Avian Protection Plan

It shall be a firm policy that all District personnel observe and comply with all applicable Federal laws regarding avian protection. Concepts outlined in this Avian Protection Plan (APP) are to be incorporated into District operations.

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General Manager

Dated: April 1, 2005
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Introduction

SCOPE

An Avian Protection Plan is a utility specific program designed to protect and conserve migratory birds by reducing the risks that result from avian contact with utility facilities. Chelan County PUD (District) should implement an Avian Protection Plan (APP) to:

- Improve electrical reliability to customer-owners
- Reduce avian mortality

This guideline introduces information in general terms for protecting birds from electrocution and collisions resulting from contact with overhead power lines.

BACKGROUND

Electrocution is a particular threat to birds with large wingspans, such as eagles, hawks and owls, all species protected under the Migratory Bird Treaty Act. Avian interactions with power lines also cause power outages, which represent added cost and inconvenience for customer-owners.

In 2003 the District implemented a program for tracking outages as part of the computerized maintenance management system called Maximo. Every power outage (>5 minutes) is assigned a Maximo number along with a failure code. Maximo provides a means of reporting:

- What type of outages are occurring in the system (equipment, tree, weather, animal, 3rd party, etc.)
- The date and location of the outage
- The expenses incurred to the District because of the outage
- The customer impact from the outages (reliability indices)

Running a query for bird related outages in 2003 and 2004 provided the following information shown in Table 1.

Table 1: Bird Related Outages in 2003 & 2004

<table>
<thead>
<tr>
<th>Year</th>
<th># of bird related outages</th>
<th>Customers Out</th>
<th>Customer Hours Out</th>
<th>Total Restoration Cost</th>
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<tr>
<td>2003</td>
<td>22</td>
<td>367</td>
<td>342</td>
<td>$4,287.00</td>
</tr>
<tr>
<td>2004</td>
<td>20</td>
<td>1,821</td>
<td>3,812</td>
<td>$25,625.00</td>
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RECOMMENDATION

The District will formally adopt this Avian Protection Plan (APP), and educate District staff on new policy, procedures, and standards, that come with the APP.

PRINCIPLES OF AN AVIAN PROTECTION PLAN

District Policy
A statement of District policy confirming the District’s commitment to work cooperatively towards the protection of migratory birds. This includes a commitment by the District 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 all necessary permits, monitor incidents of avian mortality, and make reasonable efforts to construct and alter infrastructure to reduce the incidence of avian mortality.

Training
All appropriate District personnel, including managers, supervisors, engineers, wildlife biologists, dispatchers, wiremen, and line personnel, should be properly trained in avian issues. This training should encompass the reasons, need, and method by which employees should report an avian mortality, follow nest management protocols, dispose of carcasses, and comply with applicable regulations, including the consequences of non-compliance.

Compliance
Identify the process under which the District obtains and complies with all necessary permits related to avian issues. Particular attention should be given to specific activities that require Special Purpose Permits including, but not limited to, direct or incidental take, nest relocation, temporary possession, depredation, salvage/disposal, and scientific collection.

Construction Design Standards
Avian contact with facilities should be considered in the design and installation of new facilities, as well as the operation and maintenance of existing facilities. For those reasons, inclusion of accepted construction standards for both new and retrofit techniques should also be included in an APP. These standards should be used in areas where new construction should be bird-friendly, as well as where existing infrastructure should be retrofitted to provide avian safety.

Nest Management
An APP may include procedures for nest management on utility structures. These procedures should be explained to District employees during training to ensure uniform treatment of avian nest issues among personnel.

Avian Reporting System
A Geographical Information System (GIS) and work management system like Maximo, can generate reports and maps, and pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring, as well as the extent of such mortalities. History of avian nest problems, problematic poles or line configurations, as well as actions taken, can also be tracked.
**Risk Assessment Methodology**
The District can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk. Therefore, as a general matter, an APP should include a method for evaluating the risks posed to migratory birds in a manner that identifies areas and issues of particular concern. A risk assessment study will often begin with an assessment of available data addressing areas of high avian use, avian mortality, nesting problems, established flyways, adjacent wetlands, prey populations, perch availability, evidence of perching on utility structures by large birds (streamers), effectiveness of existing procedures, remedial actions and other factors that can increase avian contacts with District facilities.

