Avian Protection Plan

Sacramento Municipal Utility District

Hydro License Implementation • July 2015

Upper American River Project

FERC Project No. 2101

Powering forward. Together.

SMUD®

Contents

Figures, Photos, and Appendices

1.0 Background and Introduction

This Upper American River Project Avian Protection Plan (UARP APP) was prepared according to the terms and conditions found in the Order Issuing New License for SMUD's Upper American River Project (UARP) issued by the Federal Energy Regulatory Commission (FERC) (FERC 2014). This UARP APP has been written to comply with License Condition 38.6 of the USFS 4(e) conditions found in Appendix B of the FERC License for the UARP. The condition is included as Appendix C of this Plan.

1.1 Existing Avian Protection Plan

SMUD has prepared a robust APP for operations in its service territory in the Sacramento Valley where conditions warrant additional protection for raptors and other birds (Appendix B). Although the APP does not include the UARP Project area, this UARP APP is designed to tier off of SMUD's existing APP prepared for operations in SMUD's service territory. The Sacramento Valley is a major migration corridor and there are many species that migrate through or overwinter there. Some species will use transmission towers for nesting sites and many species will perch upon both distribution and transmission towers and lines, since they are often the only such locations available for perching or nesting.

The service territory APP includes standards for designing new facilities that mostly follow the Avian Power Line Interaction Committee (APLIC) documents: *Suggested Practices for Avian Protection On Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012). In addition, there are procedures for detecting, investigating and reporting avian fatalities. These elements will be incorporated into this UARP APP by reference.

1.2 Description of the UARP

The UARP lies within El Dorado and Sacramento counties, primarily within lands of the Eldorado National Forest (ENF). The UARP consists of three major storage reservoirs—Loon Lake, Union Valley and Ice House (with a combined capacity of 379,622 acre-feet), eight smaller regulating or diversion reservoirs, and eight powerhouses. Together, the existing developments can store up to 425,000 acre-feet (ac-ft) of water, generate an average of 1,730 gigawatt hours (GWh) of power annually. There are 11 transmission lines with a combined length of about 177.2 miles, about 28 miles of power tunnels/penstocks, and one, 1.9-miles long canal. The UARP began operations in 1961

and has a generating capacity of approximately 688 megawatts. The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, and hiking and bicycling trails at the reservoirs.

During the relicensing of the UARP, numerous technical studies were conducted to study the effect of project operations on a variety of natural resources. One such study and report was the Bird-powerline Associations Technical Report, prepared for SMUD by Devine, Tarbel and Associates (DTA 2004). This report and other information was reviewed by multiple agencies and used to craft License Condition 38.6. The report concluded that:

1. There is no known negative effect of UARP transmission and distribution system operations and maintenance activities on birds.

2. Major bird migration corridors/flight paths do not occur within the UARP area, nor are transmission lines located in an area that pose a collision threat to birds.

The majority of UARP transmission and distribution structures were determined to meet APLIC Suggested Practices for avoiding collisions and electrocutions. Two areas that did not meet APLIC standards for adequate spacing between ground-phase and phase-phase were the 1.2 mile-long Brush Creek Tap line and 11 “Type-H” 5-pole dead end structures within the 69kV Jones Fork Transmission Line. No electrocutions have been previously documented at these sites. Overhead ground wires exist throughout most of the higher elevation transmission lines and these wires have the potential to pose a collision threat because of their small diameter and resultant low visibility. No collisions have been observed or recorded and the lines are not located in migratory corridors, so chances of a collision are minimal.

The Bird-Powerline Associations Technical Report (DTA 2004), identifies the following problem designs based on the design and sighting standards developed by the Avian Power Line Interaction Committee (APLIC) for avoidance or minimization of bird electrocutions and collisions (APLIC 1996 and APLIC 1994):

1. Eleven type-H five-pole dead end structures used on the Jones Fork- Union Valley 69 kV line, with less than 36 inches of clearance between energized jumper wires and grounded cross-arms.

2. Exposed energized hardware and inadequate phase-to-phase and phase to-ground spacing along the 1.2-mile-long Brush Creek 12 kV tap line.

3. Overhead groundwires existing throughout most of the higher elevation segments of the transmission line from Loon Lake Powerhouse to just west of Camino Powerhouse, including the Jones Fork-Union Valley transmission line segment, and an isolated segment of approximately 3.0 miles near White Rock Powerhouse.

SMUD agreed to develop an Avian Protection Plan that addresses retrofitting transmission lines to meet the design and sighting standards established by APLIC for minimization of bird electrocutions and collisions. SMUD's plan and schedule is described in Section 2. Section 3 describes SMUD's approach to training, monitoring and reporting.

2.0 Sites Requiring Upgrades to APLIC Suggested Practices

The following three sites were identified as not meeting APLIC Suggested Practices:

1. Eleven type-H five-pole dead end structures used on the Jones Fork-Union Valley 69 kV line.

2. The 1.2-mile-long Brush Creek 12 kV tap line.

3. Overhead groundwires (approximately 30 miles) existing throughout most of the higher elevation segments of the transmission line from Loon Lake Powerhouse to just west of Camino Powerhouse, including the Jones Fork-Union Valley transmission line segment, and an isolated segment of approximately 3.0 miles near White Rock Powerhouse.

Figure 1 shows the locations of the facilities listed above. SMUD has been able to complete the first two of the three retrofits as of March 2015. In the fall of 2013 SMUD's Grid Assets department needed to perform some maintenance to the Jones Fork transmission line. Because of the license condition above, SMUD decided to make the retrofits to the eleven type-H, five-pole, dead end structures while this work was being undertaken. Crews installed the best available technology for 69kV applications. The product, which was custom made for SMUD by Power Line Sentry products, is an insulator cap and conductor cover designed to protect against brush contact outages. A brochure describing a similar product is included in Appendix A and photos 1 and 2 show the product applied to the Jones Fork line.

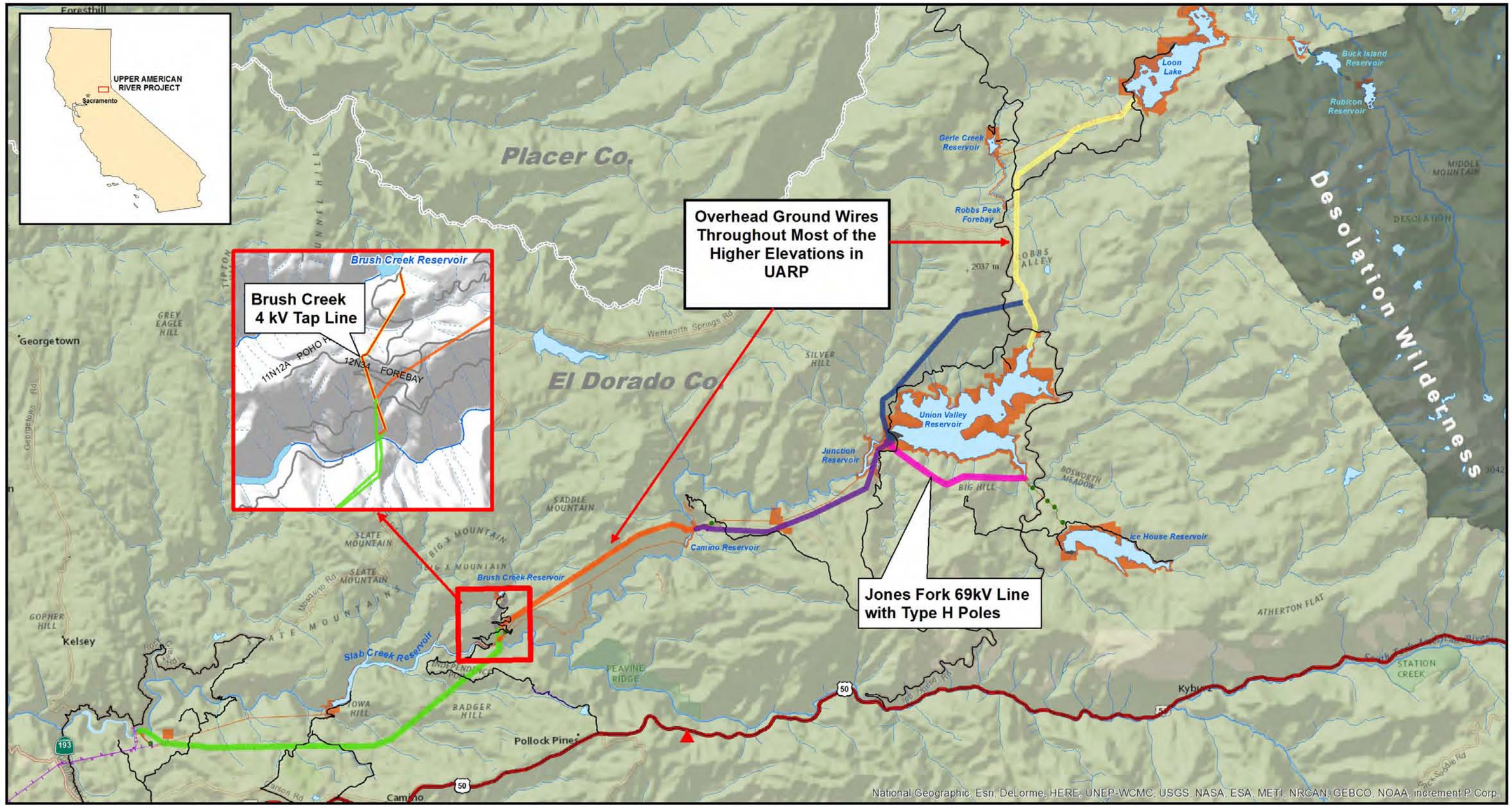


Figure 1. SMUD UARP Avian Protection Plan
Locations of License Required Retrofits
Upper American River Project - FERC No. 2101

SMUD™

Map Features

- UARP FERC Boundary
- SMUD Facilites
- Transmission Line

Transportation

- US Highway 50
- Primary Access Roads

Water Conveyance

- Canal
- Channel
- Penstock

Transmission Line
T-line Segment

- Loon Lake to Robbs
- Robbs to Union Valley
- Jones Fork to Union Valley
- Union Valley to Jaybird
- Jaybird to Camino
- Camino to White Rock
- Brush Creek

N

1 in = 2.4 miles

1:150,000

Photo 1. Detail of the insulator product applied to the 69 kV Jones Fork line.

Photo 2. Type H 5-pole structure on the 69 kV Jones Fork line retrofitted with insulators.

In September of 2014, the King Fire burned through the lower portion of SMUD's UARP in the Eldorado National Forest. The fire destroyed the 1.2-mile long, 4kV (incorrectly identified as 12 kV in the License Condition) Brush Creek Tap Line. Because of policies in SMUD's existing, corporate APP for rebuilding lines and staff's awareness of this FERC license condition, SMUD rebuilt the line with avian safe APLIC Suggested Practices using spacing and insulators to achieve the desired condition for this line. Photos 3 and 4 are from the new Brush Creek Tap Line and are representative of the whole line.

Photo 3. Poles from the rebuilt Brush Creek Tap Line showing APLIC-compliant design.

Photo 4. Pole from the rebuilt Brush Creek Tap Line using APLIC-Suggested Practices.

The one outstanding project of the three listed above and in the Settlement Agreement and License Condition is the overhead groundwires throughout the upper portion of the UARP.

The following process will be used to complete this work:

Prior to completing any retrofits, SMUD will work with FS, FWS, and CDFW to use APLIC suggested practices to develop criteria specific to the UARP for identifying areas that have increased probability of bird/powerline collisions. These criteria will be approved by FS, FWS, and CDFW. This will be completed by July 23, 2017.

Once the above criteria are approved, SMUD will develop a schedule to retrofit the overhead groundwires in the areas identified above within 10 years of license issuance (July 23, 2024).

For each line or set of lines SMUD proposes to retrofit in a given year, SMUD will provide a detailed map to the resource agencies by January 1. The map will show areas of increased probability of bird/powerline collisions based on the critiera developed above. The map will also show recreation sites, roads, and other facilities that fall within the areas of increased probability of bird/powerline collisions.

FS will determine if any of these areas are within sensitive visual areas. If any of the areas of increased probability of bird/powerline collisions are within sensitive visual areas, FS, FWS, and CDFW will determine the appropriate placement and color of diverters, if used.

If diverters are used in locations that do not occur in sensitive visual areas, dark (black or grey) diverters will be used.

3.0 Training, Monitoring, Reporting and Plan Revisions

As part of SMUD's existing, service territory APP, SMUD completes annual training of all staff involved in maintaining, inspecting and building transmission and distribution lines. This training covers all pertinent aspects of the APP, including:

- Introduction and description of the issue
- District Policy
- Identification of bird-related issues – electrocution and collision mechanisms
- Description of avian resources within the service area and species most susceptible to electrocution and collision mortality
- Discussion of state and federal regulations that protect birds, legal implications, and the need for compliance
- Construction and retrofitting standards designed to reduce mortality
- Protocols of APP implementation including assessing problems, proactive approaches, and recording/reporting data
- Discussion of each of the APP elements
- Responsibilities of staff to implement the APP

SMUD will expand its current training program to include all pertinent staff that work in the UARP, with varying levels of detail depending upon their duties at SMUD. In addition, staff in the Sacramento Valley will receive training on UARP-specific issues related to avian protection so that they can respond appropriately if they find themselves working in the UARP. Staff that investigates outages in the UARP will report the cause of the outage to SMUD's Environmental Management Department if the cause is unknown or determined to be avian caused. Staff will complete the standardized form found in SMUD's service territory APP and/or environmental management staff will gather information from field staff . Training will also emphasize the need to report any incidental observations of dead birds near UARP lines, towers or other facilities.

Monitoring will consist of collecting avian mortality incident reports/forms from line maintenance staff or other staff that observe any avian mortality near transmission lines. These reports will be reviewed annually and reported to the agencies during SMUD's Annual Review of Ecological Conditions meeting.

4.0 Updates to the UARP APP

If SMUD, USFS, CDFW, or FWS collaboratively determine that revisions should be made to the plan, SMUD will make any revisions to the Plan in coordination and consultation with the listed resource agencies. Any revisions to the plan must be approved by USFS, CDFW, and SWRCB. Any revisions shall be filed with FERC for approval prior to implementing.

5.0 References

Avian Power Line Interaction Committee (APLIC). 2012. Reducing avian collisions with power lines: the state of the art in 2012. Edison Electric Institue and APLIC. Washington, DC.

APLIC. 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edision Electric Institute, APLIC, and the California Energy Commission, Washington, DC and Sacramento, CA.

DTA 2004. Devine Tarbell & Associates, Inc. (DTA), 2004. Sacramento Municipal Utility District Upper American River Project (FERC No. 2101). Bird-powerline Associations Technical Report. Prepared for SMUD. Devine Tarbell & Associates, Inc., Sacramento, CA.

FERC 2014. Order Issuing New License for the continued operation of the Upper American River Project, No. 2101. Federal Energy Regulatory Commission, Washington, D.C.

SMUD et al. 2007. Relicensing Settlement Agreement for the Upper American River Project and Chili Bar Hydroelectric Project. Sacramento Municipal Utility District, Sacramento, CA.

Appendix A. Product Brochures

POWER LINE SENTRY

Wildlife Mitigation Products — Insulating Devices

69 kV Conductor Cover

Our patented insulator cap and conductor cover is designed to cover vertical insulators 69 kV applications. The product was designed to protect against brush contact outages on sub-transmission lines.

Specifications

- Extended service life made of UV resistant RPVC
- Secure even in high winds (> 85 mph) for sustained periods
- Covers only the energized portion of insulators, allowing the insulator skirts to naturally clean, (as they are designed to do), and for the insulators to be easily viewed during line inspection.
- Fits conductor sizes #6 through 795 mcm
- Models for dead-ends, single and double insulators

Product Number	Description	Box Qty
CC-STT-VT-69	Single Insulator and Rigid Conductor Cover (4/0 to 477 mcm) wire. Fits larger 69 kV insulators including trunion mount	10
CC-DTT-VT-69	Double Insulator and Rigid Conductor Cover (4/0 to 477 mcm) wire. Fits larger 69 kV insulators including trunion mount	5
CC-STT-VT-69-HD	Single Insulator and Rigid Conductor Cover (500 to 795 mcm) wire. Fits larger 69 kV insulators including trunion mount	10
CC-DTT-VT-69-HD	Double Insulator and Rigid Conductor Cover (500 to 795 mcm) wire. Fits larger 69 kV insulators including trunion mount	5
CC-FLEX-69V-XXX	Double Insulator and Silicone Hose Conductor Cover wire. Fits larger 69 kV insulators including trunion mount. Silicone hose good for 25 kV brush contact. Call for proper sizing of hose to meet wire size.	5

Page 19

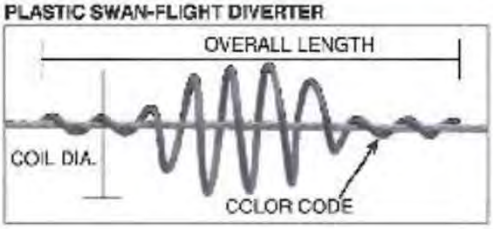
 www.powerlinesentry.com ph: 970-599-1050

PREFORMED LINE PRODUCTS

SWAN-FLIGHT™ Diverter

NOMENCLATURE

PLASTIC SWAN-FLIGHT DIVERTER



Length: Distance product covers the conductor.

Color Code: Identifies conductor range, corresponding to tabular information on the following page.

Color: Yellow or Gray

Material: Outdoor grade High Impact PVC

Coil Diameter: Outside diameter of diverter coil

GENERAL RECOMMENDATIONS

The Preformed Line Products SWAN-FLIGHT Diverter is designed for use on conductor/strand to create greater visibility for avian flight paths on overhead lines and tower down guys. Offering little wind resistance, it reduces hazards to both lines and birds. For construction up to 230kV, the SWAN-FLIGHT Diverter can be applied to phase conductors (bare or jacketed). For EHV voltages, it is typically installed on the shield wire.

The SWAN-FLIGHT Diverter is lightweight, offers little wind resistance and is easily and quickly applied by hand or hot stick. The positive grip on the conductor ensures that the SWAN-FLIGHT Diverter remains in the applied location and cannot move along the span under Aeolian vibration or other conditions.

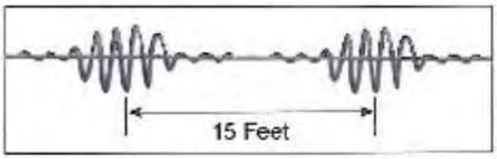
Visibility: The diverter section increases the visible profile of the cable or conductor to a degree necessary to ensure safety, but avoids an undesirably bulky outline.

Materials: The SWAN-FLIGHT Diverter (SFD) is manufactured from rigid .375" and .500" high impact polyvinyl chloride (PVC) possessing excellent chemical resistance and tensile strength properties. The SFD will retain good physical characteristics within range of extreme temperatures. Aging tests confirm the material does not deteriorate in function or appearance from the effects of severe weather conditions. Industrial fumes and salt water cannot seriously degrade the properties of rigid PVC.

