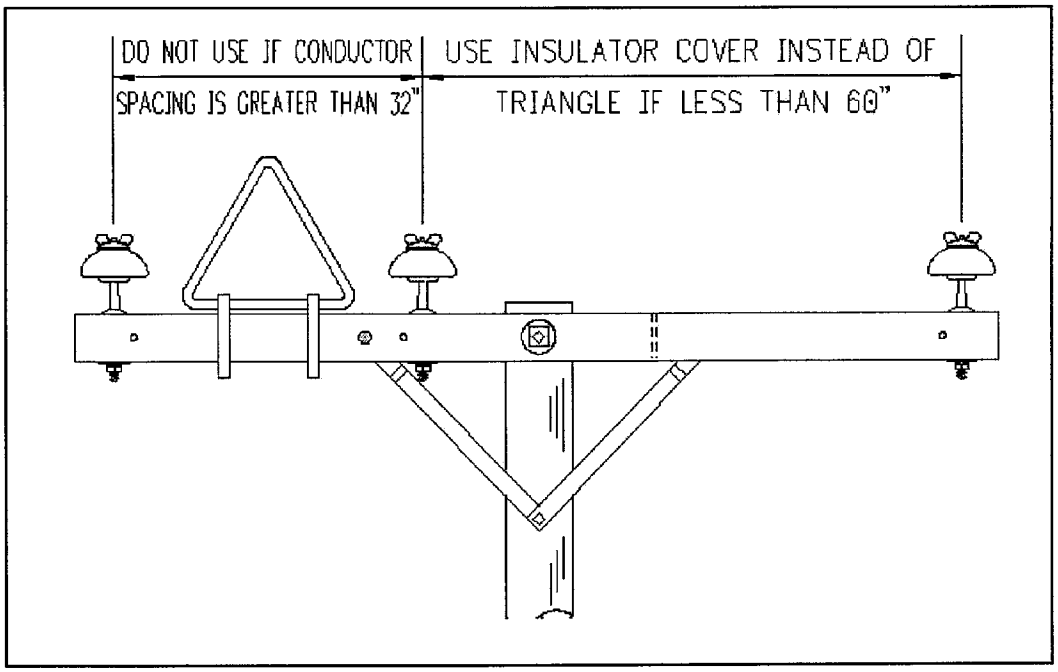

Figure 8. Properly installed perch guard.

Covering Conductors

Where adequate separation of conductors, or conductors and grounded parts, cannot be achieved, covering conductors may be the only solution short of reframing or replacing structures. Covering material should be used to cover both the conductor and the insulator. On three phase structures, the cover should extend a minimum of three feet from the pole top pin insulator (see Figure 9). Occasionally, on double circuits or distribution underbuild, a smaller (32 to 36-inch) one–piece cover may be used in areas where eagles or other large birds are absent. There are many manufactures of insulator covers. Insulator covers are similar to the temporary cover-ups used to protect crews working on energized lines. ***However, the products should not be used for human protection or considered as insulation.***