**Mortality Reduction Measures**
After completing a risk assessment, the District can focus its efforts to areas of concern, ensure that the activities taken by the utility are not out of proportion to the risks encountered by migratory birds, and then determine which aspect of the APP need to be implemented in certain areas. An APP could implement this approach by developing a risk reduction plan, utilizing risk assessment results to direct where system monitoring should occur, where retrofit efforts should be focused, and where new construction warrants special attention to raptor and other bird issues. If the District finds that implementation of such avian protection measures is appropriate, it also may choose to develop a schedule for implementation.

**Avian Enhancement Options**
In addition to taking steps to reduce mortality risk to avian species, an APP also may include opportunities for the District to enhance avian populations or habitat, including developing nesting and perching platforms, managing habitats to benefit migratory birds, or working cooperatively with agencies or organizations in such efforts. Where feasible, such proactive development of new ideas and methods to protect migratory birds should be encouraged and explored.

**Quality Control**
An APP also may include a mechanism to review existing practices, ensuring quality control. For instance, the District may conduct an independent assessment of its avian reporting system to ensure its effectiveness, or invest in research on the effectiveness of different techniques and technologies used to prevent collisions, electrocutions and problem nests.

**Public Awareness**
An APP generally should include a method to educate the public about the company’s avian protection program, as well as its successes in avian protection.
Key Resources
An APP should identify key resources to address avian protection issues including District biologists, engineers, superintendents, and line personnel who have been trained on avian interaction problems. External organizations like the Avian Power Line Interaction Committee (APLIC) can also serve as a helpful resource by providing guidance, workshops, materials, and contacts. An understanding of raptor and other bird behavior can influence how and when avian protection should be utilized, and an APP that connects avian experts with utility decision-makers may reduce the risk of avian incidents and improve system reliability.

Figure 1: Raptors and other birds often use utility poles for perch sites

Figure 2: Some utility poles have adequate spacing between wires to protect most birds
FEDERAL BIRD PROTECTION LAWS

Most birds killed by contacting power lines are protected by the Migratory Bird Treaty Act. Golden and bald eagles killed by power line interactions are further protected under the Bald and Golden Eagle Protection Act and bald eagles are protected by the Endangered Species Act. The US Fish and Wildlife Service (USF&WS) enforces these federal laws. Violations of these laws, including the results of "accidents", can and have resulted in fines of $5,000-250,000 and 6-24 month prison sentences per violation.

There are only a few species of birds that are NOT protected by law: English sparrow, European starlings, and rock dove (common pigeon).

OUTAGE REDUCTION

Preventative actions the District takes to reduce the number of bird-caused power outages will directly address the District’s Critical Success Factor for Customer Service. Goals of Customer Service include the reduction of the frequency and duration of power outages.

ENVIRONMENTAL STEWARDSHIP

The District will provide an additional level of Environmental Stewardship, by having a USF&WS approved Avian Protection Plan for reducing bird-caused power outages thus reducing bird mortalities.

PUBLIC RELATIONS

Power outages are unpopular with customers, but they can be especially so if the public discovers that the outages are caused by birds dying on the wires. Recurring bird deaths from power lines can negatively impact the District's public relations.
**REDUCE RISKS**

Animal-caused power outages may result in fires that can destroy habitat and equipment. An Avian Protection Plan will reduce the risk of animal-caused outages (and potential associated fires) and demonstrate that the District is actively addressing this problem by implementing a plan.

**REDUCE DELIVERY COST**

Strategic planning to reduce bird-caused power outages by Chelan PUD will also reduce distribution retail delivery costs (an Operational Excellence Critical Success Factor). Costs associated with emergency work orders will be reduced with a reduction in animal caused power outages.

![Figure 6: Some poles have wires spaced close enough together to have the potential to electrocute birds](image)

![Figure 7: Eagles, hawks, owls, osprey, herons, ravens, and other large birds have a greater electrocution potential because of their large wingspan.](image)
Biology Perspective

RAPTOR PERCHING

Raptors are opportunistic and may use power poles for a number of purposes, such as nest sites, high points from which to defend territories, and perches from which to hunt. “Still hunting” from a perch is energy efficient for a bird, provided that good prey habitat is within view of the perch. Some structures are preferred by birds because they provide considerable elevation above the surrounding terrain, thereby offering a wide field of view. The tops of transformers provide feeding platforms after raptors have captured prey. Identification and modification of these “preferred” structures may greatly reduce or minimize the electrocution risk on an entire line. However, in areas where lines run through homogeneous terrain, there is no apparent advantage of some poles over others. Favored perches can be identified by examining crossarms and the ground beneath them for whitewash (feces accumulations), pellets, or prey remains. Since birds such as hawks and owls cannot digest the fur, feathers, and bones of their prey, they regurgitate these parts in the form of a “pellet” or “casting.” Remains of dead raptors may also identify power poles used by raptors for perching.