APPLICATIONS

Ensure the correct size SWAN-FLIGHT Diverter is used. For detailed installation description, refer to the application procedure. Hot stick application is fast and simple with standard equipment.

Spacing: For optimal results, spacing distances are generally recommended at 15' intervals depending upon local conditions. Since wind resistance is very limited, a sufficient quality of SWAN-FLIGHT Diverters can be used to ensure adequate visibility without creating stresses on the line. When marking adjacent spans, overall visibility is improved by the staggering application.



Catalog Number	Conductor Range (Inches)		Overall Length (Inches)	Diameter of Diverter Coil (Inches)	Diameter of PVC Rod (Inches)	Color Code
	Min	Max				
SFD-0445	0.175	0.249	20	7.0	0.375	Black
SFD-0636	0.250	0.349	23	7.0	0.375	Blue
SFD-0890	0.350	0.449	25	7.5	0.375	Brown
SFD-1140	0.450	0.599	35	8.0	0.375	Green
SFD-1520	0.600	0.770	38	8.0	0.500	Purple
SFD-1960	0.771	0.858	38	8.0	0.500	Red
SFD-2220	0.859	0.942	40	8.0	0.500	Orange
SFD-2460	0.943	1.121	40	8.0	0.500	Pink
SFD-2700	1.122	1.306	40	8.0	0.500	Gray
SFD-3035	1.307	1.530	46	8.0	0.500	Black

NOTE: Add suffix –Y to the catalog number for yellow color (i.e.: SFD-1140-Y).

B-4

Appendix B. SMUD Service Territory APP

Sacramento Municipal Utility District
Avian Protection Plan

December 2007
(Revised November 2009)

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

Sacramento Municipal Utility District
Avian Protection Plan

Prepared for:

Sacramento Municipal Utility District
PO Box 15830 MS B203
Sacramento, CA 95852
Contact: Lonn Maier
(916) 732-6566

Prepared by:

Estep Environmental Consulting
3202 Spinning Rod Way
Sacramento, CA 95833
Contact: Jim Estep
(916) 921-2515

December 2007
(Revised November 2009)

Table of Contents

List of Exhibits

List of Tables

Executive Summary

SMUD has approximately 3,900 miles of overhead distribution and subtransmission lines and 450 miles of overhead transmission lines. Both the overhead and underground electric facilities serve approximately 600,000 customers in a safe, reliable, and cost effective manner. Unfortunately, some overhead power lines pose an electrocution or collision hazard to birds. As a result, SMUD has incorporated avian protection practices in its construction standards.

This Avian Protection Plan (APP) formalizes and enhances past practices of avian protection and incorporates industry best practices for future installations as necessary. This document is based on and is organized according to the APP Guidelines, a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) (APLIC and USFWS 2005).

The SMUD service area supports an abundance of nesting and wintering birds. Of particular note are the presence of certain birds and bird groups that are most susceptible to electrocution and collision mortality, such as large raptors and large water-associated birds, such as cranes, egrets, and herons. Raptors are most susceptible to electrocution due to their large size, use of utility poles as perches, and potential contact with phase conductors or electrical equipment that can result in electrocution. Large water birds are most susceptible to collision with overhead wires – particularly during periods of low visibility (e.g., fog conditions) – when lines intersect with wetland, open water, or other traditional feeding and roosting sites.

Intent and Need

Avian mortality from interactions with the human-built environment is a world-wide phenomenon. The causes of incidental avian mortality are numerous, but primary causes are associated with obstacles to bird flight, such as moving vehicles, tall buildings, and radio towers. Overhead electrical facilities also take a toll on bird populations. Inherent in the construction and operation of overhead high-voltage energized facilities is the potential for bird collision with overhead wires and electrocution from contact with conductors or a conductor and ground source. While incidental avian mortality is generally an accepted consequence of the built environment, measures can be taken to reduce the impact of certain structures, such as overhead electric facilities on avian resources; such measures are identified in this plan.

It is not the intent of this Avian Protection Plan to eliminate all potential sources of collision and electrocution within the SMUD service area, nor is there any intent to perform a carte blanche assessment or retrofit of SMUD facilities. With over 4,350 miles of overhead power lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. SMUD will continue to address the issue of avian mortality with an approach that takes into account a number of different factors as described in the following sections. Engineering design,

assessments, data keeping, and practical experience will all contribute to having a positive impact on the phenomena of avian mortality. This will entail a multi-year effort spanning decades into the future. This is a living document that may be periodically revised based on new information or new developments in avian protection.

The APP will provide a level of compliance with regulatory agencies and their regulatory requirements, such as the US Fish and Wildlife Service and the California Department of Fish and Game (e.g., Migratory Bird Treaty Act, Endangered Species Act, and California Endangered Species Act).

Background

When considering avian mortality and the types of electrical facilities used in the industry, (e.g., transmission, subtransmission and distribution lines), distribution lines tend to be responsible for the majority of bird electrocutions and collisions, and this may be due to the sheer number of miles of distribution lines compared to others. Typically, avian risk occurs where 1) poles provide perching opportunities and conductor separation and/or proximity to other energized hardware creates electrocution potential and 2) where overhead wires cross traditional bird use areas and create collision potential. This is found more often than not with distribution facilities.

Even though data is currently maintained on outages caused by avian activity[1], the exact extent of existing bird mortality within the SMUD service area is uncertain. Several issues are relevant to the APP process, including the mechanisms of electrocution and collision mortality as it relates to structures and operations; the costs – both avian and economic of bird-caused power outages; and state and federal laws and regulations that protect birds. This APP was developed to minimize the potential for mortality and comply with state and federal laws and regulations by implementing mortality reduction actions based on reported incidents and through a risk assessment process. It is designed to identify problem areas and implement measures to prevent or reduce mortality associated with new construction and with existing power lines.

Approach

The approach used in the formulation of this APP focuses on the following two response mechanisms:

- **Reactive** – responds to reported incidents and problem nests; and
- **Proactive** – incorporates avian standards in new projects and new structures as required.

These processes are incorporated into the elements of the APP described below.

[1] For example, in 2007, birds were responsible for 84 outages from January 1 through November. This equates to about 0.02 bird-caused outages per mile per year of overhead sub-transmission and distribution line.

Response Procedures for Power Outages and Incidental Observations

Response procedures address *actual* reported bird incidents identified through outage investigations or actual observations. Actual observations are either witnessed contacts by SMUD staff or incidental observations reported by SMUD staff or the public of possible electrocution or collision mortality incidents. This process includes investigating and reporting procedures, and implementing avian-safe designs.

Risk Assessment Procedures

The proactive process addresses the *potential* for incidents by assessing mortality potential associated with new projects and selecting the appropriate construction standards. Based on proximity to important bird use areas, habitats, and relevant historical information, environmental staff will assist the project designer to select a route and pole construction that minimizes the potential for avian contact.

Mortality Reduction Actions

Mortality reduction actions are triggered as a result of reported incidents or the risk assessment process for new projects. Mortality reduction actions would include:

- consideration of alternative routing of new facilities to avoid sensitive or high use areas (e.g., siting near high bird use areas);
- avian-safe pole configurations for new construction;
- mortality monitoring by troubleshooter and specialty staff (with expertise in avian species); and
- retrofitting demonstrated hazard poles and lines to reduce electrocution and collision hazard potential.

Design and Siting Standards

Where potential problem areas are identified, reducing the risk of electrocution or collision requires modifications to structures and structural design, and consideration for high risk areas during project route siting. To provide guidance on design and siting standards, this APP establishes:

- Siting standards for new power line corridors,
- Avian-safe design standards for new construction, and
- Avian-safe design standards for existing power poles and overhead lines.

Nest Management

The APP also provides a process for risk determination and if necessary removal or relocation of bird nests. Bird nests often pose no problems for system functioning and reliability and are thus allowed to remain. Occasionally, however, bird nests are constructed in areas that pose either a risk of system malfunction, create maintenance

issues, or a risk to the birds themselves. In these cases, SMUD may elect to remove or relocate nests. The APP provides guidance on nest detection, risk determination, and an approach for dealing with problem nests.

Avian Reporting System

The District Outage Management System (OMS) will be enhanced to provide a more complete avian reporting system, including identification of species, location of the contact or problem nest, and notification for corrective action.

Permit Compliance

Several state or federal permits may be required to implement some portions of the APP, including:

- Incidental Take Permits
  - Section 10(a)(1)(b) Incidental Take Permit
  - Bald and Golden Eagle Act Permit
  - Section 2081 Permit
- Collection/Salvage Permits
- State Scientific Collection Permit
- Federal Migratory Bird Permit
- Nest Removal and Relocation Permits

Training

Successful implementation of this APP will require a thorough understanding of the issues and corresponding protocols. To accomplish this, SMUD will develop a training program focusing on staff with direct and indirect implementation responsibilities including managers, supervisors, first responders, field crews, engineers, dispatch staff, and design staff.

Avian Enhancement Options

SMUD has and will continue to promote natural resource protection and actions that benefit local and regional bird populations and other wildlife. SMUD commits to a continuing partnership with local agencies and state and federal resource agencies to explore and participate in activities that enhance and restore habitat. Possible enhancement measures include planting trees, installing artificial nest platforms and perches, and restoring riparian and wetland vegetation.

Program Review and Quality Control and Public Awareness

SMUD will institute program review and quality control measures to ensure continuing monitoring of the effectiveness of the APP, and expand its public awareness campaign to provide information on implementation and effectiveness of mortality reduction actions.

Section 1. Introduction

This Avian Protection Plan (APP) was developed to expand and formalize the Sacramento Municipal Utility District's (SMUD) existing avian protection program in accordance with the APP Guidelines, a joint guidance document prepared by the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS). The APP Guidelines along with related APLIC documents (described below) are considered the most up-to-date and comprehensive guidance tools to reduce the potential for avian electrocution and collision mortality. The APP Guidelines (APLIC and USFWS 2005) define an APP as "a utility-specific document that delineates a program designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities". This document incorporates the principals of an APP as outlined in the APP Guidelines and establishes a process for monitoring and evaluation, reporting and data collection, siting and design considerations, and implementation of remedial actions.

This APP consists of introductory sections that describe relevant issues and the regulatory framework; a description of the SMUD service area including the various relevant components of the electrical system, the landscape and land use within the service area, and a general description of bird use and populations within the service area; and finally the APP itself.

1.1 Background

1.1.1 Brief History of SMUD

The voters of Sacramento County created SMUD in 1923 as a publicly owned and operated utility. However, it wasn't until 1946 that SMUD acquired the distribution system (previously owned by Pacific Gas and Electric Company) and began building an organization that would eventually become the sixth largest publicly owned utility in the country in terms of customers served. SMUD was founded with the idea that providing electric power to the Sacramento region was a job best done by a public utility overseen by an elected board of directors. Local control was thought to be the best way to ensure a reliable source of electricity at a lower cost and with more reliable service.

Over the last 60 years, SMUD has successfully transformed the antiquated electrical system it acquired into an efficient and diverse system of energy production, transmission, and distribution facilities. SMUD's Energy Management Center allows the utility to make its own minute-by-minute decisions on buying power and managing energy resources. During the 1970s and 1980s, SMUD began to move away from the concept of large central energy production plants toward diverse power sources such as cogeneration plants, wind power, low-cost purchased power, and research and development of renewable resources and advanced technologies like solar, fuel cells, gas

turbines, and biomass. As a result, SMUD's efforts toward reliable, diverse, and innovative energy programs and its emphasis on energy conservation have been recognized throughout the state, nation, and world.

1.1.2 SMUD Service Area

SMUD's current service area includes all of Sacramento County with the exception of the lower southwest arm of the county, and a small portion of Placer County (Exhibit 1-1). A description of the SMUD service area and electrical facilities is presented in Section 4.

1.1.3 Avian Mortality Associated with Overhead Power Lines

Many bird species are quite adaptable to the presence of man-made structures. Electrical facilities are no exception and in fact in some case attract bird use by providing perching and nesting structures. However, electrical structures can also pose risk to birds through electrocution by exposure to energized wires and related devices. These and other man-made structures (e.g., buildings, communication towers, etc.) can also act as obstacles to bird flight occasionally resulting in collision mortality or injury.

Electrocution and collision-related bird mortality from power lines and related structures have been documented for many decades (California Energy Commission 1995). Focusing primarily on raptor mortality, in the mid-1970s the Edison Electric Institute (EEI) developed a manual for addressing raptor electrocution on power lines entitled *Suggested Practices for Raptor Protection on Power Lines* (Miller et al. 1975). Since then, this guidance document has been updated and expanded several times beginning with the 1981 version (Olendorff et al. 1981). Following the formation APLIC, which is composed of biologists from the utility industry, the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the National Audubon Society, an updated guidance manual was prepared in 1996 (APLIC 1996) followed by the most recent version entitled *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

APLIC also produced a guidance document that addresses bird collisions with power lines entitled *Mitigating Bird Collisions with Power Lines: the State of the Art in 1994* (APLIC 1994).

To supplement these APLIC guidance documents and to provide a standard approach that can be adopted industry-wide, APLIC and the USFWS jointly prepared the Avian Protection Plan (APP) Guidelines (APLIC and USFWS 2005). The intent of the APP guidelines is to provide utilities with a planning approach designed to reduce avian risk as well as reducing risk of enforcement under the Migratory Bird Treaty Act (MBTA). This APP was prepared according to the guidance in the APP Guidelines.

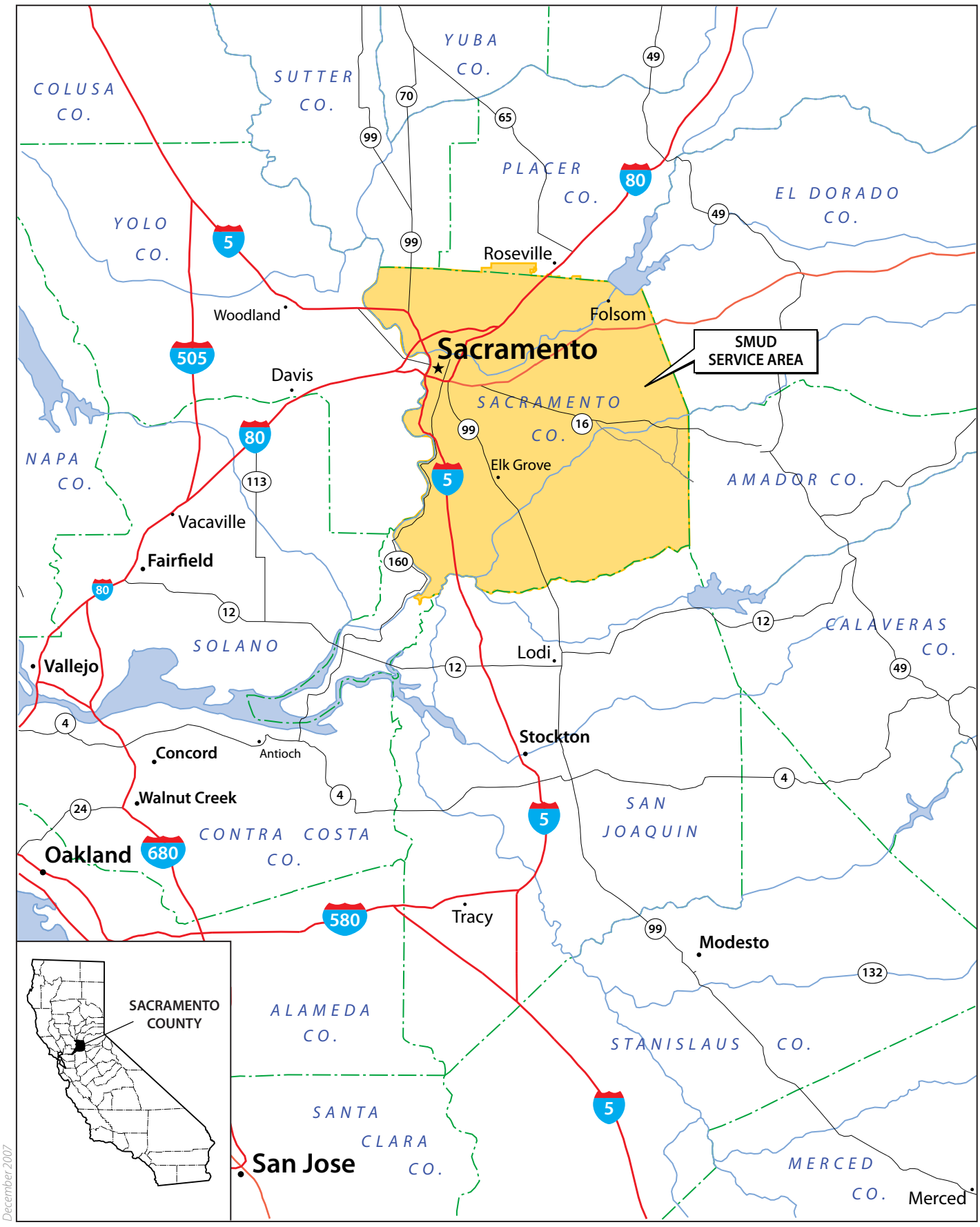


Exhibit 1-1
SMUD Service Area

1.1.4 SMUD's Current Avian Protection Program

SMUD has taken steps to minimize avian electrocution on power poles. As far back as 1981 SMUD has implemented avian protection measures in its service area. Engineers designed utility pole configurations to accommodate protection measures (such as shown in Exhibit 1-2), where bird perch guards were included in the design.

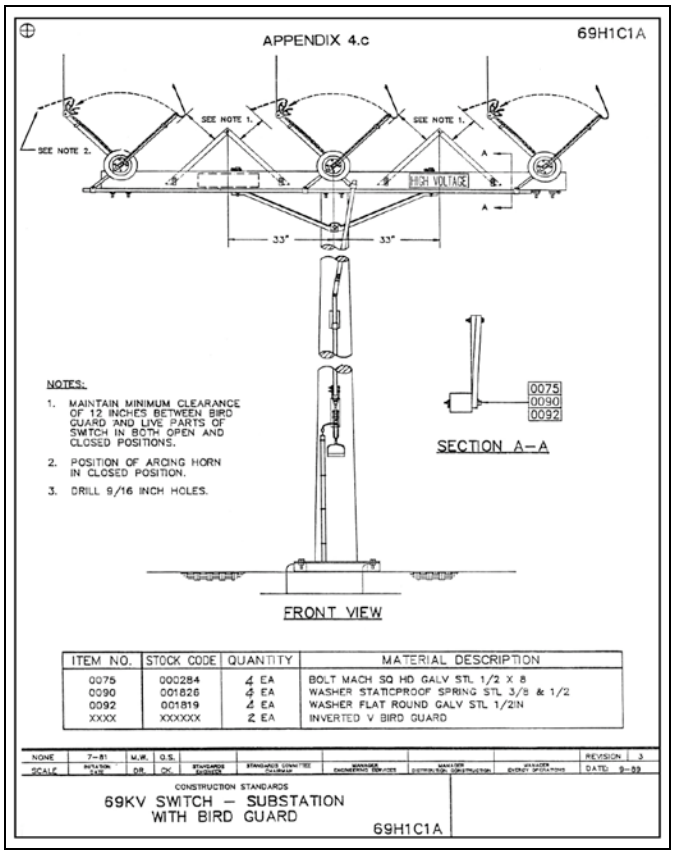


Exhibit 1-2. Bird guard installation and switch design (SMUD 1989)

Power line siting and design characteristics are evaluated with respect to potential avian mortality and other biological resource-related issues during environmental review of all new 69 kV and substation projects pursuant to the California Environmental Quality Act (CEQA).

