CLEAN LINE ENERGY PARTNERS

# AVIAN PROGRAM



NOVEMBER 2014

CLEAN LINE
ENERGY PARTNERS

## *Version History*

| Date | Description |
|---|---|
| November 2014 | Initial Release |
| | |
| | |
| | |

*Note: This document will be modified and updated as new information is gathered in an effort to advance progress toward lowering avian risk through implementation of adaptive management. New versions will be dated and a description of changes will be provided.*

# TABLE OF CONTENTS

# POLICY STATEMENT

It is the policy of Clean Line Energy Partners LLC (Clean Line) and its affiliate companies that transmission systems will be planned, designed, constructed, operated, and maintained in an environmentally responsible manner. The goal of this Avian Program is to advance progress toward electric transmission systems safer for all avian species.

This Avian Program establishes a framework for reducing risks to birds and their habitats. To fulfill our commitment to this goal, Clean Line will carry out the following:

- Ensure our actions are in accordance with applicable Federal and state laws, regulations, and permits.
- Develop and implement Avian Protection Plans for each transmission system to realize the goals of this Program.
- Adhere to the principles of avian protection during the planning, design, construction, operation, and maintenance of our transmission line systems.
- Incorporate avian protection measures to avoid or minimize impacts to avian species.
- Monitor bird mortality and injuries to better understand impacts to avian species and implement appropriate adaptive management actions to avoid and minimize bird mortality or injuries.
- Provide information, training, and resources to improve staff knowledge and awareness of the principles of avian protection to ensure successful implementation company-wide.
- Participate with public and private organizations to advance the knowledge of avian interactions with transmission systems.
- Integrate a commitment to adaptive management by applying monitoring and research results, new technology, and state-of-the-art avoidance and minimization practices pertaining to avian species and impacts from transmission systems.

# 1.0 INTRODUCTION

Unintended avian mortality from interactions with the anthropogenic environment is a well-documented global phenomenon. Primary causes of mortality include collisions with building windows, moving vehicles, and communications towers. The North American Bird Conservation Initiative and the U. S. Fish and Wildlife Service (USFWS) also report that a significant amount of avian mortality is caused by cats, oil spills, and pesticide use (NABCI 2014; USFWS 2002)[1]. Overhead electrical facilities also contribute to avian mortality. Inherent to the operation of any transmission system is the potential for bird collision with overhead wires and electrocution from contact with energized components. A recent peer-reviewed study estimates avian mortality from direct interaction with transmission lines in the United States may range from 12 million to 64 million birds per year (Loss, et al. 2014). While unintended avian mortality is generally a consequence of the built environment, responsible development of infrastructure has proven to reduce risk of avian mortality.

This Avian Program describes Clean Line's corporate commitment to implement current industry suggested practices and recommended guidelines to reduce avian risk and create transmission systems safer for avian species. This Avian Program is based on the Avian Protection Plan Guidelines, a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the USFWS (APLIC and USFWS 2005). As set forth in the Policy Statement, Clean Line will ensure each of its transmission systems is planned, designed, developed, constructed, operated, and maintained in accordance with the principles of avian protection outlined in the Avian Protection Plan Guidelines. Implementation of Clean Line's Policy Statement ensures that the highest standards of professionalism are met.

## 1.1 APPROACH

Clean Line's approach to avian protection is based on an established corporate culture that acknowledges the importance of the natural environment and strives to minimize potential impacts to sensitive resources, including avian species. Recognizing that above-ground electrical infrastructure can result in hazards to avian species, Clean Line firmly believes that avian protection standards and methods should be applied throughout the life of its transmission line systems, beginning in development and continuing through operation. Applying avoidance, minimization, and mitigation measures at each step along the way contributes to Clean Line's overall commitment to reduce the risk of avian mortality at its facilities.

There is no one-size-fits-all strategy for avian protection. Clean Line's approach establishes this Avian Program to outline the general issues associated with avian species and power line interactions. This Program establishes an overall policy and approach to guide the development and implementation of avian protection measures for each transmission line system. Each system will have its own Avian Protection Plan.