POWER LINE ELECTROCUTIONS

Birds are electrocuted by power lines because of two seemingly unrelated, yet interactive factors:

1. Environmental factors such as topography, vegetation, available prey and other, behavioral or biological factors influence birds to utilize power poles.

2. Inadequate clearance between energized components and grounded hardware, thereby providing two points of contact.

Electrocution can occur when a bird completes an electric circuit by simultaneously touching two energized parts or an energized part and a grounded part of the electrical equipment. Most electrocutions occur on distribution lines where the spacing between conductors may be small enough to be bridged by birds.

Avian-safe structures are those that provide adequate clearances to accommodate a large bird between energized and/or grounded parts. Consequently, 60 inches of horizontal separation, which can accommodate the wrist-to-wrist distance of an eagle (which is approximately 54 inches), is used as the standard for raptor protection. Likewise, vertical separation of at least 48 inches can accommodate the height of an eagle from its feet to the top of its head (which is approximately 36 inches. Because dry feathers act as insulation, contact must be made between fleshy parts, such as the wrists, feet, or other skin, for electrocution to occur under most circumstances. In spite of the best efforts to minimize avian electrocutions, some degree of mortality may occur due to influences such as weather that cannot be controlled.
COLLISIONS

Factors that influence collision risk can be divided into three categories: those related to avian species, those related to the environment, and those related to the configuration and location of lines. Species-related factors include habitat use, body size, flight behavior, age, sex, and flocking behavior. Heavy-bodied, less agile birds or birds within large flocks may lack the ability to quickly negotiate obstacles, making them more likely to collide with overhead lines. Likewise, inexperienced birds as well as those distracted by territorial, hunting, or courtship activities may collide with lines. Environmental factors influencing collision risk include the effects of weather and time of day on line visibility, surrounding land use practices that may attract birds, and human activities that may flush birds into lines. Line-related factors influencing collision risk include the configuration and location of the line and line placement with respect to other structures or topographic features. Collisions are more likely to occur with the overhead static wire, which may be less visible than the other wires due to its smaller diameter.
Non-Raptor Safe Designs

DISTRICT INFRASTRUCTURE

The District’s distribution infrastructure is made up of many different standards that have been adopted and built since the system first came into existence. Some of these standards would be identified as being non-raptor safe.

COMMON INDUSTRY FRAMING

The following industry standards have historically caused avian electrocution problems. These designs should be avoided in known raptor or other protected bird use areas and rural areas.

Figure 10: Common industry standards that are not “bird-friendly”
COMMON INDUSTRY EQUIPMENT

Poles with equipment such as transformers, reclosers, sectionalizers, and capacitor banks, are at higher risk for bird mortalities. The opportunity to perch in close proximity to energized parts is increased.

Figure 11: Transformer bank that is not “bird-friendly”
Raptor-Safe Designs and Modifications

CONDUCTOR SEPARATION

A vertical clearance of at least 48 inches between uninsulated conductors, ground wires and grounded hardware is considered sufficient to protect perching raptors. When 48 inches vertical clearance cannot be achieved, at least 60 inches of horizontal clearance must be established between conductors or between conductors and grounded parts.

MODIFICATION OF EXISTING STRUCTURES

Where adequate separation of conductors, or conductors and grounded parts, cannot be achieved, covering conductors may be the only solution short of reframing or replacing the structures. Insulator covers are similar to the temporary cover-ups used to protect crews working on energized lines. However, these products should not be used for human protection or considered as insulation.

Figure 12: Conductor separation illustration

MODIFICATION OF EXISTING STRUCTURES

Where adequate separation of conductors, or conductors and grounded parts, cannot be achieved, covering conductors may be the only solution short of reframing or replacing the structures. Insulator covers are similar to the temporary cover-ups used to protect crews working on energized lines. However, these products should not be used for human protection or considered as insulation.

Figure 13: On the left is a cutout cover. The middle picture shows a lineman installing a transformer bushing cover. On the far right are pin covers and cover extensions.
POLE MOUNTED BIRD PERCH & GUARD

If conductor separation cannot be achieved and covering or reframing is impractical, perch guards (triangles) with optional perches may be used for large perching bird protection. Since raptors will normally perch on the highest vantage point, the installation of perch guards between closely-spaced conductors and the placement of perches above existing arms and conductors may keep a bird from contacting energized parts or wires. Perches may not be effective when used without perch guards. Perches and guards, when properly installed, are not an absolute solution, but they do reduce the risk to the birds. Ideally, when a perch guard is installed, an alternative, safe perch site should be provided. The open part of the crossarm could serve as such a site.