SMUD's present Outage Management System (OMS) documents and stores information on not only avian, but also other types of outages (e.g., primary failures, wind or lightning caused, animal and automobile–pole accidents). Both the OMS and the previous outage logging system did not capture information regarding bird species, type of contact (e.g., phase-to-phase or phase-to-ground), or other relevant data. Enhancing the OMS, as described in this APP, will provide distribution operators and environmental staff with the ability to collect, store, and monitor specific information about the species

and the mechanisms of electrocution and collision mortality that gives the engineering staff data to determine appropriate mitigation.

1.2 Purpose

This Avian Protection Plan (APP) formalizes and enhances past practices of avian protection and incorporates industry best practices for future installations as necessary. This document is based on and is organized according to the APP Guidelines, a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) (APLIC and USFWS 2005).

It is not the intent of this Avian Protection Plan to eliminate all potential sources of collision and electrocution within the SMUD service area, nor is there any intent to perform a carte blanche assessment or retrofit of existing SMUD facilities. With over 4,230 miles of overhead power lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. SMUD will continue to address the issue of avian mortality with an approach that takes into account a number of different factors as described in the following sections. Engineering design, assessments, data keeping, and practical experience will all contribute to having a positive impact on the phenomena of avian mortality. This will entail a multi-year effort spanning decades into the future. This APP is therefore a living document that may be periodically revised based on new information or new developments in avian protection.

The overall purpose and goal of this APP is to reduce the potential for bird mortality associated with SMUD's electrical transmission, sub-transmission and distribution facilities by responding to reported incidents of electrocution and collision mortality, by assessing the potential for electrocution and collision-related mortality, and by implementing specific mortality reduction actions designed to address mortality associated with existing and proposed facilities.

Section 2. Issues

This section discusses the relevant issues related to avian interaction with power lines that establish the need to prepare this APP and implement mortality reduction actions, including the mechanisms of bird mortality, bird nesting on transmission towers and utility poles, power outages and the economic costs of bird interactions, and the regulatory protection provided to most bird species.

2.1 Avian Mortality

The use of power lines by birds is influenced by several ecological factors including 1) the presence and distribution of natural perches (e.g., trees, outcrops); 2) topography; 3) vegetation; and 4) prey abundance and availability. Thus, use of power lines and utility poles by raptors and other large birds is primarily an issue associated with rural areas and open natural or farmland landscapes.

Bird fatalities occur as a result of electrocution through contact with energized phase conductors and associated hardware and collision with wires.

2.1.1 Electrocution

Electrocution is usually associated with distribution poles because they provide perching and sometimes nesting opportunities for birds in close proximity to energized hardware and phase conductors. Certain bird species and species groups are more susceptible to electrocution mortality than others based on their size and behavior that increases their risk of exposure to energized wires and hardware. For example, raptors (e.g., hawks, eagles, falcons, and owls) are more susceptible to electrocution mortality than other bird groups because they will readily perch on utility poles and conductors, exposing them to energized electrical hardware and power lines (see Exhibit 2-1 below).

Electrocution occurs when a bird completes an electric circuit by simultaneously touching two energized conductors or an energized conductor and a grounded part of the electrical equipment. This can occur in several ways, including:

- Phase to phase contact: this can occur when a bird that is perched, landing, or taking off from a utility pole cross-arm comes into contact with two conductors completing an electrical circuit. Where the wrist-to-wrist distance of the bird is greater than or equal to the distance between conductors, phase-to-phase contact is possible and electrocution can occur. Larger birds of prey are at particular risk of this type of electrocution because of their larger wingspan. For example, an adult golden eagle has a wrist-to-wrist distance of approximately 54 inches. If the distance between the conductors is less than 54 inches, upon landing, taking off, or stretching of the wings, the eagle has the opportunity to touch both conductors simultaneously.

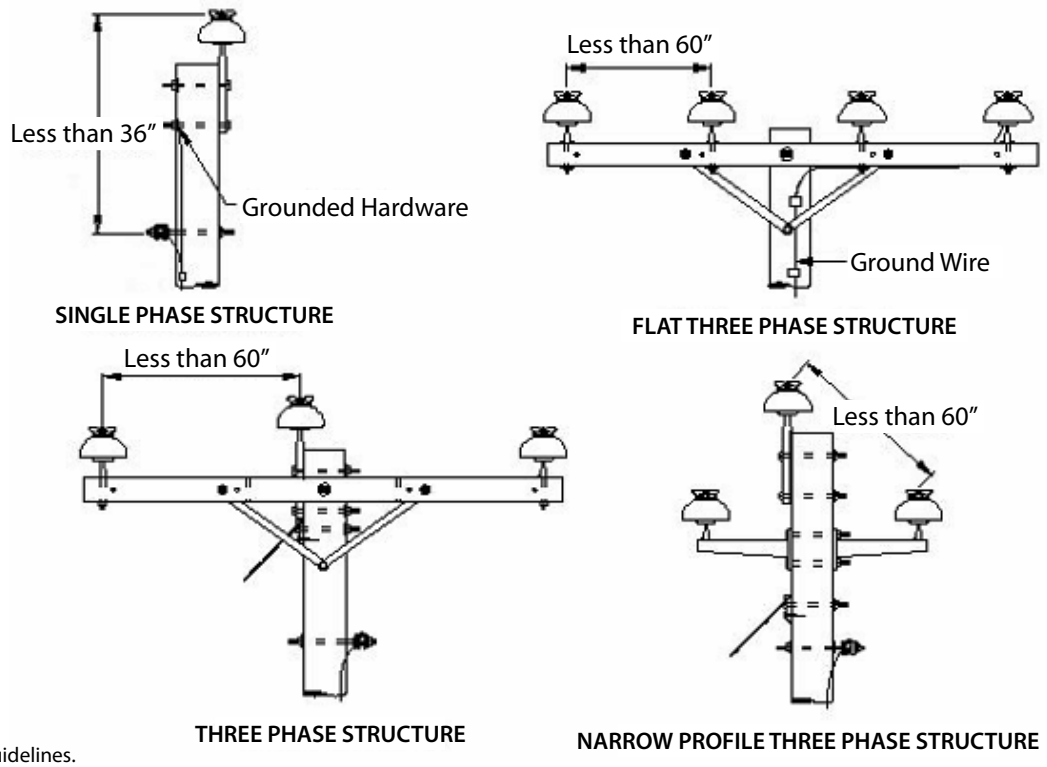
Exhibit 2-1. Red-tailed hawk perching on cross arm.

- A complete circuit can also occur through simultaneous contact with energized phase conductors and other equipment. Poles with equipment such as transformers, reclosers, sectionalizers, and capacitor banks are at higher risk for electrocution through contact with jumper wires and equipment bushings, particularly where these energized parts are in close proximity to neutral or ground conductors.

- Phase to ground and phase to neutral contact: simultaneous contact with an energized wire and a grounded wire or other grounded device or neutral wire can result in an avian injury or death.

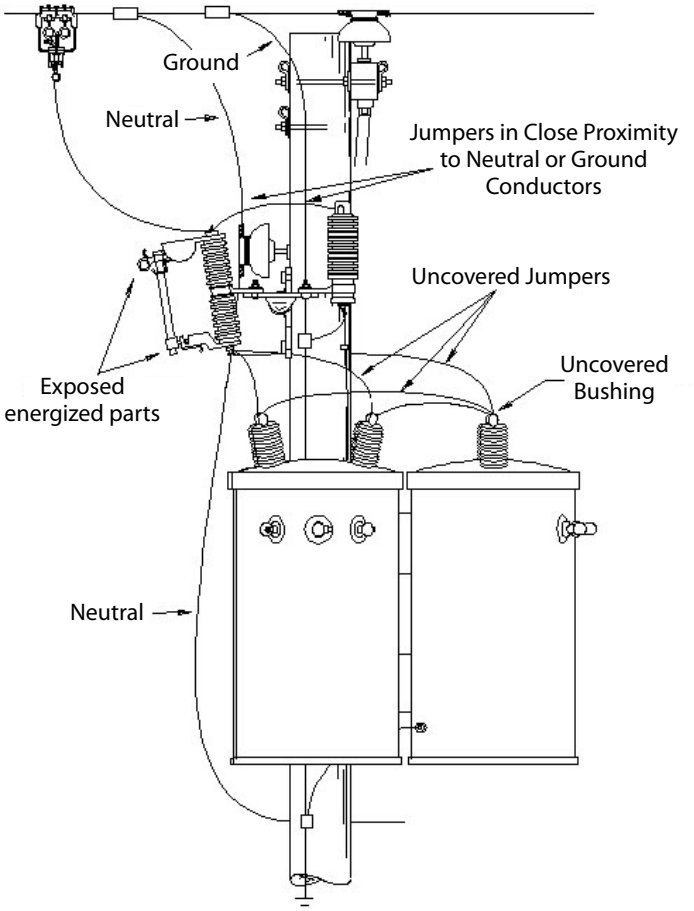
Exhibits 2-2 and 2-3 illustrate the elements of a power pole that are most commonly associated with bird electrocutions.

While a fatality can potentially occur at any unprotected pole, certain configurations have been shown to be more lethal than others (APLIC 2006). Most electrocutions occur on medium-voltage distribution lines (4 to 34.5 kV) where the spacing between conductors is typically less than on higher voltage lines. As noted above, poles with exposed hardware or equipment such as transformers, capacitor banks, jumper wires, cutouts, or lightning arresters tend to be responsible for a disproportionate amount of mortality (Harness 2000, Liguori 2001, Dwyer 2004). Multiple phase distribution lines with conductor separation less than 60 inches, dead-end structures, and corner pole multi-phase configurations are also responsible for a disproportionate amount of mortality (APLIC 2006).



SOURCE: APP Guidelines.

Exhibit 2-2. Examples of avian electrocution risk based on conductor spacing and configuration



SOURCE: APP Guidelines.

Exhibit 2-3. Examples of avian electrocution risk based on type, configuration, and proximity of transformers and related hardware components

2.1.2 Collision with Power Lines

Collision with power lines occurs during circumstances when the lines are not detectable by flying birds. Collisions are influenced by the conductor size (smaller conductor sizes are more difficult to see); the type and behavior of the bird species (large, slower moving birds, species that are active at night, flocking birds, less experienced juvenile birds, and raptors distracted during hunting or defensive maneuvers tend to be more susceptible); and inclement weather (which reduces visibility).

Raptors are more susceptible to collision with power lines when the visibility of the line is partially obscured by vegetation, particularly in areas where small diameter lines cross trees and other tall vegetation and where multiple lines intersect near poles or other raptor perches (Exhibit 2-4). Waterfowl, cranes, egrets and herons, and other water birds are susceptible to collision when lines are placed in the vicinity of traditional use areas such as wetlands and certain types of agricultural habitats – and particularly during inclement weather when visibility is reduced (Exhibit 2-5).

Exhibit 2-4. Conductors in vegetation reduce visibility.

Exhibit 2-5. Small diameter conductors reduce visibility particularly during inclement weather.

2.2 Bird Nesting

Utility poles and transmission towers also provide nesting opportunities for many bird species. Raptors, particularly golden eagle, osprey, and red-tailed hawk often construct nest sites on transmission towers, especially in areas where other nesting habitat is limited. Nests are constructed on a variety of flat surfaces depending on the configuration of the transmission tower (Exhibit 2-6). Many nests in transmission towers pose little risk to the nesting birds or to the functionality of the line. Nests are occasionally constructed in areas that may pose risk to the birds or interfere with access or maintenance of the tower. In these cases, further action such as relocation of the nest is often considered.

Nests constructed on distribution poles generally pose a greater risk to birds and greater likelihood of power outages. Nests are often constructed on tops of transformers or other flat locations in close proximity to energized conductors and hardware (Exhibit 2-7).

Exhibit 2-6. Red-tailed hawk nest on transmission tower.

Exhibit 2-7. Red-tailed hawk nest on transformer.

2.3 Power Outages

Depending on electrical facility configuration, electrocution events may result in power outages. Within the SMUD service area, a total of 63 bird-caused outages between January 1, 2007 and September 19, 2007 were reported. These outages resulted in temporary loss of service to SMUD customers that can range from a few minutes to a few hours as well as staff time to investigate the cause of the outage. Since the present outage information does not include species type, the number of raptor deaths associated with electrical lines is not known.

2.4 Protected Species

Most native migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA). Bird electrocution and collision mortality associated with aboveground electrical lines have been interpreted by the U.S. Fish and Wildlife Service, the Department of Justice and the United States Courts (U.S. v Moon Lake) as a violation of the MBTA. In addition, several special-status species that are afforded additional protection under state or federal regulation occur within the SMUD service area that may be susceptible to electrocution or collision mortality (Table 2-1). Electrocution or collision mortality of state or federally listed species may be considered take pursuant to the state or federal endangered species acts and in the absence of required permits may constitute violations of one or both acts.

Table 2-1. Special-status birds known to occupy the SMUD service area.

Species	Status (State/Federal)	Habitat Associations
Least bittern *Ixobrychus exilis*	SSC/-	Fresh/brackish water emergent wetlands
Redhead *Aythya americana*	SSC/-	Freshwater emergent wetlands/open water
Northern harrier *Circus cyaneus*	SSC/-	Grasslands, seasonal wetlands, irrigated pastures/croplands
White-tailed kite *Elanus leucurus*	FP/-	Grasslands, seasonal wetlands, irrigated pastures/croplands
Swainson's hawk *Buteo swainsoni*	T/-	Grasslands, irrigated pastures and croplands
Ferruginous hawk *Buteo regalis*	SSC/FSC	Grasslands, irrigated pastures and croplands
Osprey *Pandion Haliaetus*	SSC/-	Rivers, lakes, reservoirs and associated woodlands/forests
Bald eagle *Haliaatus leucocephalus*	E,FP/BGEPA	Rivers, lakes, wetlands and associated woodlands/forests
Golden eagle *Aquila chrysaetos*	SSC,FP/FSC,BGEPA	Grasslands, irrigated pastures and croplands
Peregrine falcon *Falco peregrinus*	E,FP/-	Wetlands, open water, grasslands, cliffs and outcrops
Greater sandhill crane *Grus canadensis tabida*	T,FP/-	Seasonal wetlands, irrigated pastures and croplands
Lesser sandhill crane *Grus canadensis canadensis*	SSC/-	Seasonal wetlands, irrigated pastures and croplands

Table 2-1. Continued.

Species	Status (State/Federal)	Habitat Associations
Burrowing owl *Athene cunicularia*	SSC/FSC	Grasslands, irrigated pastures and croplands
Short-eared owl *Asio flammeus*	SSC/-	Grasslands, pasturelands, wetlands, croplands
Loggerhead shrike *Lanius ludovicianus*	SSC/FSC	Grasslands, irrigated pastures and croplands
Purple martin *Progne subis*	SSC/-	Urban areas, woodlands
Tricolored blackbird *Agelaius tricolor*	SSC/FSC	Wetlands, grasslands, irrigated pastures, croplands
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	SSC/-	Freshwater emergent wetlands

T – threatened, E – endangered, FSC – federal species of concern, SSC – state species of special concern, FP – state fully protected, BGEPA – Bald and Golden Eagle Protection Act.

Section 3. Regulatory Framework

3.1 Applicable State and Federal Regulations

Most birds are protected under one or more state or federal regulations. The following state and federal laws and regulations are directly applicable to the issues of avian mortality from electrocution or collision and nest management on utility poles and towers.

3.1.1 Migratory Bird Treaty Act (MBTA)

The MBTA (Title 16, United States Code [USC], Part 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the (former) Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of MBTA.

The MBTA is the overriding federal regulation that has guided the development of bird protection guidelines, including the APP Guidelines. Most birds receive protection under the MBTA; however, the Act is not regularly enforced with respect to power line-associated bird mortality due to ongoing efforts on the part of utilities to take corrective actions to minimize the potential for mortality. The U.S. Fish and Wildlife Service actively engages the electric utility industry to reduce the incidental take of protected birds, and reserves the option of seeking prosecution when deemed necessary.

The human-built environment is an inescapable reality for most birds and a circumstance that poses a variety of risks as well as some benefits to some species. The MBTA has been interpreted to cover bird mortality that could occur as a result of construction or operation of virtually any man-made structure. However, while most bird mortality goes undetected and undocumented, mortality associated with certain industries is more visible and in some cases has been documented for many years. Bird electrocution on power poles has been documented and studied for over 100 years (California Energy Commission 1995). It is considered a particularly important problem because it affects mainly birds of prey, species that breed at relatively low densities and that could suffer significant regional population declines as a result of electrocution events. As a result of this more visible and potentially more biologically significant issue, the USFWS has and likely will continue enforcement of the MBTA where raptor mortality has been reported and where the utility is not in compliance with standard practices to reduce electrocution and collision mortality.

3.1.2 Federal Endangered Species Act

The USFWS administers the federal Endangered Species Act (ESA) as it relates to terrestrial wildlife. The ESA requires USFWS to maintain lists of threatened and endangered species and affords substantial protection to listed species. The USFWS can list species as either endangered or threatened. An endangered species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]). Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered and most species listed as threatened. Take, as defined by the ESA, means "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 "any act that kills or injures the species, including significant habitat modification."

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. In the absence of permits or authorization by the USFWS, fatality of federally listed species from electrocution or collision could potentially result in an enforcement action under the federal ESA.

3.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act[1] prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Under this act, it is a violation to "…take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof…." Take is defined to include pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing.

3.1.4 State Endangered Species Act

The California Endangered Species Act (CESA) prohibits take of wildlife listed as threatened or endangered by the California Fish and Game Commission. *Take* is defined under the California Fish and Game Code as any action or attempt to "hunt, pursue, catch, capture, or kill." Like the ESA, CESA allows exceptions to the take prohibition for take that occurs during otherwise lawful activities. The requirements of an application for incidental take under CESA are described in Section 2081 of the California Fish and Game Code. Incidental take of state-listed species may be authorized if an applicant submits an approved plan that minimizes and "fully mitigates" the impacts of the take.

[1] 16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978.

3.1.5 California Fish and Game Code

California Fully Protected Species

In the 1960s, before CESA was enacted, the California Legislature identified species for specific protection under the California Fish and Game Code. These "fully protected" species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Fully protected bird species are described in Section 3511 of the California Fish and Game Code. These protections state that "…no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish]."

California Fish and Game Code 3503 (Bird Nests)

Section 3503 of the Fish and Game Code makes it unlawful to take, possess or needlessly destroy the nests or eggs of any bird. California Department of Fish and Game (DFG) may issue permits authorizing take.