*1 A recent review of annual avian mortality estimates in the U.S. revealed 2.4 billion birds are killed by cats, 599 million in window collisions, 200 million in automobile collisions, and 6.6 million in communication towers collisions (NABCI 2014). The USFWS estimates mortality resulting from pesticide use could be as high as 72 million birds annually. Additionally, up to 2 million birds are killed in oil and wastewater pits, and hundreds of thousands are killed in oil spills each year (USFWS 2002).*

## 1.2 SCOPE OF AVIAN PROGRAM

The scope of this Program includes the following:

- Provides a framework for implementing recommended guidelines and suggested practices;
- Encourages a corporate culture of avian awareness that cultivates environmental stewardship and underscores the importance of avian protection for transmission system planners, designers, and engineers;
- Functions as a guidance document for the development of Avian Protection Plans; and
- Ensures that each transmission system's Avian Protection Plan is in compliance with applicable laws, regulations and permits.

### *Mechanisms for Implementation*

The implementation of this Program will support Clean Line's fundamental commitment to reducing the risk of potential bird mortality or injury associated with its electric transmission lines and related facilities. This Program is a "living document" that articulates Clean Line Energy's ongoing commitment to develop and implement a strategy that reduces the risk of avian mortality. Applying adaptive management principles, this document and proposed approach to avian protection may be modified and updated based upon new scientific information, dynamic environmental conditions, system modifications or additions, and as progress is made toward lowering avian risk through implementation of Avian Protection Plans. New versions of this Program will be dated and a description of updates will be provided.

## 1.3 GOALS OF AVIAN PROTECTION PLANS

Clean Line's Avian Protection Plans will consider specific habitat types, species, system components, potential risks, and avoidance, minimization, and mitigation measures to address each system. The goals of each Avian Protection Plan will be the following:

- Identify potential risks to avian species and important issues associated with transmission line and avian interactions;
- Follow suggested practices and recommended guidelines to reduce avian risk;
- Ensure transmission line design incorporates raptor-safe suggested practices;
- Adopt the founding principles of avian protection as published by APLIC and USFWS (2005);
- Reduce the potential for electrocution and collision impacts to avian species by implementing specific mortality reduction actions;
- Avoid reliability and service disruptions by reducing the potential occurrence of outages and repairs due to avian interactions;
- Establish a reporting system to document incidents of avian mortality and their causes, and to identify facilities in need of modifications that would minimize risk of future avian mortality;

- Identify site-specific avian protection measures appropriate for each transmission system's unique species, habitats, or other environmental factors; and
- Conduct training on avian and transmission line interactions to promote awareness of avian risk and reinforce the principles and policies established in this Program.

### *Mechanisms for Implementation*

To meet the stated objectives of this Program, each Avian Protection Plan will apply the following four mechanisms:

- **Preventative** – The preventative approach addresses the potential for incidents by assessing risk associated with transmission line systems in high avian use areas and selecting the appropriate state-of-the-art, avian-safe design and construction standards. Based on proximity to important bird use areas, habitats, and relevant historical information, environmental staff will assist in transmission system design to preferentially select alternative routes and influence structure siting and associated electrical equipment construction to minimize potential for avian interactions.
- **Proactive** – The proactive approach guides how resources are dedicated to improve employees' knowledge and awareness of avian interactions with electric transmission infrastructure through training and educational opportunities. Partnering with organizations that conduct research on effects of avian and electric equipment interactions is also an important aspect of a proactive approach. This mechanism also encourages evaluating electrocution and collision risks in high avian use areas and establishes protocols to identify structures or equipment that require modification to prevent or reduce avian mortality over time.
- **Reactive** – The reactive approach responds to actual or reported incidents, unsafe nest locations, or outages identified through investigations or observations. Actual observations are either avian incidents witnessed by Clean Line staff or avian incidents incidentally observed by staff or the public. This process includes procedures to investigate and report incidents, including reviewing design features that may have resulted in the event and implementing avian-safe design changes, if appropriate. This approach outlines a compliance strategy that ensures compliance with applicable laws, regulations, and permits, including reporting protocols to notify agencies of incidents in accordance with company policy, permit conditions, and/or regulatory requirements.
- **Collaborative** – The collaborative approach facilitates cooperative responses and remedial actions with the appropriate regulatory agencies to reported mortality events or avian-caused incidents. This mechanism also establishes regular reviews of Avian Protection Plans to evaluate risk assessment efficacy and modify existing protocols as appropriate.

## 1.4 LIMITATIONS

This Avian Program serves as a strategic guidance document that identifies and incorporates the founding principles of avian protection to minimize general avian impacts; it does not address site-, species-, habitat-, or other environmental-specific issues or associated mitigation actions. Avian Protection Plans identify transmission system-specific issues and comprehensive actions. This Program is not meant to summarize legal requirements. Instead, this Program provides guidance for achieving and maintaining legal compliance, minimizing avian-related interruptions in service, and documenting efforts to reduce the risk of avian mortality over the life of Clean Line's transmission systems.

