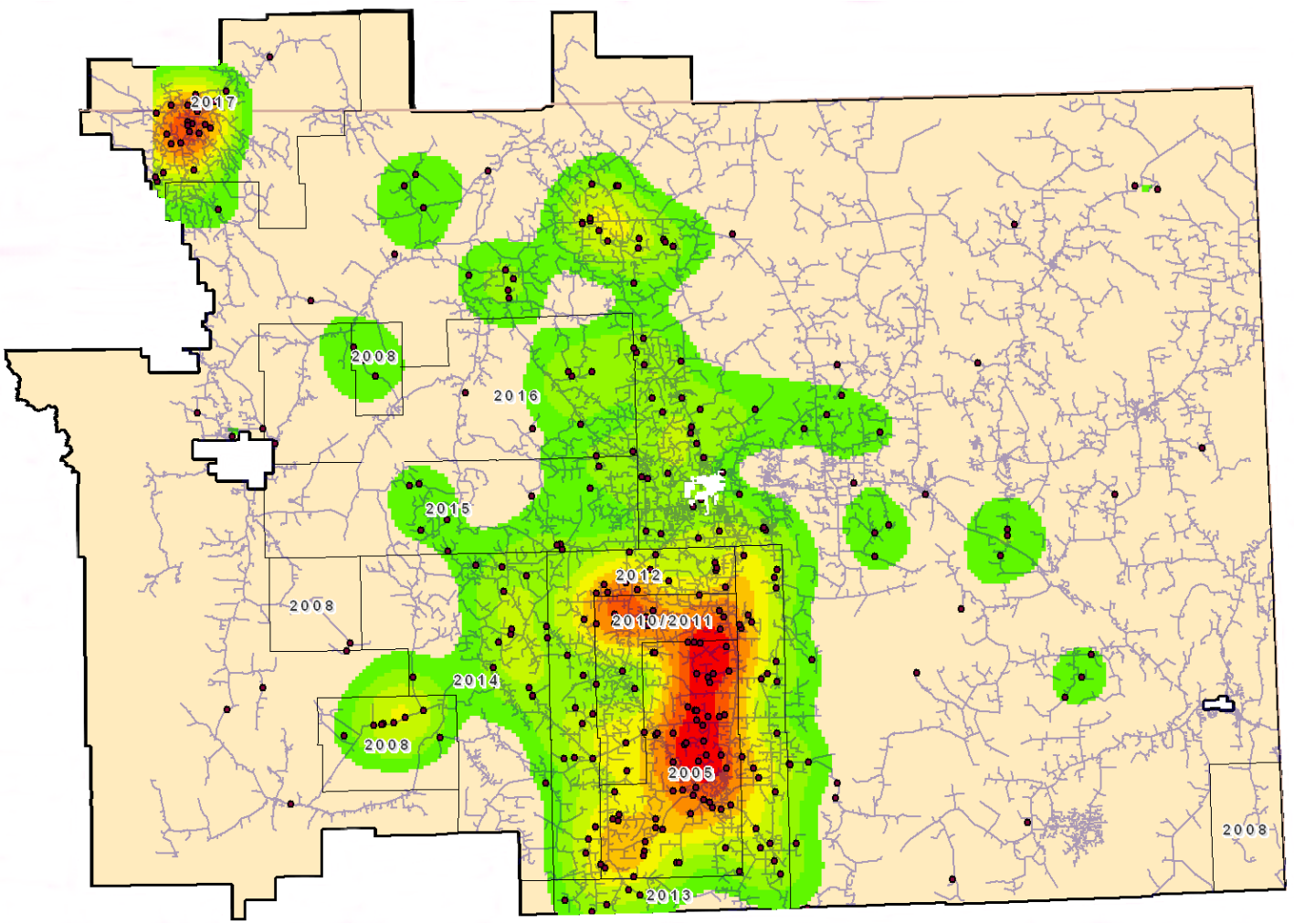
7. **APLIC Guidelines**
   - ❖ Suggested Practices 2006

8. **Reporting Forms/Data Collection/Handling**
   - ❖ Nest Procedures
   - ❖ Dead or Injured Bird Procedures
   - ❖ Bird/Nest Report Form
   - ❖ Monitoring
   - ❖ Importance of keeping records

9. **Questions and Open Discussion**

APPENDIX L
MORTALITY AND RETROFITTING MAPS

PRECorp Service Territory Density of Mortalities and Retrofitting Phases



Density: raptor mortality/sq. mile, red=high, yellow=medium, green=low
Year geographic area scheduled to be retrofitted

PRECorp Service Territory
Retrofitting: Phases 1-9, 2005-2017