California Fish and Game Code 3503.5 (Birds of Prey)

Section 3503.5 of the Fish and Game Code prohibits the take, possession or destruction of any birds of prey or their nests or eggs. DFG may issue permits authorizing take.

Section 4. Description of the SMUD Service Area

This section describes the SMUD service area in terms of the landscape and land uses, bird populations and distribution, and the SMUD electrical transmission and distribution system network.

4.1 Landscape Characteristics

The SMUD service area extends from the Sacramento-San Joaquin Delta east to the foothills of the Sierra Nevada, transitioning from low elevation croplands to higher elevation western slope grasslands and woodlands (Exhibit 4-1). In general, the service area can be characterized by the following land use types:

- Irrigated cropland. This type is defined as areas that are dominated by crop patterns that involve annual cultivation (Exhibit 4-2). This type is found primarily in the Delta and Natomas Basin portions of the service area.

- Irrigated cropland/irrigated pastureland. This type is defined as areas that are dominated by a mixture of irrigated croplands and a large percentage of irrigated pasture (Exhibit 4-3). This type is found primarily in the interior of the service area south of the City's of Sacramento and Elk Grove.

- Uncultivated grasslands. This type is defined as uncultivated annual grassland habitat and vernal pool grasslands that are regularly or irregularly grazed by livestock and that have retained most topographical and other natural features (Exhibit 4-4). This type is found primarily in the eastern portion of the service area.

- Woodlands and Savannas. Other then several relatively small remnant oak groves south of Sacramento, oak and cottonwood woodlands occur primarily along the eastern edge of the service area (Exhibit 4-5).

- Watercourses and Riparian Systems. Several major river systems occur in the service area, including the Sacramento, American, and Cosumnes Rivers (Exhibit 4-6), along with numerous other smaller creeks and sloughs.

- Low Density Urban. Low density urban development occurs primarily on the northern edge of Sacramento and south of Sacramento in the vicinity of Wilton and Galt (Exhibit 4-7).

- High Density Urban. Densely populated urban areas occur primarily within the Sacramento Metropolitan area and in the City of Galt.

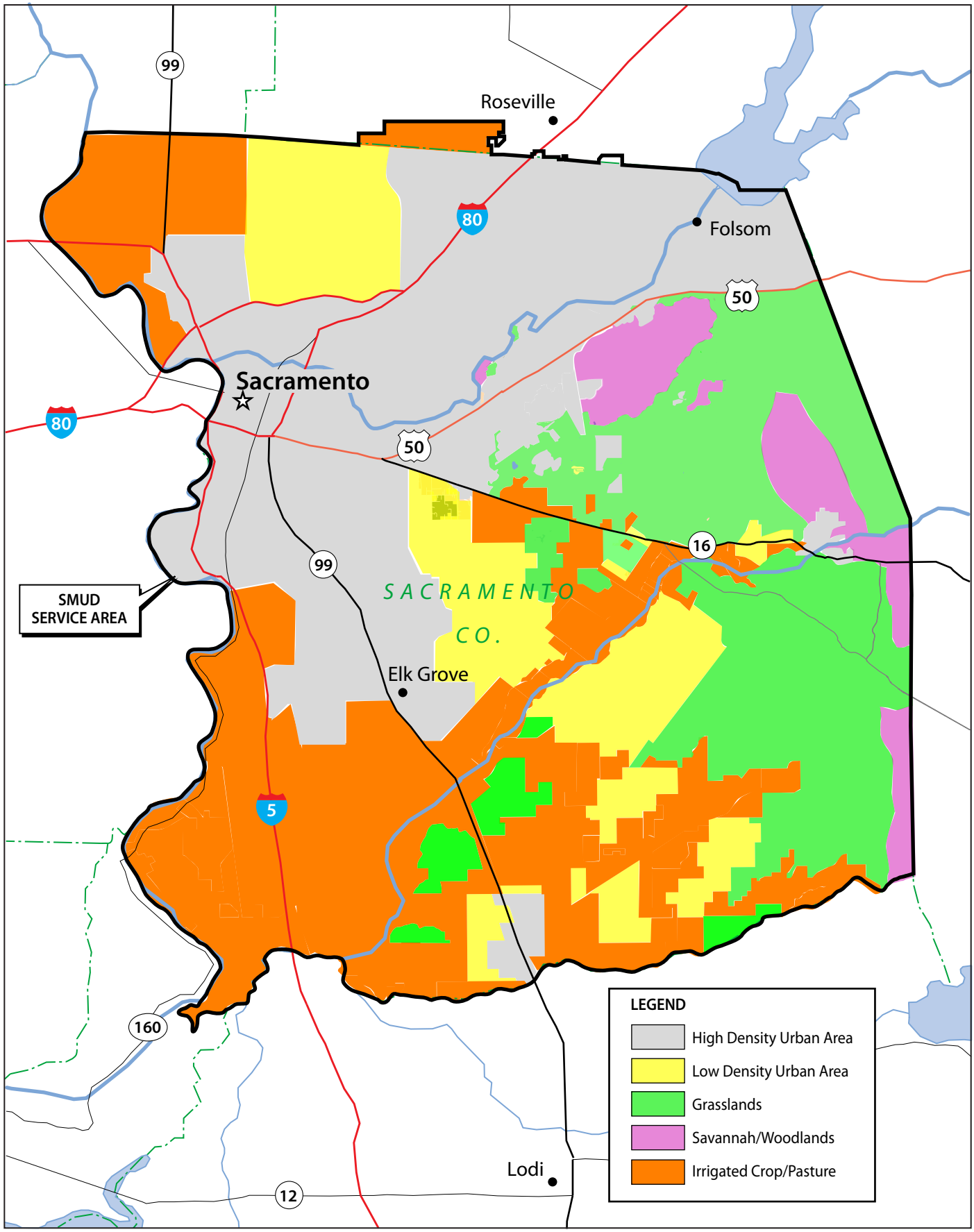


Exhibit 4-1
Generalized Representation of Major Land Use Types in the SMUD Service Area

Exhibit 4-2. Irrigated cropland west of I-5

Exhibit 4-3. Irrigated cropland/pastureland south of Elk Grove

Exhibit 4-4. Uncultivated grasslands - eastern Sacramento County

Exhibit 4-5. Oak woodlands and savannah – eastern Sacramento County

Exhibit 4-6. Watercourses and riparian vegetation – Cosumnes River

Exhibit 4-7. Low density rural residential – north Sacramento County

4.2 Bird Populations and Use within the SMUD Service Area

The Sacramento Valley supports abundant bird populations year round. The combination of open rangeland, agricultural lands, riparian corridors, oak woodlands, and wetlands creates high value bird habitat that supports large and diverse bird populations. Several bird groups that are most susceptible to electrocution and collision mortality are discussed below.

4.2.1 Raptors

The Sacramento Valley is home to abundant raptor populations year round. Several medium-sized raptor species are common breeders in the service area, including red-tailed hawk (Exhibit 4-8), Swainson's hawk (Exhibit 4-9), red-shouldered hawk, white-tailed kite, and great-horned owl. As an example of raptor nesting distribution in the service area, Exhibit 4-10 illustrates the 2006/2007 breeding distribution of the red-tailed hawk and Swainson's hawk (Estep Environmental Consulting 2007a,b; Jones & Stokes 2007). Swainson's hawk breeding density in this area is among the highest reported within the species' range.

Exhibit 4-8. Adult red-tailed hawk

Exhibit 4-9. Adult Swainson's hawk

During the non-breeding season, many more raptors move into the Sacramento Valley where they remain from approximately October through February. A large number of red-tailed hawks are present during this period along with wintering ferruginous hawks and rough-legged hawks. Golden eagle is less common within the service area, but is occasionally observed during the breeding and wintering seasons, particularly in the eastern portion of the service area.

Bald eagle also occurs occasionally in the service area, particularly during winter in the Folsom Lake area and less frequently in waterfowl concentration areas near Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve.

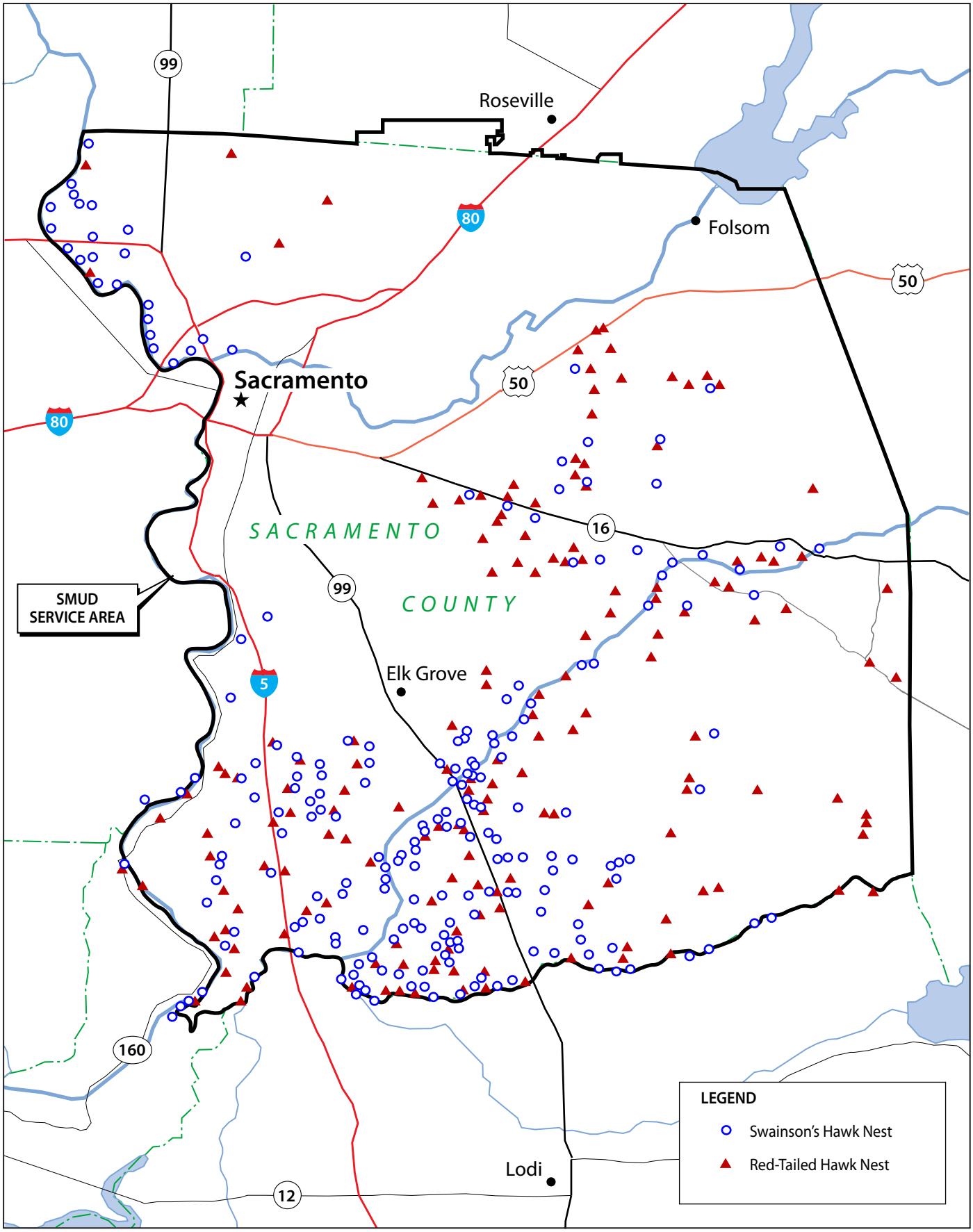


Exhibit 4-10
2006 Distribution of Swainson's Hawk and Red-Tailed Hawk Nesting Territories

Table 4-1 lists the raptor species that occur in the SMUD service area that are susceptible to electrocution mortality.

Table 4-1. Raptors in the SMUD service area that are susceptible to electrocution mortality.

Species	Description	Behavior	Season	Relative Susceptibility
Bald eagle (*Haliaeetus leucocephalus*)	Largest of our local raptors. Adults with white head and tail. Length (L) = 31 inches Wingspan (WS) = 80 inches	Occasionally perches on utility poles	Year-round – but uncommon – primarily in the vicinity of Folsom Lake.	High – due to size and potential for phase to phase contact.
Golden eagle (*Aquila chrysaetos*)	Large local raptor; dark body with golden mantle. L = 30 inches WS = 79 inches	Occasionally perches on utility poles.	Year-round – but relatively uncommon – primarily in eastern Sacramento County	High – due to size and potential for phase to phase contact.
Osprey (*Pandion haliaetus*)	Large, long-winged raptor with white underside, dark upperside, and dark eyestripe. L = 23 inches WS = 63 inches	Occasionally constructs nests on utility poles and transmission towers.	Spring/summer breeding season and during migration primarily in eastern Sacramento County.	High – due to size and behavior. Constructs large stick nests on utility poles that can potentially ignite ground fires.
Red-tailed hawk (*Buteo jamaicensis*)	Common medium-sized raptor. Variable plumage, dark belly band, red tail. L = 19 inches WS = 49 inches	Regularly hunts from and perches on utility poles. Will also construct nests on transformers and towers.	Year-round; but winter populations are highest and include greater numbers of juvenile birds that are particularly susceptible to electrocution.	High – due to size and behavior. Uses utility poles as perches more frequently than other medium and large raptors.
Swainson's hawk (*Buteo swainsoni*)	Relatively common (in Sacramento County) medium-sized raptor. Variable plumage, dark breast band. L = 19 inches WS = 51 inches	Occasionally perches on utility poles.	Present only during the breeding season (March through September)	Moderate – perches less frequently on utility poles than red-tailed hawk and other buteos.
Ferruginous hawk (*Buteo regalis*)	Uncommon winter visitor. Largest buteo with variable plumage, reddish shoulders. L = 23 inches WS = 56 inches	Frequently perches and hunts from utility poles.	Present only during the non-breeding season (October through February)	High – due to size and behavior

Table 4-1. Continued

Species	Description	Behavior	Season	Relative Susceptibility
Rough-legged hawk (*Buteo lagopus*)	Uncommon winter visitor; medium-sized with dark underwing patches and white tail band. L = 21 inches WS = 53 inches	Frequently perches and hunts from utility poles.	Present only during the non-breeding season (October through February)	High – due to size and behavior
Red-shouldered hawk (*Buteo lineatus*)	Relatively common medium-sized breeding raptor. A shorter-winged buteo with reddish breast and shoulders. L = 17 inches WS = 40 inches	Occasionally hunts from wires and perches on utility poles.	Year-round	Moderate – due to smaller wing-span (wrist-to-wrist distance) and less frequent use of poles compared with other buteos.
White-tailed kite (*Elanus leucurus*)	Relatively common breeder – smaller in size than buteos. White with black shoulder patches and white tail. L = 15 inches WS = 39 inches	Occasionally hunts from wires and occasionally perches on utility poles	Year-round	Moderate – due to smaller size and less frequent perching on poles compared with other hawk species.
Cooper's hawk (*Accipiter cooperii*)	Uncommon breeder in the service area. Smaller than buteos with long tail, dark cap and back, and reddish front. L = 16.5 inches WS = 31 inches	Occasionally perches and hunts from poles and power lines.	Year-round	Low – due to smaller size and less frequent use of poles compared with buteos.
Peregrine falcon (*Falco peregrinus*)	Uncommon falcon, large with relatively long wings, dark back, head, and face, white breast/throat. L = 16 inches WS = 41 inches	Occasionally observed perching on utility poles.	Year-round.	Low due to less frequent use of utility poles compared with eagles and hawks.
American kestrel (*Falco sparverious*)	Small falcon with reddish back and distinct facial stripes. L = 9 inches WS = 22 inches	Regularly perches and hunts from power lines and utility poles	Year-round	Low. Small size helps avoid phase-to-phase contact.

Table 4-1. Continued

Species	Description	Behavior	Season	Relative Susceptibility
Great-horned owl (*Bubo virginianus*)	Largest local owl species with large heavy body and distinct ear tufts. L = 22 inches WS = 44 inches	Regularly perches on and hunts from poles.	Year-round	Moderate due to size and behavior.
Barn owl (*Tyto alba*)	Large owl with light plumage and distinct heart-shaped facial disc. L = 16 inches WS = 42 inches	Occasionally perches on poles and power lines.	Year-round	Moderate.

4.2.2 Sandhill Crane

Three subspecies of sandhill crane occur in the study area during the winter, including the greater sandhill crane, a state threatened species (Exhibit 4-11). Cranes are highly traditional to their wintering grounds and occur regularly on Delta Islands and in and around the Cosumnes River Preserve during winter. Several thousand cranes migrate to this area each winter, occupying wetlands and agricultural lands for feeding and roosting. Cranes are highly mobile during this period, regularly moving between feeding areas and between feeding and roosting areas each day – and creating opportunities for collision with overhead power lines, particularly during inclement weather and other periods of low visibility.

Exhibit 4-11. Greater sandhill cranes flying in low visibility conditions

4.2.3 Waterfowl

The service area is within the Pacific Flyway, a waterfowl migration corridor that extends the length of the Central Valley. Large groups of wintering waterfowl (ducks, geese, and swans) overwinter in wetland and agricultural lands throughout the region, particularly in portions of the northern Sacramento County in and around the Natomas Basin, in and around the Stone Lakes National Wildlife Refuge, Delta Islands, and in and around the Cosumnes River Preserve. Much of this area is managed to attract and provide wintering habitat for waterfowl (Exhibit 4-12). Like cranes, waterfowl frequently move between feeding and roosting habitats and can be susceptible to collision mortality, particularly during periods of low visibility.

Exhibit 4-12. Seasonal wetland near Cosumnes River Preserve.

4.2.4 Other Water Birds

The service area is also home to a variety of other large water-associated birds, such as herons, egrets, ibis, cormorants, and white pelicans. These birds can be found throughout Sacramento County in wetlands, open water, and agricultural habitats. They are highly active species that regularly move between feeding and roosting habitats and are susceptible to collision mortality. Several large traditional rookeries (breeding colonies) occur within the service area occupied by great-blue herons, great egrets, black-crowned night herons, and snowy egrets. During the breeding season, these birds travel relatively large distances to feeding areas, regularly traveling back and forth between nesting and feeding sites.

4.3 SMUD Electrical Transmission and Distribution System Network

The SMUD electrical transmission, subtransmission, and distribution system includes the following components:

- 447 circuit miles of overhead transmission (230 and 115 kV)
- 586 circuit miles of overhead 69 kV sub-transmission
- 3,320 circuit miles of overhead distribution (21 kV, 12 kV, and 4 kV)
- 235 electrical substations
- 145,000 sub-transmission and distribution poles
- 35,426 pole-bolted transformers

The majority of SMUD's aboveground distribution lines are associated with older urban areas and rural areas. New developments are all underground 12 kV distribution lines with overhead 69 kV lines (Exhibit 4-13).