Clean Line sets the primary goal herein of advancing progress toward safer electric transmission systems, with the understanding that overhead transmission lines present an inherent risk to birds and no system can be fully avian safe. Through this policy of avian protection, Clean Line will provide reliable service to its customers, ensure regulatory compliance, reduce costs, and reduce risks to birds.

No program or plan by itself will completely protect avian species; however, the dedicated implementation, monitoring, and continuous improvement of this Program will advance Clean Line's corporate commitment toward an electric system safer for avian species.

# 2.0 REGULATORY FRAMEWORK

## 2.1 BACKGROUND

Anecdotal reports of avian mortality associated with overhead lines date to collisions with telegraph lines in the 1870s and discoveries of avian electrocutions in the 1920s.[2] The extent of the problem was recognized in the 1970s during a review of unusual incidences of avian mortality where researchers found that a significant number of eagles died from electrocutions along power lines in Utah.[3] As interest in avian interactions with overhead lines increased, more scientific studies confirmed impacts to avian species from both collisions and electrocutions by electric lines.[4,5] With an assortment of avian protection regulations already in place, the power industry began to take on the challenge of avian protection. A variety of species from different regions was found to be at risk of both electrocution and collision. However, because of their size and perching behavior, larger species such as raptors (e.g. eagles, hawks, owls) have received much of the attention paid to avian electrocution and collision. All migratory birds, however, are afforded legal protection under the Migratory Bird Treaty Act.

Since the 1970s, studying causes of avian injury and mortality associated with power lines and the minimization of these risks has been the focus of many organizations and agencies' guidelines. For example, the APLIC was formed in the late 1980s to address this issue. Its work in avian protection is presented in the documents Reducing Avian Collisions with Power Lines: the State of the Art in 2012 (APLIC 2012) and Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (APLIC 2006). Previous landmark documents included the APLIC/EEI Mitigating Bird Collisions with Power Lines: The State of the Art in 1994 and the APLIC/USFWS Avian Protection Plan Guidelines, published in 2005.

## 2.2 EXISTING LAWS AND POLICIES

The primary Federal laws protecting avian species in the United States are: the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), and the Endangered Species Act (ESA). Many states also afford legal or regulatory protection for state-listed birds. The following laws and policies are directly applicable to the issues of avian mortality from electrocution or collision and nest management on utility poles and structures.

### 2.2.1 Migratory Bird Treaty Act

Most migratory bird species (except for introduced species such as pigeon, starling, monk parakeet, and house sparrow) are afforded protection under the Migratory Bird Treaty Act of 1918 (MBTA) [16 U.S. Code 703-712; 50 CFR 10]. The MBTA, administered by the USFWS, offers protection to over 1,000 species of migratory birds, including waterfowl, shorebirds, seabirds, wading birds, non-migratory upland game birds, raptors and passerines (including crows and ravens).

---

**2** *Prior to electric infrastructure, Coues reported 100 avian carcasses below a 3-mile section of telegraph line in 1876.*

**3** *Murphy and Smith noted at least nine eagles were electrocuted over a two year period by a power line located in Tooele County, Utah and in a second situation at least 47 eagles were electrocuted by a segment of power line in Beaver County, Utah.*

**4** *In 1987, Faenes determined the avian mortality rate due to collisions to be 100 collisions per mile per year.*

**5** *Between 1986 and 1996, Harness and Wilson confirmed reports of 1,450 raptor electrocutions representing 16 species.*

### *Guidance Memo*

The USFWS, in a 2003 guidance memo, clarified the application of the MBTA protections to nest destruction. The MBTA does not prohibit or require permit for the destruction of inactive nests (no eggs or young) of most species, provided that no possession occurs. Active nests of all migratory birds are afforded protection.

In uncommon situations, the USFWS may issue a permit to remove an active nest in cases of imminent danger (safety or fire risk). These may be considered when human or worker safety is a primary concern. In these cases, the structure's owner would work with agencies or wildlife rehabilitators to save eggs and young if possible, including considering nest relocation. It should be noted that eagles' and threatened and endangered species' nests are also protected under BGEPA and ESA, respectively.