Figure 14: Perch Guard
COLLISIONS

The proximity of a line to high bird-use areas, vegetation that may attract the birds and topographical features that affect local and migratory movements should be considered when determining the extent of necessary remedial action or when siting a new line. Avoiding construction of new lines in areas of high bird use may be the best way to prevent or minimize collision issues.

Marker balls, swinging markers, spiral vibration dampers, bird flight diverters, or other similar devices are commercially available products to increase the visibility of overhead wires to birds.

Figure 15: Flight Diverters installed on distribution line

Figure 16: Close-up of flight diverter

Figure 17: Aerial Marker ball installation performed by helicopter
NEST PROTECTION

In the absence of other suitable nest sites, raptors often use transmission structures and distribution poles for nesting. State and federal laws and regulations protect these nests from removal at certain times of the year without first obtaining authorization from state and federal wildlife agencies. It is unlawful to destroy nests when eggs or young birds are in them. While some nests are benign and need no management, others may need to be managed to reduce the risk of delivery failure and bird electrocution.

Figure 18: Bird nest located on top of transmission line

Figure 19: Bird nesting platform installed on top of distribution line

Figure 20: Bird nest on top of distribution line
District Responsibility Areas

DISTRIBUTION

Adopt Policy

Distribution will adopt the following policies:

- The installation of protective measures on existing lines where there is a high risk of avian mortalities or where avian mortalities have occurred in the past.
- Where feasible and appropriate, implement avian protection design standards on new lines and lines that are planned for re-building.

Process Work Flow

Upon initial discovery of a dead bird, the following process will be initiated.

Dead Bird (Raptor, Waterfowl, Crow, Robin) **Do not transport carcass**

- Eagle, Hawk, Owl, Osprey, or any Raptor
  - Leave on site (Do not bury)
  - Immediately Contact Superintendent or Duty Supervisor
  - Superintendent or Duty Supervisor to contact District Wildlife Biologist or Distribution Engineer ASAP

- Small Bird/Non-Raptor
  - Leave on site
  - Complete Outage Tracking Form
After the outage tracking report has been completed and submitted by line personnel the next process begins.

**Maintain Maximo/GIS Reporting System**

All charges for avian protection measures along with avian caused outages will be given a specific Maximo work order number. This will facilitate tracking:

- where mortalities occur
- status of corrective measures
- generating bird mortality reports
- documenting which structures have been made “avian friendly”

**Establish Budget**

Distribution will establish an annual budget for:

- taking remedial action on problem structures
- Avian Power Line Interaction Committee (APLIC) membership and annual dues
Warehouse Stock

Distribution will identify different line apparatus covers to stock in inventory and establish appropriate min/max levels to stock. Stocking certain materials gives the District the ability to perform a retro-fit in a short time.

CCPUD FISH AND WILDLIFE DEPARTMENT

Investigation

Raptor caused power outages will need to be investigated by a biologist that can identify the species of the raptor that caused the outage. This information must be reported to the US Fish and Wildlife Service, along with information regarding the outage conditions and corrections made to protect against future bird caused outages.

Identify High Risk Structures

The Fish and Wildlife Department will identify areas and specific structures that are at high risk for bird caused power outages and recommend prevention measures.

APLIC

The District should maintain a membership with the Avian Power Line Interaction Committee (APLIC). APLIC leads the electric utility industry in the protection of avian resources while enhancing reliable energy delivery. APLIC also provides a knowledge base for addressing animal caused power outages, and avian power line collision problems. They offer training courses on programs, laws, and liability. APLIC membership gives the District the ability to remain abreast of guidelines and modifications on design criteria for avian issues. The Fish and Wildlife Department will coordinate the membership and annual dues.

Training

Provide training for Distribution personnel on program, laws, liability, and identifying different avian species. Explain:

- Why District is adopting Avian Protection Plan
- The District, customer, and environmental benefits
- How information will be used
- Potential liabilities of continuing without an Avian Protection Plan
- Procedures for investigating, reporting, and any handling of birds associated with this plan
Reporting to USF&W

The Fish and Wildlife Department will coordinate the District’s APP with the USF&WS to ensure compliance with federal laws and applicable permits. Provide APP annual reports to USF&W.

The annual report will contain:

- List of avian mortalities (date, location, species)
- Summary of mitigation including costs incurred (labor, materials, management)
- Digital Photos if available