Exhibit 4-13. 69 kV (double circuit) power line.

SMUD typically uses cross-arm, standoff brackets, and line post insulators for its overhead sub-transmission and distribution lines. An 8-foot-long crossarm is typically used for poles with and without equipment. A 5-foot-long wooden crossarm can also be installed with the center phase on a kingpin.

Exhibits 4-14 through 4-21 illustrate some of the more typical distribution pole and hardware configurations within the SMUD service area.

Exhibit 4-14. Three phase, two on one side.

Exhibit 4-15. Three phase, center kingpin.

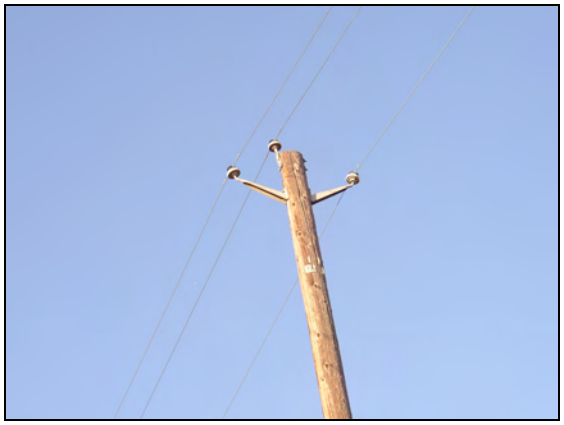


Exhibit 4-16. Three phase, one center, fibergalss crossarms.

Exhibit 4-17. Double crossarm, three phase each; upper with center, lower with two on one.

Exhibit 4-18. Double crossarm, three phase corner pole.

Exhibit 4-19. Single transformer bank.

Exhibit 4-20. Double transformer bank.

Exhibit 4-21. Triple transformer bank.

Section 5. Avian Protection Plan

5.1 District Policy

The SMUD Board of Directors recently adopted a number of Strategic Directives (SDs) that embody the core values of SMUD. SD-7 is related to environmental protection, and in part states

> "The District will conduct its business affairs and operations in a manner that reduces adverse environmental impacts, reduces pollution, and enhances resource conservation and stewardship."

As part of its ongoing commitment to the protection of natural resources and observance of SD-7, SMUD is committed to managing its existing facilities, developing new energy resources, and expanding electrical energy services in a manner that minimizes the potential for avian mortality as a result of electrocution and collision incidents.

Thus, it is the intent of the District to adopt and implement the avian protection measures as described herein to minimize potential avian mortality and injury as a result of operation of the District's facilities, to continue to comply with state and federal regulations that protect avian resources, and for the benefit of its costumers and natural resources within its service area.

5.2 APP Development

This APP was developed based on recommendations from the APP Guidelines (APLIC and USFWS 2005) and includes sections from the 12 elements addressed in the APP Guidelines below:

- Corporate Policy (see 5.1 above)
- Risk Assessment (5.5)
- Mortality Reduction Actions (5.6)
- Construction Design and Siting Standards (5.7)
- Nest Management (5.8)
- Avian Reporting System (5.9)
- Permit Compliance (5.10)
- Training (5.11)
- Avian Enhancement Options (5.12)
- Program Review and Quality Control (5.13)
- Public Awareness (5.14)
- Key Resources (5.15)

5.3 Approach and Organization

5.3.1 Approach

The approach used in the formulation of this APP is a process of assessment and implementation of mortality reduction actions. Assessment is accomplished through standard observation and/or investigation, monitoring, and data collection procedures. Based on assessment results, mortality reduction actions are implemented according to the following two response mechanisms and as illustrated in Exhibit 5-1.

- **Reactive** – responds to reported incidents and problem nests. SMUD's current program consists of responding to power outages, investigating the cause of the power outage, and if the result of a bird electrocution, implementing retrofitting measures to reduce the potential for future incidents at that specific location. This program will be expanded to include assessment of surrounding power poles from where the avian-caused power outage occurred. It will also include examination of additional mortality observations reported by field staff and the public.

- **Proactive** – responds to new projects and new structures with avian-safe standards. Based on known avian use and habitat data, the appropriate construction standards will be implemented for all projects (includes new projects and reconstruction) to minimize the potential for avian mortality. Alternate routes for new lines will be considered when available to avoid specific habitats.

5.3.2 Organization

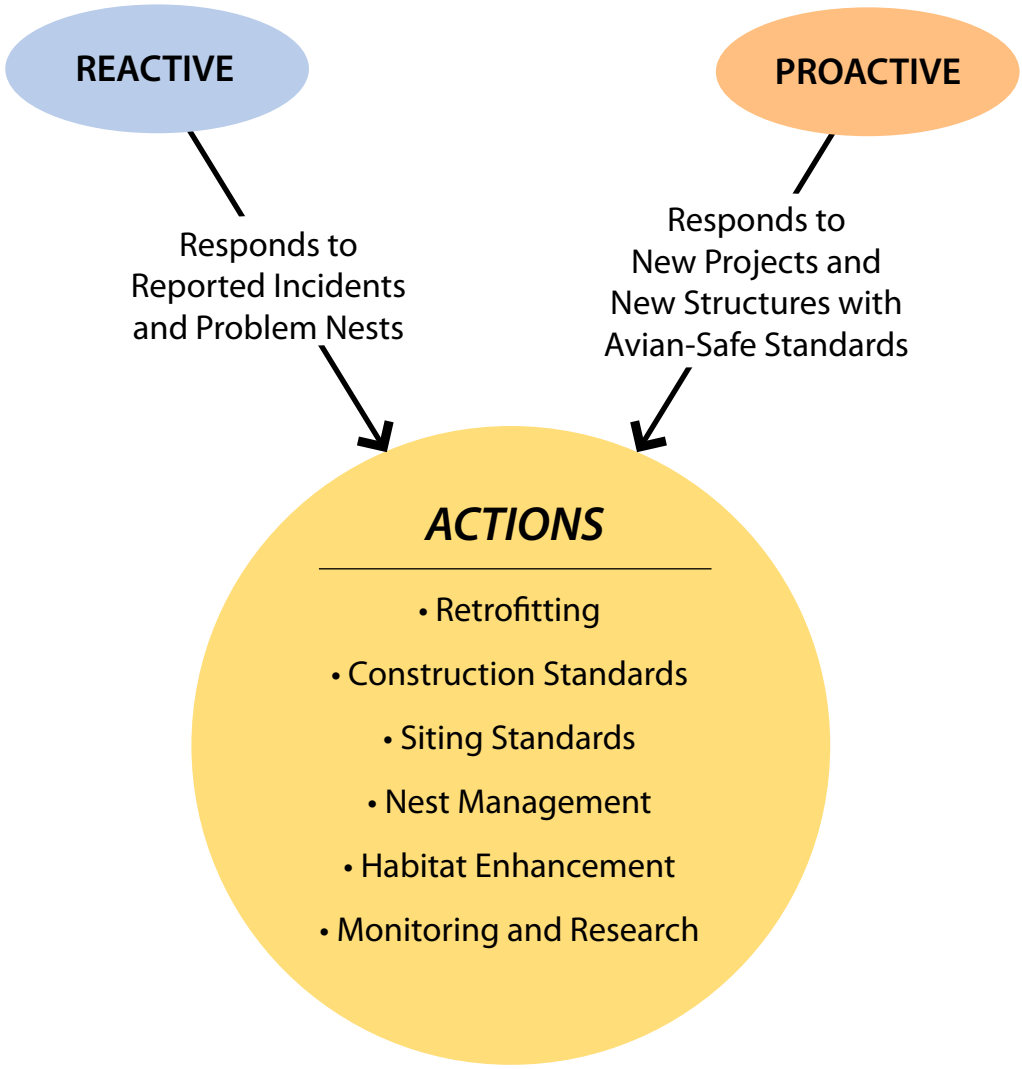
The APP is organized into the following sections:

Response procedures for power outages and incidental observations. Describes the procedures for responding to and investigating the cause of avian-related power outages and incidental observations of bird injury or mortality.

Risk assessment. Describes the procedures used to evaluate the risk of future avian contacts when planning for new facilities or reconstruction of existing facilites.

Mortality reduction measures. Describes the mortality reduction actions that may be implemented based on an assessment of reported incidents and the results of the risk assessment procedures.

Construction design and siting standards. Describes the construction design and siting standards that may be used to reduce the potential for electrocution and collision mortality through siting of new power line corridors, design standards for new construction, and design standards for retrofitting existing power poles.



December 2007

Exhibit 5-1
Plan Implementation Approach – Response Mechanisms

Nest management. Describes assessment procedures and additional mortality reduction actions that will be implemented to address bird nests on pole or tower structures.

Avian reporting system. Describes the process of reporting, processing, and managing data collected through implementation of the APP.

Permit compliance. Describes the state and federal permits required to implement some elements of the APP, including handling raptors and sensitive species and nest removal or relocation.

Training. Describes the framework for a staff training program.

Avian enhancement options. Describes additional involvement and possible mitigation options associated with habitat enhancement programs.

Program review and quality control. Outlines program review and quality control procedures.

Public awareness. Describes the potential for public awareness of avian mortality reduction actions implemented by SMUD.

Key contacts. Lists a variety of local regulatory and support contacts.

5.4 Response Procedures for Avian-caused Power Outages and Incidental Observations

Response procedures address *actual* reported bird-caused outages or incidental observations. Incidental observations refer to observations made by SMUD staff or reported to SMUD of a dead or injured bird – or bird remains that suggest a possible electrocution or collision fatality. The process includes the following steps as outlined in Exhibit 5-2:

- Respond to power outage and determine if it is bird-related, and respond to reports of incidental mortality observations.
- Determine the species or bird group. Use the accompanying bird guide as needed.
- If state or federally listed species or banded bird, contact environmental manager for direction regarding documentation, agency contact, and disposition of bird and bands.
- Investigate the possible cause of the injury or fatality.
    - Document location of the bird contact (pole UD#)
    - Document visible injuries

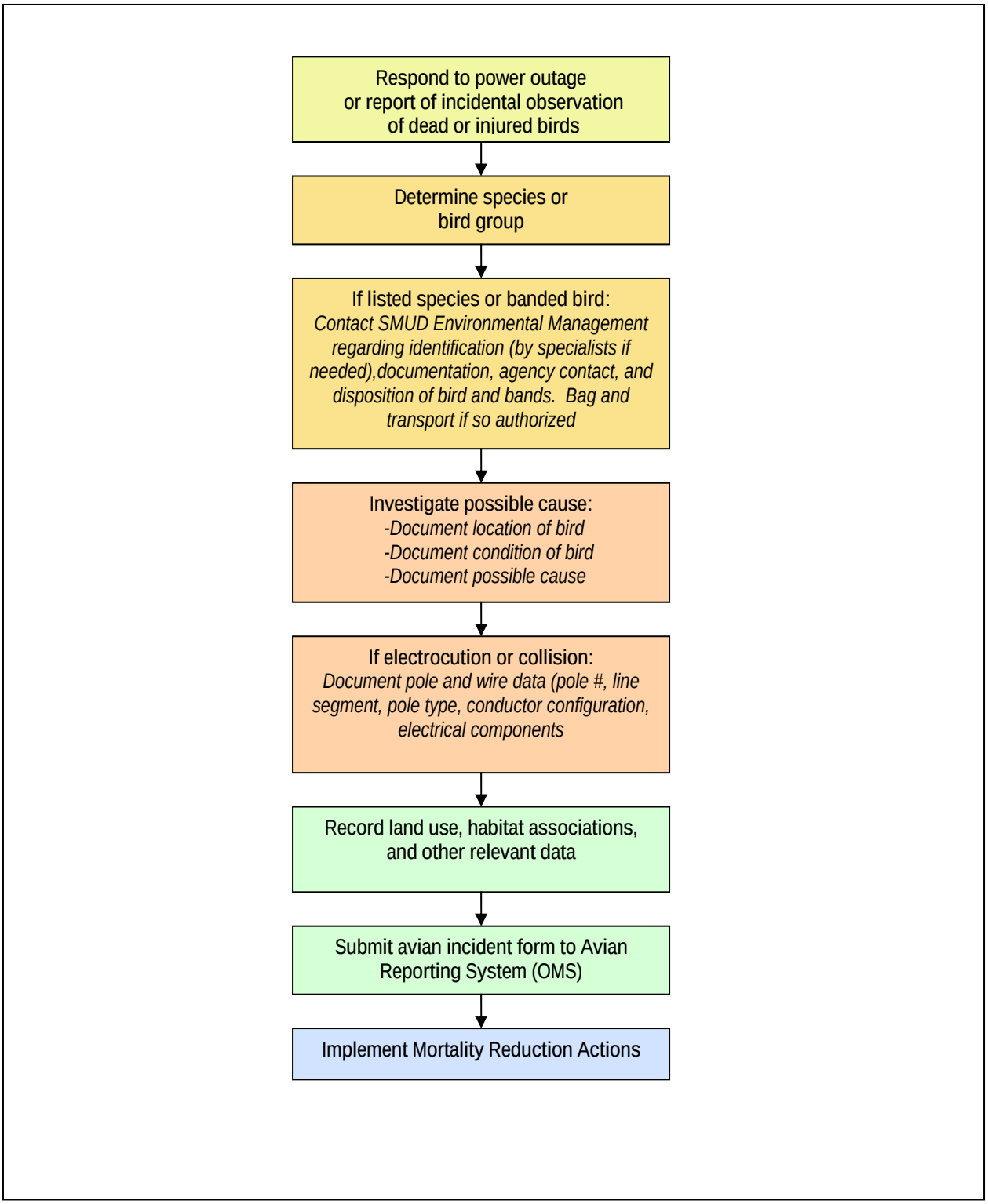


Exhibit 5-2
Response Procedures for Power Outages and Incidental Observations

    - Based on location (i.e., beneath pole, mid-span) and type of injuries, record the possible cause (e.g., electrocution, wire collision, vehicle collision, predation, shot, etc.)
- Document pole type, phase conductor configuration, and associated electrical components.
- Record land use and habitat associations.
- Submit completed Avian Incident Form to the Distribution System Operator (DSO), who logs data into the OMS.
- Area Engineer evaluates information and determines appropriate mortality reduction actions.

5.5 Risk Assessment

With over 3,900 miles of overhead distribution and subtransmission lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. Thus, the risk assessment process under this APP is currently limited to new project routes and reconstruction efforts along existing routes. Establishing risk assessment procedures is a proactive approach to guiding management efforts and focusing remedial actions into areas with the highest potential for avian incidents.

5.5.1 Risk Assessment Process

The risk assessment process utilizes available information on important avian use areas, habitats, and avian movement corridors to establish avian assessment zones. The creation of these zones will provide guidance to designers and field personnel on the possible implementation of mortality reduction measures in these sensitive areas. The boundaries of the avian assessment zones will be established using available information from local, state, and federal resource agencies, local expertise on bird use and movements, and SMUD environmental staff. These zones will be used for new construction and reconstruction (i.e. pole replacement, insulator replacement, etc.) and can be used to address site-specific mortality issues associated with existing facilities.

The process involves three steps: 1) establishing avian assessment zones within the SMUD service area where significant avian use is known; 2) assessing the potential for mortality based on proximity to key habitats or bird use areas with the zone; and 3) applying appropriate mortality reduction measures to new project segments or reconstructed segments within these zones (Exhibit 5-3).

Avian zones will initially be created in the vicinity of known significant bird use areas, including:

- Stone Lakes National Wildlife Refuge
- Cosumnes River Preserve
- Folsom South Canal

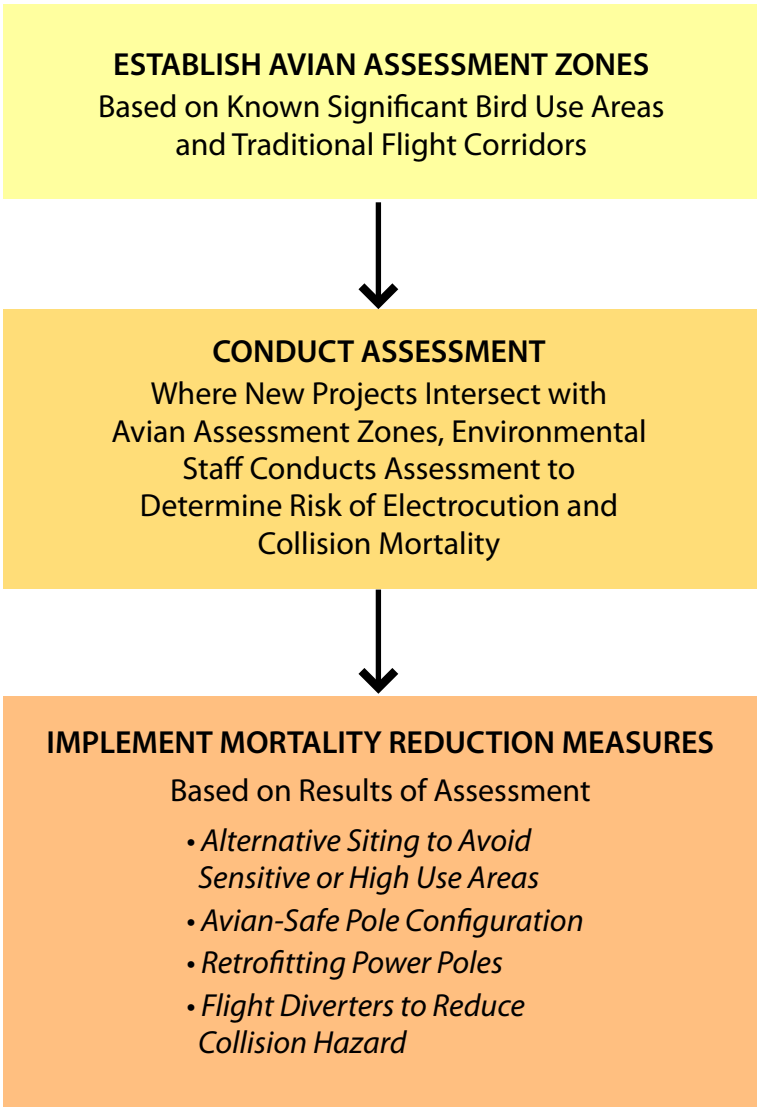


Exhibit 5-3
Risk Assessment Procedures

- Sacramento Regional County Sanitation District Bufferlands
- Rancho Seco
- American River Parkway
- Natomas Basin
- Other state, federal, local, or private conservation lands
- Duck clubs and other traditionally flooded agricultural lands
- Important raptor nesting and wintering areas
- Important sandhill crane use areas

The SMUD service area includes a spectrum of landscapes with some that are completely urbanized and others that consist of rural farmlands and native habitats. This highly diverse landscape results in a distribution of bird populations and use that follows land uses. Most densely urbanized areas pose less risk to birds because they lack open landscapes and habitats that support large and diverse bird populations, particularly those bird groups such as raptors and large water birds that are most susceptible to electrocution and collision mortality. However, important wildlife habitat may intersect some densely urbanized areas (e.g., the American River Parkway).