### 2.2.2 Executive Order 13186

Issued by President Clinton on January 10, 2001, Executive Order (EO) 13186 directs federal agencies that are "taking actions with a measurable negative effect on migratory bird populations' to develop and implement a Memorandum of Understanding (MOU) with the USFWS that promotes the conservation of migratory bird populations. Executive Order 13186 requires federal agencies to incorporate migratory bird conservation measures into their agency activities and decisions. Federal agencies are encouraged to incorporate avian-protective actions into their MOU, as practicable and appropriate. In particular, EO 13186 directs agencies to ensure that environmental analyses of federal actions required by the National Environmental Policy Act (NEPA) or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with an emphasis on species of concern.

### 2.2.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (BGEPA) [16 U.S. Code 1531-1544; 50 CFR 17] affords protection to bald and golden eagles, their nests, eggs, and young. To "take" or "disturb"[6] eagles is strictly prohibited under the Act; however, a 2009 amendment to the BGEPA regulations provides a permit for non-purposeful take, including take resulting in disturbance and limited take resulting in mortality that may occur as a result of otherwise lawful activities. A 1994 policy addresses the collection and distribution of feathers for Native American religious ceremonies. The bald eagle was removed from Endangered Species list in June 2007; however, it is still protected under BGEPA and MBTA. North American Bald Eagle Guidelines were published in conjunction with the bald eagle's delisting.

**6** *According to 50 CFR 22.26, "take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb." "Disturb" is defined as "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."*

### 2.2.4 Endangered Species Act

Comprehensive protection for species at risk of becoming extinct is found in the Endangered Species Act of 1973 (ESA) [16 U.S. Code 668a-668d; 50 CFR 22]. The ESA protects species determined to be threatened or endangered (listed species) and provides a means of protecting their habitats and ecosystems. Federal agencies are directed to utilize their authority to conserve listed species and make sure that actions do not jeopardize their continued existence. The U.S. Fish and Wildlife Service also gives special importance to candidate species that may become listed in the future.

Section 9 of the ESA prohibits "take," which is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "an act that actually kills or injures wildlife including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

The ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. For non-federalized projects, Section 10 allows for the issuance of a 10(a)(1)(b) permit to take covered species during otherwise lawful activities with approval of a habitat conservation plan. Projects with a federal nexus that may affect an endangered or threatened species must comply with Section 7(a)(2) of the ESA, which directs federal agencies to "ensure their actions and activities do not jeopardize the existence of any listed species or result in adverse modification of critical habitat. Under Section 7(a)(2), a formal biological opinion is issued after consultation on the effects on a threatened or endangered species resulting from a federal agency action or authorization. Upon issuance of the biological opinion, the USFWS may grant incidental take authorization for take of such covered species during otherwise lawful activities. In the absence of incidental take authorization under Sections 7 or 10, injury to, or fatality of, federally listed species from electrocution or collision could potentially result in an enforcement action under the ESA.

# 3.0 AVIAN BIOLOGY AND INTERACTION WITH ELECTRICAL INFRASTRUCTURE

This section describes the relationship between avian biology and factors that influence the risk of avian interaction with overhead power lines. An understanding of these factors is instrumental for planning, design, and setting priorities for potential future retrofits or mitigation. A number of biological and environmental factors present challenges that affect decision-making regarding avian protection measures.

## 3.1 ELECTROCUTION

Avian electrocutions occur due to a combination of biological, environmental, and electrical design factors. Biological and environmental factors are those that influence avian use, such as habitat, prey abundance and availability, species and behavior. Electrical design factors that contribute to avian electrocution are most often inadequate spacing between two points of contact that allow an electrical charge to short-circuit through a bird. Examples of points of contact include energized or grounded structures, conductors, hardware or equipment, such as bushings and transformers. Electrocutions can occur when the spacing between two conductors or between grounded hardware and an energized phase conductor is less than the head-to-foot or wrist-to-wrist distance of a given bird. The wrist-to-wrist distance only considers the fleshy parts of the wings, not the feathered wing tips because dry feathers act as insulation (APLIC 2006).

Larger birds of prey, such as eagles, are at higher risk of electrocution, as some electrical designs may not provide adequate spacing for them to land and perch on a utility structure. A raptor-safe structure provides proper clearance between energized and/or grounded parts. The standard for raptor protection, according to Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006, allows for 60 inches (150 cm) of horizontal separation between energized and/or grounded parts, and 48 inches (120 cm) of vertical spacing between energized and/or grounded parts. These separation standards accommodate for the wrist-to-wrist distance (31–42 in) and head-to-foot distance (18–26 in) of an adult golden eagle (APLIC 2006). The 48-inch vertical separation will also accommodate for the head-to-foot height of larger water birds, such as the great blue heron.

Although these raptor-safe pole design standards will greatly reduce the potential for electrocution, some risk still exists. Wet feathers and wet wood are conductive, and birds can be electrocuted on poles that would normally be considered raptor-safe (APLIC 2006). Adequate spacing between energized and/or grounded parts, in conjunction with insulator and phase conductor covers, may provide the greatest protection against avian electrocution in situations where birds may have wet feathers.

## 3.2 COLLISION

Risk of collision is highest during conditions when flying birds are unable to detect power lines or structures. Factors that influence collision risk fall into three categories: avian, environmental, and power line configuration (APLIC 2006).

A bird's size, flight behavior, age and flocking behavior may contribute to its collision risk. Larger, heavy-bodied birds with short wing spans are typically not agile flyers and, along with birds that fly in large flocks or at night, may collide more frequently with power lines or structures. Raptors are typically agile flyers that can easily avoid obstacles; however, when exhibiting certain behaviors, such as hunting or territorial activities, raptors may be distracted and therefore at a higher risk of collision. These species group-related scenarios can affect a bird's ability to quickly negotiate obstacles, such as power lines and structures (APLIC 2006). Recent studies have also shown that certain species may exhibit blind spots that lie in the direction of travel under certain conditions (Martin and Shaw 2010).

Environmental factors that influence the risk of collision include reduced visibility due to inclement weather or time of day, or vegetation that may obscure the line or structure. Surrounding land use practices may also attract birds to an area with power lines, therefore increasing the probability of collision mortality (APLIC 2006). Low visibility conditions, such as fog, may also lead to an increased risk of collision.

Utility structures with small conductors, which are less visible to flying birds, also increase the risk of collision mortality. Collisions are more likely to occur with the less-visible overhead static wire or shield wire, both of which have small diameters compared to conductor bundles (APLIC 2006).

## 3.3 NESTING

Utility structures, including ancillary electric infrastructure like substations and transformers, may provide nesting opportunities for many bird species, especially in areas where other nesting habitat is limited. For example, certain species of raptors are known to use lattice transmission structures for nesting sites. Nests that pose the greatest risk to birds are those that are built in proximity to energized conductors and hardware. Generally, nests built on transmission structures—if constructed at a sufficient distance away from energized conductors and hardware—pose little risk to the nesting birds or to the functionality of the line. However, while a nest that is not in close proximity to energized parts may not be a risk in and of itself, it will draw its occupants to the area more frequently, thus potentially increasing the risk of electrocution or collision (APLIC 2006). Nests are occasionally constructed in areas that may pose risk to the birds or interfere with access or maintenance of the structure. In these cases, further action such as relocation of the nest may be considered after agency consultation.

## 3.4 BIOLOGICAL AND ENVIRONMENTAL FACTORS INFLUENCING RISK

### 3.4.1 Size

Birds with large wingspans, or very tall birds, are at greatest risk of electrocution mortality. These birds have a greater probability of making two contacts when they approach to perch on a power pole, or stretch their wings when perched. Tall birds, such as great blue herons, can simultaneously contact different conductors on poles with vertical construction. The 60-inch (150 cm) standard of separation between energized or grounded parts is intended to allow sufficient clearance for an eagle's wrist-to-wrist span, while the vertical separation of 48 inches (120 cm) allows for clearance of a large wading bird's head-to-foot distance. These separation standards will also afford protection to smaller species (APLIC 2006). Larger, heavy-bodied birds with high wing loading are typically not agile flyers and, along with birds that fly in large flocks or at night, are at greater risk of colliding with power lines or structures than smaller, more agile birds.

### 3.4.2 Age

The age of a bird can influence its risk of electrocution or collision. Research on golden eagles suggests that young birds are more susceptible to electrocution than adults (APLIC 2006). Young birds are less experienced at landing on, taking off from, and hunting from perches. They are less adept at maneuvering, which potentially increases the risk of collision, and often land with much wing flapping, increasing the risk of electrocution. Young birds may also hunt from poles more than adults, as they have more success hunting from a stationary perch. This increased use of poles increases their risk of electrocution (APLIC 2006).

### 3.4.3 Behavior

Certain behaviors such as nesting, courtship and territorial behavior can make birds more susceptible to electrocution and collision. For example, during courtship and territorial displays, raptors often lock talons, which essentially doubles their size, allowing them to bridge the gap between energized parts. Birds that nest on poles may have an increased chance of electrocution while carrying prey items or nesting material to the nest; anything that dangles from a raptor's talons can bridge the gap between energized parts (APLIC 2006).