Rural areas pose a greater risk to avian mortality due to open landscapes, presence of wetlands, woodlands, riparian vegetation, open water habitats, farmlands, and other habitats that attract large and diverse bird populations. Thus, bird use and potential risk is variable within the service area depending on these and other factors. The avian assessment zones will initially be selected based on known significant avian use areas, such as those listed above. Additional avian zones may be established in the future on the basis of these factors.

Mortality reduction actions will be implemented based on the results of individual risk assessments conducted when projects intersect with an avian assessment zone. For example, power lines that cross through the Cosumnes River Preserve will be assessed to determine the potential for greater sandhill crane collisions with above-ground wires. Where this potential exists, applicable mortality reduction actions may include alternative siting or installation of flight diverters to reduce collision hazard as described below.

5.6 Mortality Reduction Actions

This section describes the mortality reduction actions that will be implemented based on an assessment of reported incidents and the results of the Predictive Analysis and Risk Assessment procedures.

Mortality incidents reported as a result of power outages or through incidental observations are immediately reviewed. If the review indicates the cause is related to an unprotected power pole or conductor visibility issues, mortality reduction actions (i.e., retrofitting poles or installation of flight diverters) will be implemented accordingly. Adjacent pole retrofits will be considered on a case-by-case basis.

As noted above, once completed the Risk Assessment can be used to inform, strategize, and direct mortality reduction actions. This is a proactive strategy designed to minimize risk by targeting remedial actions into areas identified as having the greatest risk. Actions may include:

- Alternative siting of new facilities to avoid sensitive or high use areas
- Avian-safe pole configurations
- Retrofitting distribution poles to reduce electrocution hazard
- Installing flight diverters to reduce collision hazard

Each action is described below and implementation sequence of each action is illustrated on Exhibit 5-4.

5.6.1 Alternative Siting of New Facilities

Data derived from the risk assessment process within avian assessment zones will be used when selecting routes for future powerlines. When alternative routes are available, staff will consider routes that minimize the potential for electrocution or collision mortality. When alternative routes are not available, construction design standards will be implemented in areas where avian habitat or important movement corridors creates contact potential (See Section 5-7 – Construction Design and Siting Standards).

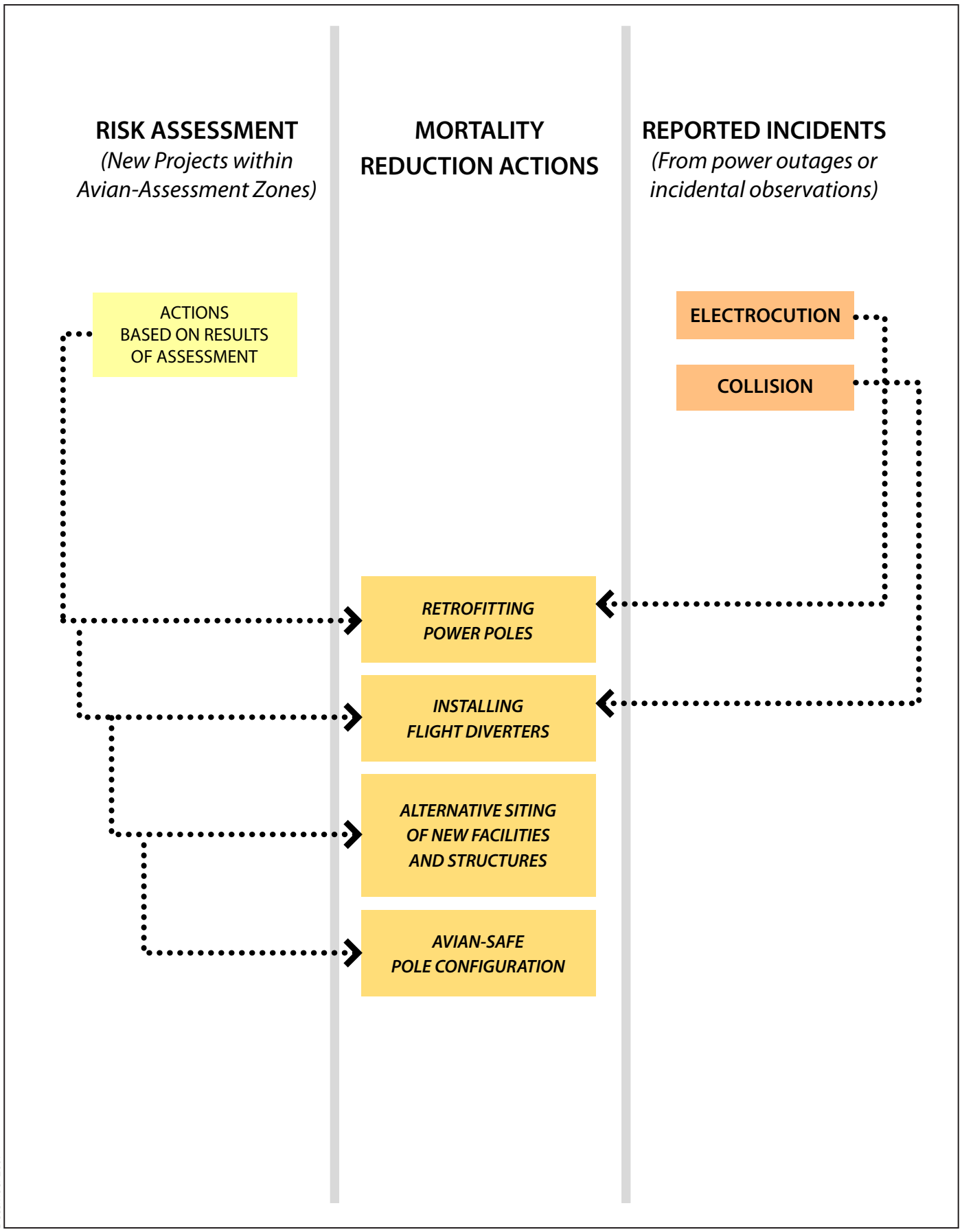
5.6.2 Avian-Safe Pole Configurations

The structural design of new power pole configurations will also be analyzed during or prior to the environmental review process to assess the effects of operation on electrocution and collision hazard. As discussed in Section 2, configurations that do not provide sufficient separation between energized equipment can result in electrocution. The APP Guidelines (APLIC and USFWS 2005) provide several examples of alternative configurations that will be considered to reduce electrocution potential (See Section 5-7 – Construction Design and Siting Standards).

5.6.3 Retrofitting Power Poles

At sites with recorded electrocution fatalities of raptors or other large birds detected either through power outages or incidentally by field staff, SMUD will retrofit utility poles with protection devices as described below under Construction Design and Siting Standards. Retrofitting includes installation of protective coverings including cutout covers, conductor insulators, conductor covers, jumper covers, and bushing covers. In addition, wood pole caps, perch flight diverter, and anti-perch triangles may also be installed. Installation of these protection devices is consistent with standard practices according to the APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006*.

In areas of significant raptor use and where safe perches are limited, SMUD may also install raptor perches above the upper crossarm of utility poles.



December 2007

Figure Exhibit 5-4
Implementation of Mortality Reduction Actions

5.6.4 Installing Flight Diverters to Reduce Collision Hazard

Where the results of the risk assessment indicate a potential collision hazard, SMUD may install flight diverters as described below under Construction Design and Siting Standards. Installation of these protection devices is consistent with the standard practices and guidance in the Edison Institute's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*.

5.7 Construction Design and Siting Standards

This section describes and illustrates the design and siting standards that can be used for new and retrofit construction in avian assessment zones. As discussed in Section 2, avian risk occurs where 1) poles provide perching opportunities and conductor separation and/or proximity to other energized hardware creates electrocution potential and 2) where power lines cross historical bird use areas and create collision potential. To reduce this potential requires modifications to structures and structural design, and consideration for sensitive areas during project route siting. This section describes how this can be achieved by implementing the following:

- Siting standards for new power line corridors,
- Avian-safe design standards for new construction, and
- Avian-safe design standards for existing power poles and overhead lines.

5.7.1 Siting New Power Line Corridors

Siting issues are related primarily to proximity to significant bird use areas that may increase the potential for bird electrocution and collision mortality. The following siting standards will be addressed and implemented to the extent possible in consideration of engineering, safety, or other logistical or practical constraints.

- Minimize proximity to significant wetland habitats that attract and support breeding and/or wintering waterfowl and other water bird populations.
- Minimize proximity to important avian flyway corridors that are used traditionally for migration or local movement between feeding and roosting/breeding areas.
- Minimize proximity to areas traditionally used by listed or other sensitive species (e.g., Greater sandhill crane).
- Avoid or minimize proximity to Stone Lakes National Wildlife Refuge, Cosumnes River Preserve, and other state, federal, local, and private (e.g., land trust, mitigation banks, duck clubs) lands set-aside or managed for bird use and other natural resource uses.

5.7.2 Design Standards for New Construction

SMUD will analyze electrocution and collision potential (See Risk Assessment Section) and in consideration of engineering, operational, geographic area, economic and other related constraints, will use avian-safe standards as illustrated by example in Exhibits 5-5 and 5-6 to reduce bird electrocution hazard. Risk factors will be assessed and addressed as determined necessary (e.g., it would not be practical to use raptor protection spacing standards in urban areas).

The objective of these standards is to maximize phase separation and phase-to-ground clearances in order to minimize the risk of electrocution or to prevent perching where sufficient clearance cannot be achieved, as described in Section 2.

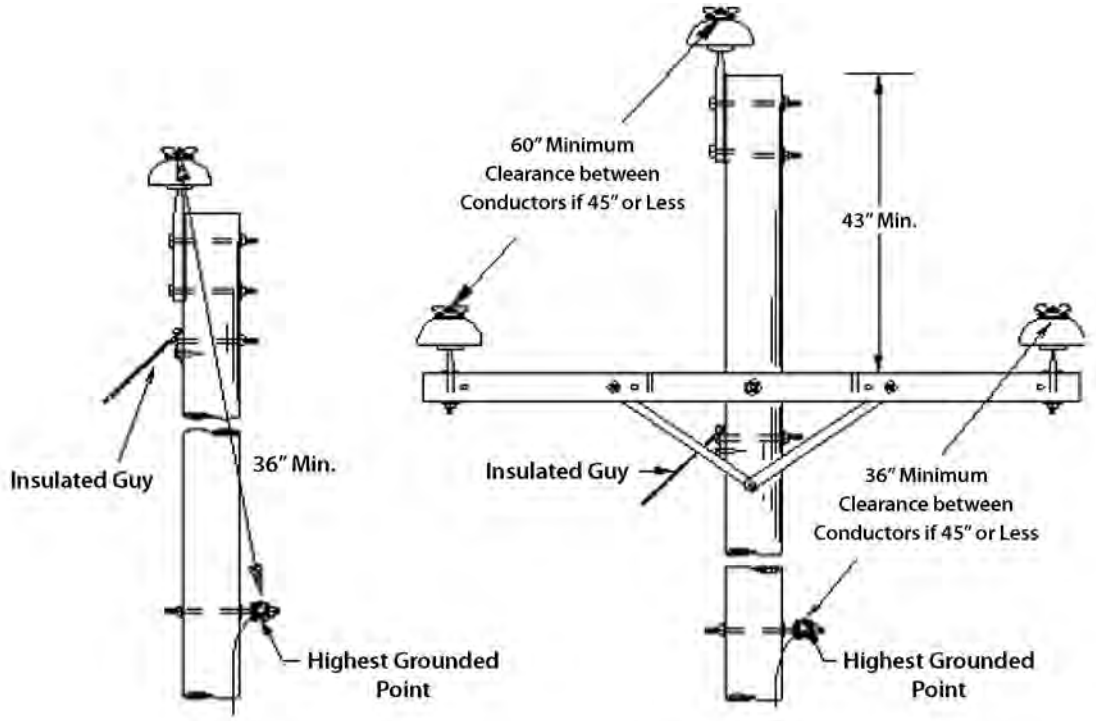
The standard 60-inch separation as described in the APP Guidelines (APLIC and USFWS 2005), is based on the wrist-to-wrist distance of eagles. As illustrated on Exhibit 5-5, a minimum vertical separation of 36 inches from phase to ground is needed on single phase structures to safely accommodate eagles. On three-phase structures, a vertical clearance of at least 43 inches between energized conductors and ground components is required. In most cases, an 8-foot crossarm with center phase kingpin will provide the necessary 60-inch clearance.

Although eagles are uncommon throughout most of the service area, this standard will be considered in areas where eagles are more likely to occur – such as the eastern edge of the service area and in the vicinity of Folsom Lake and upper reaches of the American River. An alternative standard is warranted in areas where eagles are unlikely to occur. Throughout most of the service area, buteos such as red-tailed hawk, Swainson's hawk, ferruginous hawk, and rough-legged hawk are among the larger raptors that are susceptible to electrocution. In these areas, a standard clearance of 48 inches is sufficient to minimize electrocution potential based on the wing length (and wrist-to-wrist distance) of buteos. Thus, the dimensions used in Exhibits 5-5 and 5-6 will be modified using a standard horizontal separation of 48 inches where eagles are unlikely to occur.

As an alternative to modifying pole configuration, where this standard is impractical or otherwise unfeasible, SMUD will apply the retrofitting standards described below to new construction. Through initial assessment of raptor and other avian use, insulators, covers, perch guards, and flight diverters (see below) can be used to minimize electrocution and collision potential.

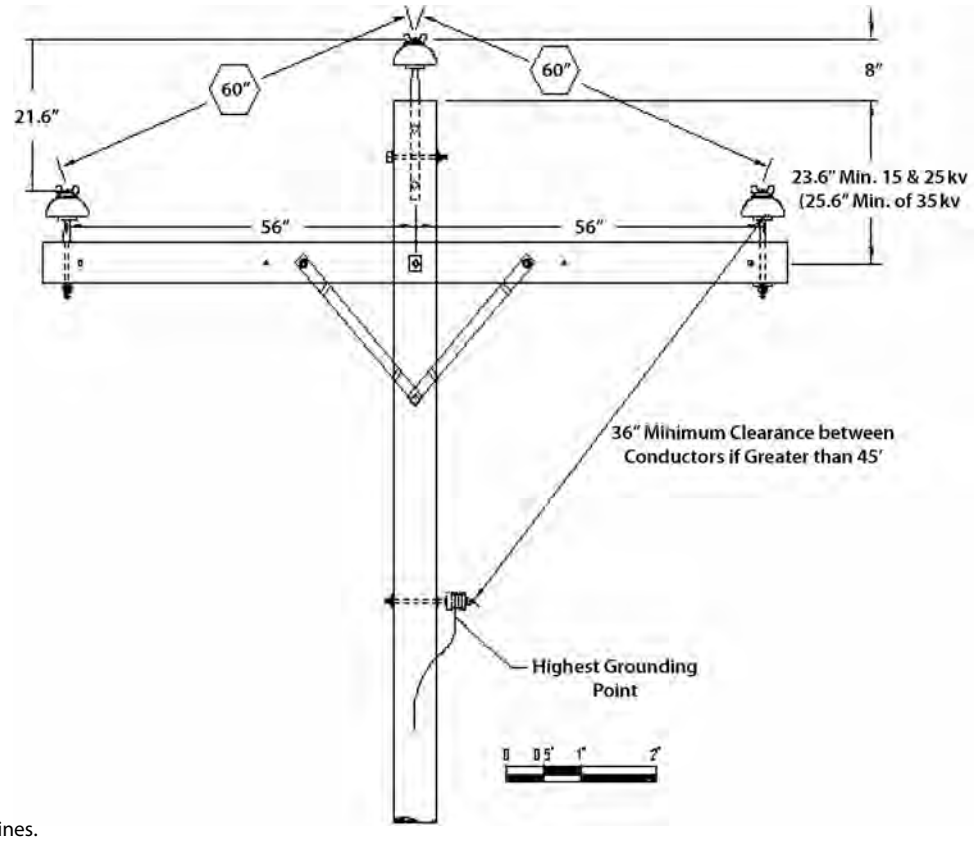
5.7.3 Design Standards for Retrofitting Existing Power Poles

Design standards to modify existing power poles are based on standard techniques, materials, and dimensions as described in the APP Guidelines using commercially available equipment designed specifically for this purpose. Exhibit 5-7 illustrates the standard avian protection modifications that can be used by SMUD to minimize electrocution potential on power poles. These modifications provide a level of insulation around energized components that are potential electrocution hazards. Once properly



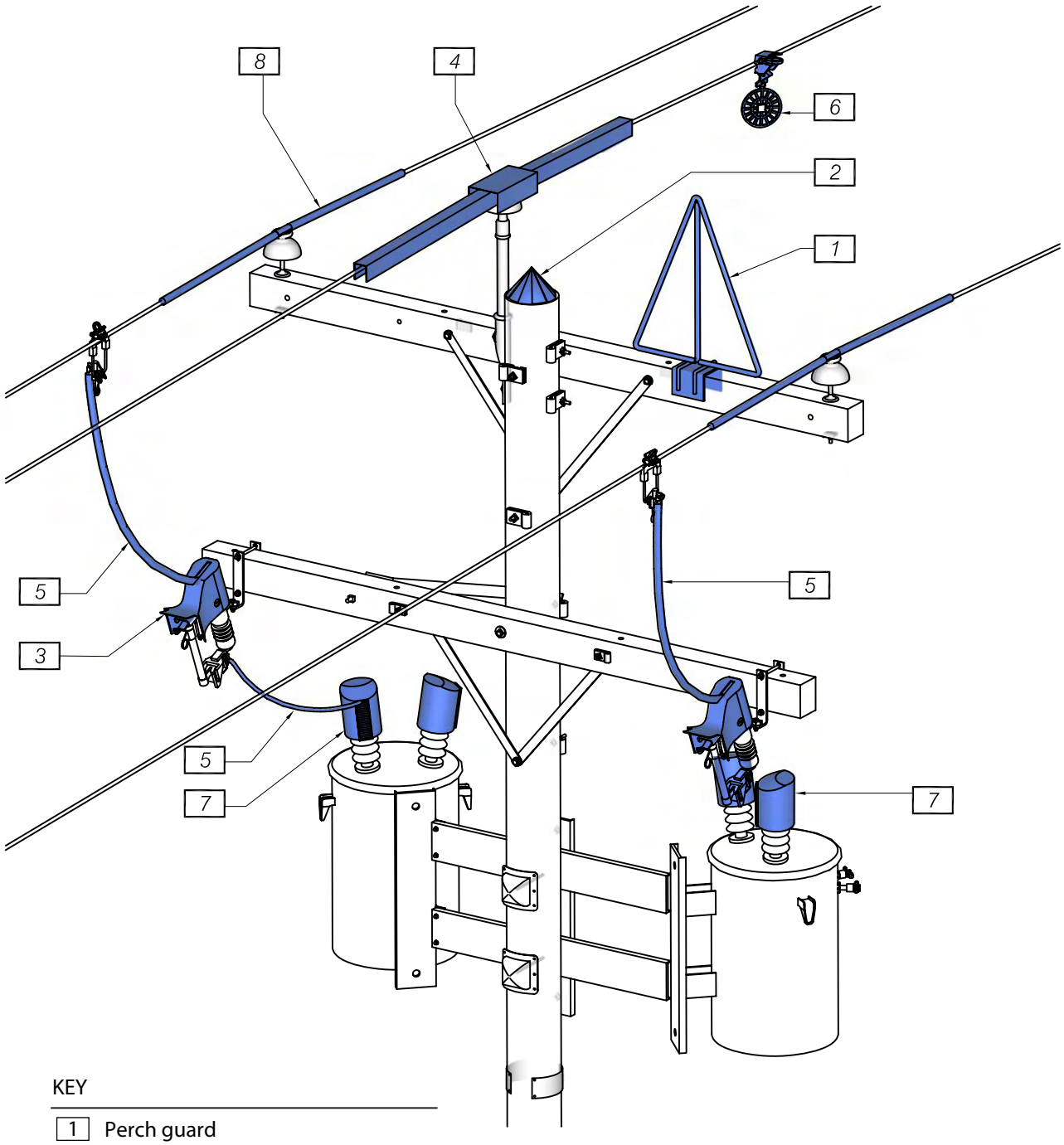
SOURCE: APP Guidelines.