### 3.4.4 Seasonal Patterns

Depending on the species, bird electrocutions may occur more frequently in certain seasons. Electrocution data on golden eagles suggests that most mortality occurs during the winter, when birds occur in larger concentrations in open areas that often have existing power lines. Seasonal weather patterns, such as fog, storm events, and low cloud ceilings, may reduce visibility and contribute to bird collisions with power lines, structures, or other electrical equipment like substations. Some species may experience greater electrocution or collision rates due to behavior changes during specific seasons, such as during the breeding season when species may be exhibiting certain display or nesting behaviors that reduce their ability to avoid collision threats; or during the migration season, when nocturnal migration activity is increased (APLIC 2006).

### 3.4.5 Weather and Wet Feathers

Weather may factor into a bird's increased chance of electrocution. Rain and snow can increase feather conductivity. Dry feathers provide almost as much insulation as air, and can safely insulate a bird that would contact electrical current of up to 70,000 volts, whereas wet feathers conduct current more readily and become dangerous at conducting electricity at 5,000 volts (APLIC 2006).

# 4.0 PRINCIPLES OF AVIAN PROTECTION

This Program was developed based on recommendations from the APP Guidelines (APLIC and USFWS 2005) and the twelve principles of avian protection. These principles, outlined in the following subsections, provide a framework to systematically recognize, address, monitor and prevent avian electrocutions.

## 4.1 RISK ASSESSMENT

Risk assessment is a proactive process that addresses the potential for incidents by assessing mortality risk associated with new transmission line systems and selecting the appropriate construction and design standards best suited to eliminate or minimize these risks. Based on proximity to important bird use areas, habitats, and relevant historical information, environmental staff will assist in the design and planning of transmission systems to minimize avian risk. The risk assessment process in this Avian Program is currently limited to new system routes and reconstruction efforts along existing routes in the future. Avian Protection Plans (APPs) establish risk assessment protocols for operations and maintenance of each transmission line system. Risk assessment procedures help guide management efforts and focus risk reduction actions on areas with the highest potential avian risk.

### 4.1.1 Risk Assessment Process

The risk assessment process uses information on avian use areas, habitats, and avian movement corridors to establish geographic avian assessment zones. These assessment zones guide planners and designers when considering which mortality risk reduction measures might be appropriate for implementing in these areas. The boundaries of assessment zones are established using local, state, and federal resource agencies' data and suggestions, along with local expertise, and input from Clean Line environmental staff and supporting consultants. The zones will be applied in areas of new construction and for any future retrofits, maintenance, or reconstruction.

The assessment process involves three primary steps: 1) establish zones where significant avian use is known; 2) assess the potential for mortality based on habitats, species, behaviors, and bird use areas within each zone; and 3) apply appropriate risk reduction measures to new construction or future re-construction within these zones.

Clean Line's transmission systems are predominantly located in rural settings where natural landscapes more commonly occur. Natural land cover, such as wetlands, woodlands, riparian vegetation, open water habitats, farmlands, and other cover types provide a diversity of avifauna habitats, and therefore avian diversity and use may vary by geographic area. The risk assessment process guides the identification of specific risks associated with each habitat community, and allows planners to apply the most effective risk reduction measures in those target areas.

## 4.2 PLANNING AND SITING

Responsible planning and siting of new facilities is a proactive process demonstrated to reduce avian risk. Clean Line's planning activities consider the potential adverse effects to birds and important bird areas. Important bird areas may include, but are not limited to, known bird concentration areas, foraging areas, rookeries, important habitat, breeding and/or nesting areas, and flyways. Clean Line designs facilities to avoid adverse impacts to these areas to the maximum extent feasible. Where avoidance is not possible, minimization of impacts may include reducing the length of right-of-way or occurence of transmission system infrastructure in these areas. Once the affected areas are determined and a risk assessment is performed, risk reduction measures will be identified and reviewed for potential effectiveness and feasibility.

## 4.3 AVIAN-SAFE CONSTRUCTION DESIGN STANDARDS

Avian safety is considered when installing new facilities, as well as the operation and maintenance of those facilities. Clean Line establishes configuration design standards for new construction (and system upgrades or rebuilds as warranted in the future) following guidelines set forth in Suggested Practices (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012) and as knowledge and awareness increase. Clean Line evaluates the unique conditions of each transmission system and may explore specific designs that meet or exceed established standards and still comply with National Electric Safety Code (NESC) requirements.

## 4.4 TRAINING

Training is an important aspect of successful Avian Protection Plans. Formal training helps provide a uniform application of avian-safe suggested practices and explanation of corporate policy to employees, contractors, and construction, operations, and maintenance personnel. During the development stage, planning personnel will be trained on the benefits of conserving avian species and on available best practices, appropriate siting, and risk reduction measures to reduce avian impacts. Operations and maintenance personnel will be trained on the reasons and need for, and methods by which employees report avian mortality and follow nest management protocols. This training will also include points of contact for disposal of carcasses, treatment for injured birds, and compliance with applicable regulations, including the consequences of noncompliance.

Members of the Clean Line team attend APLIC meetings or other relevant workshops on a regular basis. These meetings provide opportunities to discuss avian issues with other utilities, learn from the successes or failures of others, and brainstorm solutions to problems with colleagues. Clean Line will conduct annual trainings to update employees on the current status of federal regulations and new technologies to reduce avian risk.

## 4.5 PERMIT COMPLIANCE

Clean Line will be applying for and obtaining all necessary environmental permits, licenses, and approvals required under applicable federal and state laws. It is expected that certain agencies (for example, the U.S. Army Corps of Engineers) will consult with the USFWS and/or relevant state agencies during its evaluation of Clean Line's permit applications. Further, these agencies may require or recommend certain practices, risk reduction measures, or adaptive management actions to reduce avian risk during construction, operations, and maintenance of a transmission line system. Clean Line will work with federal and state permitting authorities as well as USFWS (and relevant stage agencies) to ensure appropriate protections for avian species are in place.

## 4.6 NEST MANAGEMENT

In each Avian Protection Plan, Clean Line will establish nest management protocols and other procedures necessary under federal or state permit conditions or regulatory requirements related to nest management. The individual APPs will include procedures for communicating discovery of nests, including internal reporting and external communication with state and federal agencies. Nest management protocols may vary for each system based on species (including protected species), nest activity or inactivity, time of year that the nest was discovered (e.g., during breeding season), locally available nesting alternatives, and the level of risk that a nest poses to system reliability or avian safety. Nest management protocols will comply with applicable state and federal laws regarding nest management, nest removal, and protected species. Nest management protocols will also be incorporated into training materials for construction, operations, and maintenance personnel.

## 4.7 AVIAN ENHANCEMENT OPTIONS

As the Avian Program is updated over time and as Avian Protection Plans are developed and implemented for each system, Clean Line will identify appropriate habitat improvement opportunities to incorporate into each Avian Protection Plan. Clean Line is committed to the protection of natural resources and taking actions that benefit local and regional bird populations. Clean Line will seek to form partnerships with non-governmental organizations, local agencies, and state and federal resource agencies to explore and participate in activities that enhance and restore habitat. Potential options could include:

- Planting trees or vegetation for suitable habitat,
- Installation of artificial nesting platforms, or
- Restoration of riparian and wetland vegetation and habitats.

Substations, switchyards, and outdoor equipment at converter stations will be monitored for signs of avian interactions, such as flashover, streamers, and other indicators. Areas will be kept neat and clear of vegetation that may create attractants or prey habitat. Specific protocols and potential avoidance and minimization actions for these types of avian interactions at substations and related outdoor equipment will be detailed in Avian Protection Plans for each transmission system.

## 4.8 RISK AVOIDANCE AND MINIMIZATION MEASURES

Clean Line will use the risk assessment methods described earlier to inform avoidance and minimization measures in the Avian Protection Plan for each transmission line system. Clean Line will use the risk assessment methods and electrical design information to assess avian injury/mortality risk and identify precipitating causes when they occur. Each APP will also establish a protocol for tracking avoidance and minimization actions and monitoring the efficacy of such actions over time. To achieve reductions in avian injury or mortality risks on each transmission line system, Clean Line will utilize a multi-faceted strategy that incorporates preventative, reactive, protective and collaborative measures, as described earlier in this document. Risk reduction will also be a critical component of quality control and adaptive management of each system and protective actions implemented over time.

## 4.9 PUBLIC AWARENESS

This Avian Program serves as the formal policy designed to reduce the risk of avian mortality or injury and informs each transmission system's Avian Protection Plans. Any public awareness campaign would describe the planning and design efforts taken to reduce avian risk, in addition to ways that Clean Line utilizes avian-safe principles to operate and maintain its facilities. Ongoing publicization of this Avian Program and the Avian Protection Plans can describe tenets of the Program and effectiveness of the Plans, including any habitat enhancement activities or successes related to reducing avian risk on Clean Line's transmission systems.