Exhibit 5-5. Typical avian-safe structures: single phase (left), three-phase with lowered 8-foot crossarm (right)



SOURCE: APP Guidelines.

Exhibit 5-6. Typical three-phase avian-safe structure with 10-foot crossarm



KEY

1	Perch guard
2	Wood pole cap
3	Cutout cover
4	Conductor insulator/cover
5	Jumper/neutral wire insulator/cover
6	Flight diverter
7	Bushing cover
8	Conductor insulator/cover

December 2007

SOURCE: SMUD SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit 5-7
Standard Modifications to Reduce Potential for Electrocution Mortality

retrofitted with these devices, the opportunity for birds to complete an electrical circuit through contact with phase conductors or energized parts is significantly reduced. Exhibit 5-8 illustrates the use of a conductor insulator. In this example, an insulted middle phase conductor is sufficient to protect perching birds from electrocution. Exhibit 5-9 illustrates a properly installed perch guard.

Flight Diverters

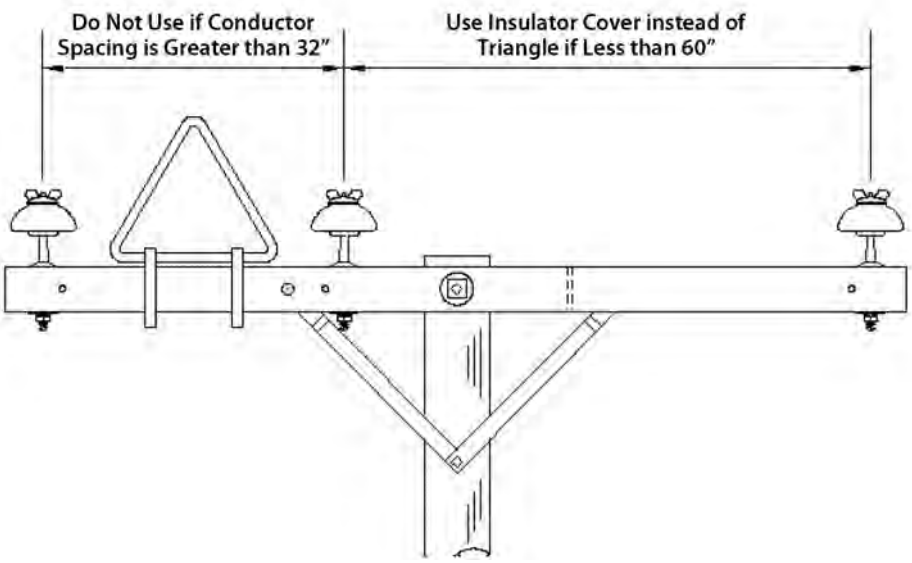
To reduce the potential for collision with power lines, SMUD may install flight diverters in high risk areas. Flight diverters are designed to increase the visibility of overhead wires to birds. Exhibit 5-10 illustrates two types of devices, a swinging marker and a coiled flight diverter. Each of these devices is installed directly onto the overhead wire, which alerts the bird to the presence of the wire and reduces the potential for collision.

Exhibit 5-8. Example of conductor insulator on center conductor. No other modifications are required to make this pole configuration raptor safe.
(Photo courtesy of Rick Harness and EDM International, Inc.)

5.8 Nest Management

5.8.1 General Nest Management

Utility poles and transmission towers often provide nesting substrate for a variety of bird species. In some areas, these artificial landscape features provide valuable nesting habitat for birds, particularly raptors. They often pose no problems for system functioning and reliability and are thus allowed to remain. Occasionally, however, bird nests are constructed in areas that pose either a risk of system malfunction or a risk to the birds themselves. In these cases, SMUD may elect to remove or relocate nests as described below and described in Exhibit 5-11, Nest Management Procedures.

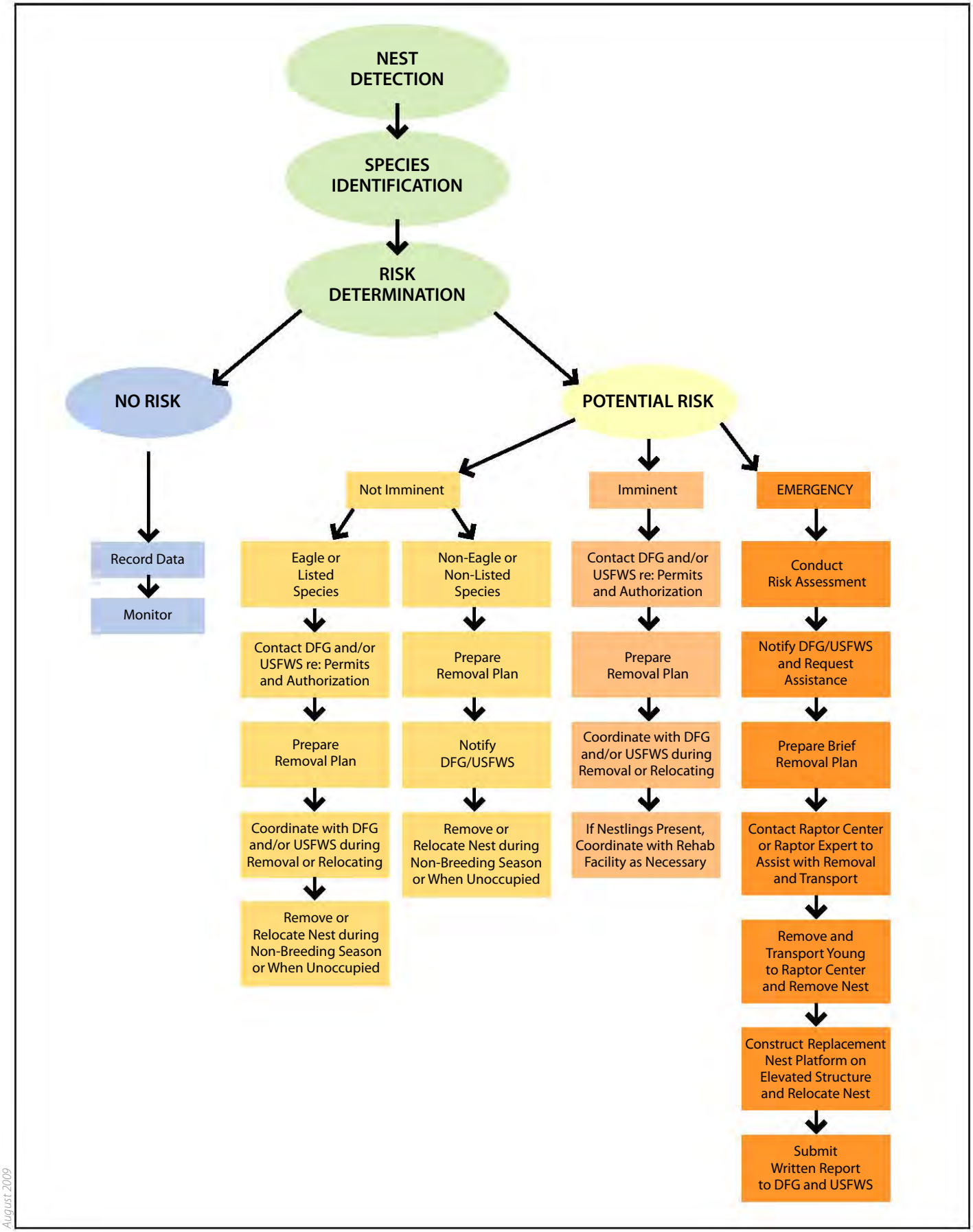


SOURCE: APP Guidelines.

Exhibit 5-9. Properly installed perch guard

SOURCE: APP Guidelines.

Exhibit 5-10. Swinging marker device (left) and bird flight diverter (right)



August 2009

Exhibit 5-11
Nest Management Procedures

In all cases where nests are detected, data will be recorded on a standardized field form (Bird Nest Record – See Avian Reporting System below). Once the bird species is identified, the environmental staff will conduct a risk assessment to determine if nest removal or relocation is warranted. If it is determined that the nest poses no risk to system function, maintenance procedures, or to the birds, the nest is allowed to remain. Data are recorded on the Bird Nest Record form and the site is periodically monitored. If it is determined that the nest poses a potential risk, then a further assessment is conducted to determine if the risk is non-imminent, imminent (i.e., if the risk of electrocution is high or if the nest compromises system function) or an emergency (i.e., if there is a substantial risk of ignition due to contact between the nest and conductors or hardware that could result in a nest-caused ground fire under conditions that could lead loss of property and life). In all cases, SMUD will coordinate with the DFG and/or the USFWS to determine whether the nest will be removed and discarded or relocated to an alternative location. Nest relocation will primarily involve eagles or special-status raptor species.

5.8.2 Non-Imminent Risk

Unless there is an immediate threat to birds or system function, nest removal or relocation (excluding eagles and state or federally listed species) will occur only during the non-breeding season when the nest is not being used or during the breeding season if the nest is unoccupied. When this activity is planned, SMUD will coordinate with DFG by providing notification and a nest removal plan. Upon removal of the nest, SMUD will either monitor the site during the early part of the breeding season to prohibit nest building activities or install devices to the structure to prevent future nesting at that location. If removal or relocation of an eagle or state or federally listed species nest is necessary, SMUD will coordinate with DFG and/or the USFWS regarding permitting and authorization pursuant to state or federal endangered species acts and the Bald and Golden Eagle Protection Act (BGEPA).

5.8.3 Imminent Risk

Nest removal or relocation will occur when the nest is occupied only in cases where it is deemed warranted based on the risk to system function or electrocution risk of the birds. This activity requires coordination and permitting/authorization with DFG and the USFWS pursuant to DFG Code and the MBTA (and state or federal endangered species act or BGEPA if an eagle or state or federally listed species nest. A plan will be developed that will include the timing, location, and techniques used to remove or relocate the nest. If possible, the nest will be relocated intact with young or eggs to an alternate location on the pole or tower structure. If necessary, and based on consultation with DFG and the USFWS, eggs or young will be collected from the nest and transported to a rehabilitation facility where they will be hatched and cared for until the earliest releasable date.

5.8.4 Emergencies

Emergencies occur when there is immediate risk to system function that could result in loss of life or property. The most immediate potential threat is from fire. Fires can be ignited as a result of bird electrocution, but also when nests are placed directly on conductors (Lehman and Barrett 2002). Ignition can occur when sticks from nests make contact with 2 conductors or a conductor and a ground wire, or from contact between jumper wires leading to transformers. Following initial ignition, sticks can fall to the ground and ignite vegetation. Under dry conditions, particularly in dry grassland or forest habitats, this can lead to grass or forest fires potentially resulting in significant loss of property, wildlife habitat, and under extreme conditions, loss of life. Osprey nests are often implicated in nest-caused fires probably due to the very large nests they construct and the opportunities for ignition. Relocation of nests on platforms constructed above the original location of the nest has proven to be a successful management measure both in terms of continued nesting of the resident birds and a reduction in electrocution and fire potential. While this is typically done during the non-nesting season, occasionally the immediate removal or relocation of an active nest may be required in order to avoid a highly hazardous condition. At these times, the protocols for permitting and authorization from DFG and USFWS as required under the Imminent Risk category may be too lengthy in order to avoid an emergency situation. Therefore, the following emergency protocols are established to address conditions deemed particularly and immediately hazardous with respect to the imminent threat of nest-caused ground fires.

Immediate nest removal will occur when the nest is occupied only in cases where it is deemed warranted based on the risk to system function and the threat of nest-caused ground fires. This activity requires a rapid assessment of the site and local environmental conditions; a determination that nest-caused ground fire is imminent due to the proximity of the nest material to conductors and hardware; immediate notification and request for assistance from CDFG and USFWS; preparation of a brief removal plan; notification of a nearby raptor center or raptor expert to assist with removal and transport; collection of the young and removal of the nest; transport of young to raptor center; construction of a replacement nest platform on elevated structure above pole crossarms and relocation of the nest (if intact) within 1 week of removal; and submittal of a written report to the CDFG and USFWS. Contact with DFG will be through the Department's CalTIP Phone Operator (1-888-DFG-CALTIP), who will notify appropriate DFG staff. A follow-up email will also be sent to the local DFG Staff Environmental Scientist. SMUD staff will provide site-specific information and details regarding the specific nature of the emergency activity.

5.9 Avian Reporting System

The Avian Reporting System is the process by which all avian incidents, nest sites, and monitoring data are recorded and cataloged into the data base. It includes the following three components:

- Detection
- Investigation, and
- Reporting

5.9.1 Detection

The detection of avian fatalities occurs through the investigation of avian-caused power outages and incidental observations. The detection of nest sites occurs through incidental observations and through monitoring efforts.

5.9.2 Investigation

Once detected, field staff will record the circumstances associated with dead or injured birds. Data will be recorded on standardized field forms (See Reporting below).

A site assessment will be conducted in response to all power outages to determine the cause and circumstances involved. If the cause is bird-related, the assessment will include a determination of bird species using the bird guide booklet that accompanies this APP; the types of injuries; the pole type and configuration; the specific cause of the fatality if possible; and other relevant data. To enhance the probability of incidental detections, all field staff will be directed to be alert for dead or injured birds in the vicinity of all SMUD facilities.

Data collection activities associated with assessments conducted within avian assessment zones will provide information on site conditions, avian use and behavior, and mortality risk within these zones. These data can be used to determine the need for remedial measures on existing structures and assess the need to explore siting alternatives for new construction.

Information on all bird nests will also be recorded as described under Nest Management and a determination made regarding the potential risk posed by the presence of the nest to system function and hazard to the nesting birds.

5.9.3 Reporting

Once a fatality or injury has been detected and investigated, the incident will be reported by submitting an Avian Incident Form (Exhibit 5-12) to the staff responsible for maintaining the data base. Information will be entered into the OMS data base and then forwarded to staff responsible for making decisions regarding remedial actions.

Exhibit 5-12 Avian Incident Report

Date Found:_____ **Name of Staff**:_____

Location
Line (Circuit) Name:_____ Segment:_____ Voltage:_____ Pole/Tower ID:_____

Pole Type and Configuration:_____ _____

Electrical Parts (circle):

Transformers Capacitor Cutouts Arresters Jumper wires

Other:_____

General Land Use (circle one):

Farmland Rangeland Rural Residential Urban Urban/Rural Interface

Location of Bird Relative to Pole or Line

Beneath Pole:____ Beneath mid-span of Line:____ Distance in feet from pole or line:_____

Species or Bird Group (note species if known, otherwise circle the most representative category)

Species (if known):_____

Hawk Eagle Falcon Owl Raptor Duck

Goose Waterfowl Crane Heron/Egret Waterbird Crow/Raven

Magpie Passerine Large Unidentified Bird Small Unidentified Bird

General Condition of Bird (circle one)

Fresh Partially Decomposed Mostly Decomposed Bones and Feathers only

Injuries (circle one)

Burn marks Dismembered Holes Trauma None Visible

Describe:_____

Likely Cause of Death (circle one)

Electrocution Wire Collision Vehicle Collision Shot Undetermined

Comments:_____

Nest data are recorded on the Bird Nest Report form (Exhibit 5-13). This information will also be entered into the OMS data base and then forwarded to staff responsible for making decisions regarding remedial actions. SMUD's Environmental Management staff will maintain other avian mortality data (e.g., line strikes) as information is received from different sources.

5.10 Permit Compliance

5.10.1 Incidental Take Permits

Section 10(a)(1)(b) Incidental Take Permit

If federally-listed birds are at risk from electrocution or collision mortality, the USFWS may recommend that SMUD seek a Section 10(a)(1)(b) incidental take permit pursuant to Section 10 of the federal ESA. This permit will allow a specified amount of take of each at-risk listed species through approval of a habitat conservation plan that includes measures to minimize potential mortality.

With the recent federal de-listing of the bald eagle and peregrine falcon, there are few federally listed birds that occur in the service area that are susceptible to electrocution or collision mortality that would warrant seeking a Section 10(a)(1)(b) permit. If species that occur within the service area become federally listed in the future and that are susceptible to electrocution or collision mortality, SMUD will work with the USFWS to assess the potential for mortality and the need to seek a Section 10(a)(1)(b) permit.

Bald and Golden Eagle Act Permit

Under the BGEAP, the USFWS issues permits to take, possess, or transport bald and golden eagles. Given the relatively unlikely event of a bald or golden eagle fatality within the SMUD service area, the need for a permit under the BGEPA is considered unnecessary at this time. If a bald or golden eagle injury or fatality occurs, SMUD staff will immediately report the incident to the USFWS who will take possession of the carcass. SMUD staff will not handle or dispose of bald and golden eagles.

2081 Permit

Section 2081 of the DFG Code provides for authorization for incidental take of state-listed species with approval of a plan that minimizes and fully mitigates the impacts of the take. Two species that occur within the service area, the state-threatened Swainson's hawk and the state-threatened greater sandhill crane, are susceptible to electrocution and collision mortality.

SMUD will submit this APP along with an application for incidental take to DFG pursuant to Section 2081. To minimize the potential for injury or mortality of these species, SMUD will focus bird collision avoidance efforts (e.g., installation of bird flight

Exhibit 5-13 Bird Nesting Record

Date:_____ **Name of Staff**:_____

Location
Line (Circuit) Name:_____ Segment:_____ Voltage:_____ Pole/Tower ID:_____

Crossroads or other specific location information:_____
_____

General Land Use (circle one)

Farmland Rangeland Rural Residential Urban Urban/Rural Interface

Description of location of nest on tower or pole:_____
_____

Species or Bird Group (note species if known, otherwise circle the most representative category)

Species (if known):_____

Hawk Eagle Falcon Owl Raptor Crow/Raven

Magpie Passerine Large Unidentified Bird Small Unidentified Bird

Condition of Nest (circle one)

Currently in use Intact Partially Deteriorating Mostly Deteriorating

Comments:_____

Eggs or Nestlings Observed:_____

Description of Nesting History at this Location:_____
_____
_____

Risk to Birds/System and Recommended Actions (circle one)

No risk Not Imminent Risk Imminent Risk Emergency

Comments:_____
_____

diverters) in the vicinity of known crane feeding and roosting areas. Pole retrofitting efforts will target known Swainson's hawk use areas.