## 4.10 QUALITY CONTROL PROGRAM

Clean Line will institute a quality control program to ensure effectiveness of this Avian Program and processes described herein. Additionally, quality control will help Clean Line determine how individual Avian Protection Plans are adhering to the policies established in this Program and, consequently, how the Program is updated to reflect lessons learned during implementation of the individual Avian Protection Plans over time. The quality control program will include the following elements:

- Designating responsibility for oversight and implementation of the quality control program to senior staff in Clean Line's Technical Services – Environmental group.
- Environmental staff will annually review the reporting system and associated mortality reduction actions to ensure that processes are adhered to, systems are up-to-date, information is recorded accurately, and mortality reduction actions are properly implemented. The staff will report the results of the review and recommend remedial actions.
- Clean Line will coordinate with respective wildlife agencies periodically to review the program and its effectiveness.

## 4.11 KEY RESOURCES

Clean Line will coordinate with key resources to develop and implement each Avian Protection Plan. Clean Line will consult other organizations and individuals as needed for expertise in local and regional bird populations, bird behavior, habitat enhancement concepts and design, and avian protection devices. These key resources may include:

- Federal agencies
- State agencies
- Local agencies
- Avian Power Line Interaction Committee
- Non-governmental organizations
- Local consultants
- Universities
- Restoration consultants and service providers
- Bird and nest removal specialists
- Bird protection device manufacturers and engineers
- Wildlife rehabilitation centers

## 4.12 AVIAN INCIDENT REPORTING SYSTEM

Clean Line will develop a reporting system to ensure incidents of avian interaction at its facilities are investigated and appropriately documented. The goal of the avian incident reporting system is to provide a standard data collection methodology so that avian incidents can be assessed and the necessary steps can be taken. This system may consist of several key components, such as detection, investigation, documentation, monitoring, and reporting. The reporting system will be designed and implemented in a way that seeks to achieve constant improvement of avian risk reduction over time by collecting avian incident data from Clean Line's transmission systems.

# 5.0 REFERENCES

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. 78 pp.

Avian Power Line Interaction Committee (APLIC). 1996. Suggested practices for raptor protection on power lines: The state of the art in 1996. Edison Electric Institute, APLIC, and the Raptor Research Foundation, Washington, D.C. 125 pp.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: The state of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission, Washington, D.C., and Sacramento, CA.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The state of the art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (USFWS). 2005. Avian Protection Plan (APP) Guidelines. Washington, D.C. 88 pp.

Coues, E. 1876. The destruction of birds by telegraph wire. Am. Nat. 10: 734-736.

Faenes, C. A. 1987. Bird behavior and mortality in relation to power lines in prairie habitats. U.S. Fish and Wildlife Service. Serv. Gen. Tech. Rep. 7. 24 pp.

Harness, R. E. and K. R. Wilson. 2001. Electric-utility structures associated with raptor electrocutions in rural areas. Wildlife Society Bulletin 29(2): 612-623.

Lammers, Wendy and Michael W. Collopy. 2007. Effectiveness of Avian Predator Perch Deterrents on Electric Transmission Lines. Journal of Wildlife Management 71(8).

Loss, Scott R., Tom Will, and Peter P. Marra. 2014. Refining Estimates of Bird Collision and Electrocution Mortality at Power Lines in the United States. PLoS ONE 9(7): e101565. doi:10.1371/journal.pone.0101565.

Martin, G.R. and J.M. Shaw. 2010. Bird collisions with power lines: Failing to see the way ahead? Biological Conservation. 143: 2695-2702.

North American Bird Conservation Initiative, U. S. Committee. 2014. State of the Birds 2014 Report. U.S. Department of Interior, Washington, D.C. 16 pages.

Smith, D. G. and J. R. Murphy. 1972. Unusual causes of raptor mortality. Raptor Research 6(2): 4-5, 1972.

United States Fish and Wildlife Service. 2002. Migratory Bird Mortality. (http://www.fws.gov/birds/mortality-fact-sheet.pdf)

CLEAN LINE
ENERGY PARTNERS

1001 McKinney, Suite 700
Houston, TX 77002
TEL 832.319.6310
FAX 832.319.6311

WWW.CLEANLINEENERGY.COM

# CLEAN ENERGY. DELIVERED.