5.10.2 Collection/Salvage Permits

There may be occasion for SMUD field staff to collect bird carcasses for necropsy to determine cause of death, for disposal purposes, or temporary collection for onsite inspection or extraction from electrical components. There may also be occasion to collect injured birds and transport them to a rehabilitation facility. It is unlawful to collect or salvage or otherwise have in possession any raptor or raptor body part, including feathers, without a state and federal permit. Thus, SMUD will coordinate with DFG and the USFWS to determine the need for a permit and if necessary will seek permits to handle dead and injured birds in the event that need arises. Each permit is described below.

State Scientific Collecting Permit

DFG requires a scientific collecting to collect, salvage, or otherwise handle all protected species including all raptors and all special-status species.

Federal Migratory Bird Permit

This permit is issued by the USFWS pursuant to the MBTA. This permit is required to salvage birds protected under the MBTA. The permit is issued by the Regional Migratory Bird Permit Office of the USFWS in Portland, Oregon.

5.10.3 Nest Removal and Relocation Permits

Raptors and other birds occasionally construct nests on certain types of distribution poles and transmission towers. Where the placement of the nest poses risk to the birds and to the functionality of the electrical system, the nests should be removed or relocated as advised by USFWS or CDFG. The nests of all birds protected under the MBTA and/or DFG Codes 3503 and 3503.5 cannot be removed or relocated without permits from the USFWS and DFG, respectively.

Nests of most birds (exceptions are bald and golden eagles and threatened or endangered species) can be removed during the non-breeding season when there is no risk to adults, eggs, or young birds. Neither the DFG Code nor the MBTA includes provisions that prohibit the removal of nests when they are not in use. Thus, nests that are not in use (either during the non-breeding season or if the nest is determined to be inactive) can be removed without state or federal permits.

If it is necessary to remove a nest while it is active, SMUD will contact the USFWS and DFG to obtain permits for this purpose under the federal Migratory Bird Permit and DFG Code under an Imminent Risk scenario (Refer to Section 5.8.3). If it is necessary to remove an active nest under an Emergency scenario (Refer to Section 5.8.4), SMUD will

contact and seek assistance from DFG and USFWS but will not necessarily wait to obtain permits, which can be a lengthy process. SMUD will coordinate with DFG and USFWS to develop Memoranda of Understanding or similar agreements or investigate development of an expedited or temporary permitting process to allow emergency nest removal without having to wait for formal permits.

5.11 Training

Successful implementation of this APP will require a thorough understanding of the issues and corresponding protocols. To accomplish this, SMUD will develop a training program focusing on staff with direct and indirect implementation responsibilities including managers, supervisors, first responders, field crews, engineers, dispatch staff, and design staff.

The training program will consist of the following elements:

- Introduction and description of the issue
- District Policy
- Identification of bird-related issues – electrocution and collision mechanisms
- Description of avian resources within the service area and species most susceptible to electrocution and collision mortality
- Discussion of state and federal regulations that protect birds, legal implications, and the need for compliance
- Construction and design standards and retrofitting standards designed to reduce mortality
- Protocols of plan implementation including assessing problems, proactive approaches, and recording/reporting data
- Discussion of each of the APP elements
- Responsibilities of staff to implement the APP

An annual review will be made to determine effectiveness of the training program and field staff.

5.12 Avian Enhancement Options

SMUD has and will continue to promote natural resource protection and actions that benefit local and regional bird populations and other wildlife. SMUD commits to a continuing partnership with local agencies and state and federal resource agencies to explore and participate in activities that enhance and restore habitat. Possible enhancement measures include:

- Planting trees. Expand the existing SMUD tree planting program that is focused primarily on urban landscapes and reducing energy consumption to include restoring or enhancing habitat for nesting native birds.
- Installing artificial nest platforms and perches. As noted above, artificial perches can be installed on existing utility poles. In other areas where nesting sites and perches are limited (and where utility poles are raptor-safe), installation of artificial structures can enhance raptor use.
- Restoring riparian and wetland vegetation. SMUD will continue to coordinate with local jurisdictions in efforts to maintain, create, and enhance habitat for wildlife and associated public access (e.g., Rancho Seco), and partner with DFG and USFWS regarding bird protection issues and habitat enhancement opportunities.

5.13 Program Review and Quality Control

The primary goal of this APP is to reduce electrocution and collision-related avian mortality and injury associated with SMUD's aboveground facilities. To do so, in addition to the monitoring, reporting, and management measures described above, SMUD will institute program review and quality control measures to ensure effectiveness of the APP. This will include the following elements:

- Responsibility for program review and quality control will be assigned to senior staff in SMUD's Environmental Management group.
- Staff will annually review the mortality data base, submitted field forms, monitoring results, and associated mortality reduction actions to ensure that the process as described above is adhered to, the data base is up-to-date, information is recorded accurately, and mortality reduction actions are implemented. The staff person will report the results of the review and recommend remedial actions needed on a separate PR/QC form.
- Sites that have been subject to retrofitting, nest protection/avoidance measures, etc. will be monitored to assess their effectiveness and need for maintenance.
- SMUD will coordinate with DFG and USFWS representatives periodically to review the program and its effectiveness.

5.14 Public Awareness

Similar to its tree planting program, SMUD will include avian protection in its ongoing public awareness campaign. The APP will be initially highlighted as a formalized program designed to reduce avian mortality and will describe the management efforts taken to reduce avian incidents. Ongoing public awareness will target the effectiveness of the program including retrofitting actions, ongoing monitoring to detect problem areas, and habitat enhancement activities. There may be opportunities to increase public awareness of the Avian Protection Plan via the internet. Periodic (e.g., biannual) updates

and mid-year reviews to the SMUD Board may be a useful information dissemination tool.

5.15 Key Resources

As noted above, SMUD will partner with local, state, and federal agencies in its efforts to successfully implement this APP. In addition, other organizations and individuals will be accessed as needed for expertise in local and regional bird populations, bird behavior, habitat enhancement concepts and design, and bird protection devices. Some of these key resources include the following:

Federal Agencies

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
2800 Cottage Way, Rm W-2605
Sacramento, CA 95825

U.S. Fish and Wildlife Service Migratory Bird Permit Office
911 N.E. 11th Avenue
Portland, OR, 97232-4181
Tel: (503) 872-2715. Fax (503) 231-2019
Email: permitsR2MB@fws.gov

State Agencies

California Department of Fish and Game
Region 2
1701 Nimbus Road
Rancho Cordova, CA 95670
Tel: (916) 358-2900. Fax: (916) 358-2912

California Energy Commission
Facilities Siting Division
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Tel: 916-654-4287

Local Agencies

Sacramento County
Department of Environmental Review and Assessment
827 7th Street
Sacramento California 95814
Tel: (916) 874-7914. Fax: (916) 874-8343

Placer County
Planning Department/Environmental Coordination Services Division
3091 County Center Drive
Auburn, CA 95603
Tel. 530-745-3000 Fax: 530-745-3080
Email: planning@placer.ca.gov

City of Sacramento
Planning Department
915 I Street
Sacramento, CA

City Rancho Cordova
Planning Department, Environmental Review
2729 Prospect Park Drive
Rancho Cordova, CA 95670
Tel: (916) 851-8700 Fax: (916) 851-8787

City of Elk Grove
Planning Division
8401 Laguna Palms Way
Elk Grove, CA 95758
Tel: (916) 478-2265 Fax: (916) 691-6411

City of Galt
Planning Department
495 Industrial Drive
Galt, CA
Tel: (209) 366-7230

City of Folsom
Planning Services
2nd Floor, City Hall Building
50 Natoma Street
Folsom, CA 95630
Tel: (916) 355-7222 Fax: (916) 355-7274

Universities

California State University Sacramento
Department of Biological Sciences
6000 J Street
Sacramento, CA 95819-6077
Tel: 916-278-6535 Fax: 916-278-6993

University of California Davis
Wildlife, Fish, & Conservation Biology Department
One Shields Ave.
Davis, CA 95616-8751
Tel: (530) 752-6586 Fax: (530) 752-4154

Organizations

Sacramento Audubon Society
765 University Ave # 200
Sacramento, CA 95825
(916) 649-7600

Central Valley Bird Club
www.cvbirds.org

Friends of the Swainson's Hawk
915 L St., Suite C-425
Sacramento, Ca. 95814
Tel: (916) 447-4956 Fax: 916-447-8689

Sacramento Tree Foundation
201 Lathrop Way # F
Sacramento, CA 95815
Tel: (916) 924-8733

The Nature Conservancy
2015 J St
Sacramento, CA 95811
Tel. (916) 449-2858

Ducks Unlimited
3074 Gold Canal Dr
Rancho Cordova, CA 95670
Tel. (916) 852-2000

Sacramento County Conservancy
P.O. Box 163351
Sacramento, CA 95816
Tel: (916) 492-0908 Fax: (916) 448-4120

Local Avian Consultants

AECOM
2022 J St

Sacramento, CA 95811
Tel. (916) 414-5800

EIP Associates
1200 2nd St
Sacramento, CA 95814
Tel. (916) 325-0602

ICF/Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814
Tel. (916) 737-3000

CH2MHill
2485 Natomas Park Dr # 600
Sacramento, CA 95833
Tel. (916) 920-0300

Airola Consulting
Tel. (916) 454-3073
d.airola@sbcglobal.net

Beedy Consulting
Tel. (530) 274-7232
tbeedy@comcast.net

Estep Environmental Consulting
Tel. (916) 921-2515
jim.estep@comcast.net

Restoration Consultants

Wildlands, Inc.
3855 Atherton Road
Rocklin, CA 95765
Tel: (916) 435-3555 Fax: (916) 435-3556

Westervelt Ecological Services
600 N Market Blvd # 3
Sacramento, CA 95834
Tel. (916) 646-3644

Hart Restoration, Inc.
13737 Grand Island Rd
Walnut Grove, CA , 95690-9766
Tel: (916) 775-4021 Fax: (916) 775-4022

Hedgerow Farms
21905 County Road 88
Winters, CA 95694
Tel. (530) 662-6847

Bird Control Consultants

BirdMaster
(John Pace – jpace@birdmaster.com)

Bird Protection Device Manufacturers

Eco Electrical Systems, Inc.
7758 Pickering Circle
Reno, Nevada 89511
Tel: (775) 853-8623 Fax: (775) 853-8615

Wildlife Rehabilitation Centers

The California Raptor Center
University of California, Davis
Tel. (530) 752-6091

California Foundation for Birds of Prey
3985 Foothills Boulevard
Roseville, California 95747
Tel. (916) 773-6049
(Vickie Joseph)

Section 6. Literature Cited

Avian Power Line Interaction Committee. 1994. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. (http://aplic.org)

Avian Power Line Interaction Committee. 1996. Suggested practices for raptor protection on power lines: The state of the art in 1996. (http://aplic.org)

Avian Power Line Interaction Committee. 2006. Suggested practices for raptor protection on power lines: The state of the art in 2006. (http://aplic.org)

Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005. Avian Protection Plan (APP) Guidelines. (http://aplic.org).

California Energy Commission. 1995. Avian collision and electrocution: an annotated bibliography. Publication Number: P700-95-001. Sacramento, CA.

Dwyer, J.F. 2004. Investigating and mitigating raptor electrocutions in an urban environment. Ms Thesis. University of Arizona, Tucson.

Estep Environmental Consulting. 2006a. The distribution, abundance, and habitat associations of Swainson's Hawk (*Buteo swainsoni*) in South Sacramento County. Prepared for the City of Elk Grove, CA.

Estep Environmental Consulting. 2006a. The distribution, abundance, and habitat associations of Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Prepared for the City of Rancho Cordova, CA.

Harness, R.E. 2000. Raptor electrocutions – emerging issues (overhead power distribution). Transmission and Distribution Construction, Operation and Live-Line Maintenance Proceedings. 2000 IEEE ESMO - 2000 IEEE 9th International Conference, Page(s):171 - 175

Jones & Stokes. 2007. Biological effectiveness monitoring for the Natomas Basin Habitat Conservation Plan Area – 2006 Annual Survey Results. (J&S 04002.04.) Sacramento, CA. Prepared for the Natomas Basin Conservancy.

R.N. Lehman and J.S. Barrett. 2002. Raptor electrocution and associated fire hazards in the Snake River Birds of Prey National Conservation Area. Technical Bulletin No. 02-7, Bureau of Land Management, Boise, ID.

Liguori, S. 2001. Raptor Electrocution reduction program. Hawkwatch International.

Miller, D., E.L. Boeker, R.S. Thorsell, and R.R. Olendorff. 1975. Suggested practices for raptor protection on powerlines. Prepared for Edison Electric Inst. by Raptor Res. Found., Inc. 19 pp.

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. Prepared by the Raptor Research Foundation, St. Paul, Minnesota. Prepared for the Edison Electric Institute, Washington, D.C. 111 pp.

Sacramento Municipal Utility District. 1989. *69 kV Switch Ground Conversion and Bird Guard Installation Implementation Plan.* Prepared by David Oto, SMUD Engineering Services.

Appendix C. Relevant License Conditions

Condition 38 Wildlife and Plant Protection Measures

6. The Bird-Powerline Associations Technical Report (Devine Tarbell & Associates 2004c), identifies the following problem designs based on the design and sighting standards developed by the Avian Power Line Interaction Committee (APLIC) for avoidance or minimization of bird electrocutions and collisions (APLIC 1996 and APLIC 1994):

a. Eleven type-H five-pole dead end structures used on the Jones Fork-Union Valley 69 kV line, with less than 36 inches of clearance between energized jumper wires and grounded cross-arms.

b. Exposed energized hardware and inadequate phase-to-phase and phase to-ground spacing along the 1.2-mile-long Brush Creek 12 kV tap line.

c. Overhead groundwires existing throughout most of the higher elevation segments of the transmission line from Loon Lake Powerhouse to just west of Camino Powerhouse, including the Jones Fork-Union Valley transmission line segment, and an isolated segment of approximately 3.0 miles near White Rock Powerhouse.

Within 1 year of license issuance, the licensee shall develop an Avian Protection Plan, as described above, that is approved by the FWS that addresses retrofitting transmission lines to meet the design and sighting standards established by APLIC for minimization of bird electrocutions and collisions.

152 FERC ¶ 62,116
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District Project No. 2101-112

ORDER APPROVING AVIAN PROTECTION PLAN PURSUANT TO ARTICLE 401a

(Issued August 18, 2015)

1. On July 14, 2015, Sacramento Municipal Utility District, licensee for the Upper American River Hydroelectric Project No. 2101, filed an avian protection plan (plan) pursuant to the requirements of Article 401a of the project license[1] and Section 4.12.1 of the project's Settlement Agreement. The project is located on the Rubicon River, Silver Creek, and South Fork American River in El Dorado and Sacramento counties, California and occupies lands within the Eldorado National Forest.

2. Article 401a of the project license requires the licensee to file, within 1 year of license issuance, an avian protection plan.[2] The licensee is required to consult with and obtain approval of the plan by the U.S. Fish and Wildlife Service (FWS). The plan must address at a minimum, the retrofitting of transmission lines to meet the design and sighting standards established by the Avian Power Line Interaction Committee for minimization of bird electrocutions and collisions.

3. The proposed plan provides information on the project area and project facilities. It outlines the technical study conducted during relicensing which formulated the requirements of Article 401a and license condition 38.6; requiring the development of the plan. The proposed plan provides the three specific sites found during the technical study that did not meet the design and sighting standards. The licensee states in the plan that as of March 2015, it has retrofitted two of the three sites, the Jones Fork-Union Valley line and the Brush Creek Tap line, and provides photographic documentation.

---

[1] Order New License, 148 FERC ¶ 62,070 (issued July 23, 2014).

[2] Article 401a encompasses conditions of the license found in the U.S. Forest Service's (Forest Service) final section 4(e) conditions. Forest Service condition no. 38.6 requires the avian protection plan approved by the FWS; the condition does not require Forest Service approval of the plan.

4. For the remaining site, which consists of overhead ground wires, the licensee proposes to work with the Forest Service, FWS, and California Department of Fish and Game to develop criteria for identifying areas where increased probability of power line collisions occur. Once approved by the resources agencies, the licensee will develop a retrofit schedule to complete the work by July 2024.

5. The proposed plan provides documentation of materials used to retrofit the existing transmission lines (appendix A). The proposed plan also describes the topics covered in the licensee's annual training provided to staff involved in maintaining, inspecting, and building transmission and distribution lines. The proposed plan defines the use of avian mortality incident reports and forms, for monitoring avian mortality, which will be reviewed annually and reported on during the licensee's annual review of ecological conditions meeting. Lastly, the plan states that any revisions to the plan must be approved by the Forest Service, California Department of Fish and Game, California State Water Resources Control Board, and the Commission prior to implementation.

6. The licensee included with the proposed plan a pre-existing Sacramento Municipal Utility District Avian Protection Plan, which it currently uses for operations in its service territory in the Sacramento Valley. The existing avian protection plan does not include the Upper American River Hydroelectric Project area; however, the licensee has written the proposed plan, discussed above and required by Article 401a, to complement the existing plan. As such, appendix B of the proposed plan includes standards for designing new facilities, which incorporates the Avian Power Line Interaction Committee's: *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012.* Additionally, in pertinent part, the procedures for detecting, investigating, and reporting avian fatalities are found in appendix B of the proposed plan.

7. The licensee provided the proposed plan to the Consultation Group on March 12, 2015 for review and comment, and to the FWS for final review and approval on July 7, 2015.[3] The FWS approved the plan via July 8, 2015 email. Documentation of consultation is included with the proposed plan filing.

[3] The Consultation Group consists of the signatories to the Settlement Agreement (filed with the Commission on February 1, 2007), including: American Whitewater, American River Recreation Association, Bureau of Land Management, California Parks and Recreation, California Department of Fish and Wildlife, California Outdoors, California Sportfishing Protection Alliance, Camp Lotus, Foothill Conservancy, Forest Service, Friends of the River, FWS, U.S. Department of Interior, U.S. National Park Service, Pacific Gas & Electric Company, Rich Platt, Hilde Schweitzer, Theresa Simsiman, and the licensee.

8. The proposed plan meets the requirements of Article 401a and has been approved by the necessary agency. Implementation of the plan will help to ensure that the project's transmission lines meet the design and sighting standards for avian protection and minimize avian electrocutions and collisions. As such, ordering paragraph (A) approves the plan.

The Director orders:

(A) The avian protection plan, filed by the Sacramento Municipal Utility District, for the Upper American River Hydroelectric Project No. 2101 on July 14, 2015, required by Article 401a of the license, is approved.

(B) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 CFR § 385.713 (2014). The filing of a request for hearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Robert J. Fletcher
Chief, Land Resources Branch
Division of Hydropower
Administration and Compliance

Document Content(s)