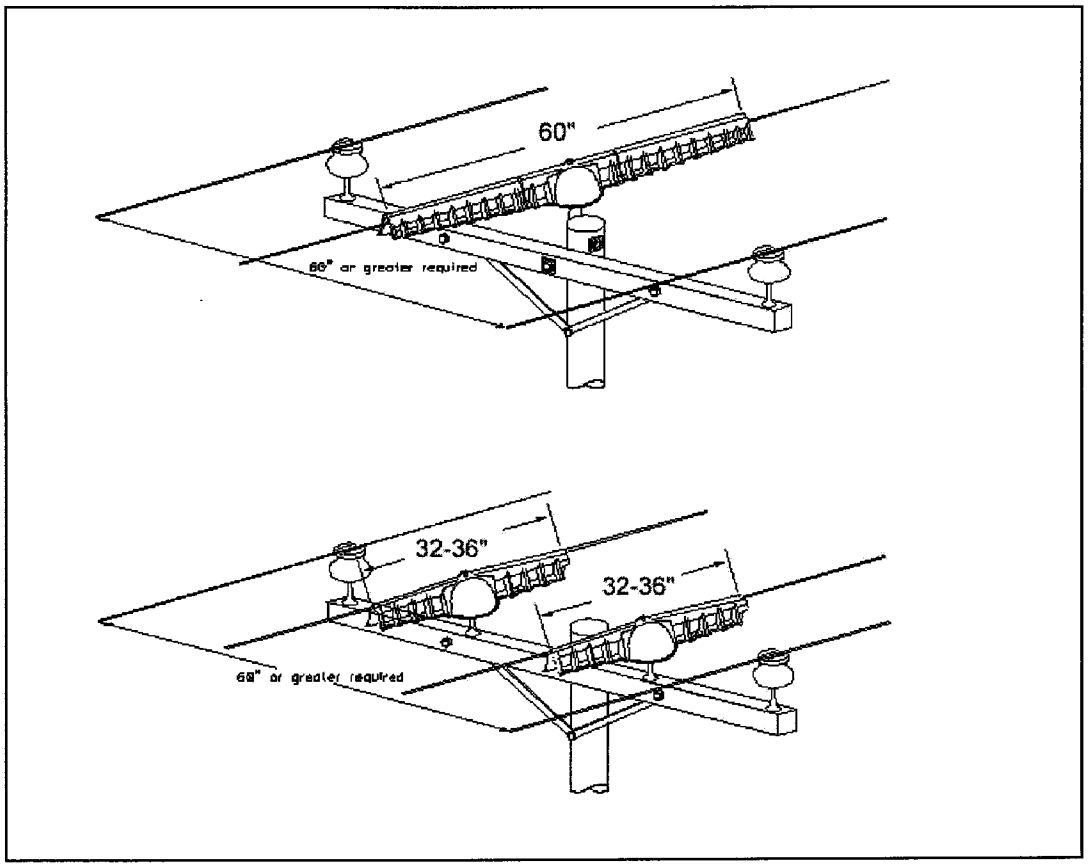

Figure 9. Conductor and insulator covers.

Covering Equipment Parts

If transformers, cutouts or other energized or grounded equipment are present on the structure, jumpers, cutouts and bushings should be covered to decrease the chance of a bird electrocution (Figure 10). For jumper wires, use a bird jumper wire guard, cover-up hose or insulated power cable. For cutouts, various covers are available to fit different sizes and styles of cutouts. For bushings, use a bushing guard that provides the protection needed. (*Note* - Your APP should include specifications on materials your utility will accept).

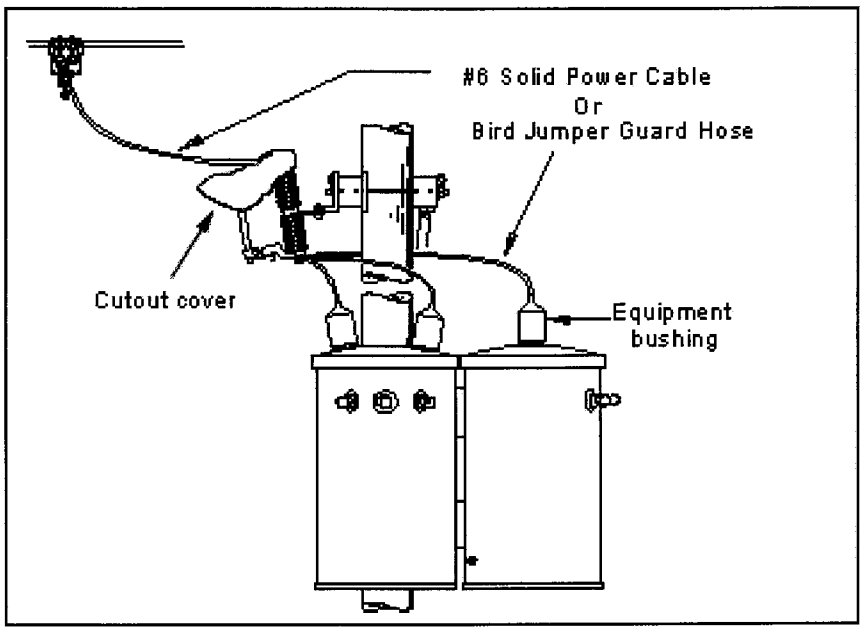

Figure 10. Hose and bushing caps.

Collisions: Bird Protection

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

On existing lines, the risk of collision may be reduced or eliminated by burying or relocating the line, reconfiguring the line, removing the overhead ground wire, or marking the line to increase visibility. Because in most instances remediation of only a few spans will eliminate the problem, burying, relocating or reconfiguring the line are not cost-effective solutions. Removal of the overhead ground wire may not be feasible due to operational or safety concerns. However, research indicates that marking the shield wire (transmission lines) or conductors (distribution lines) to increase visibility significantly reduces the incidence of avian collisions.

Marker balls, swinging markers, bird flight diverters, or other similar devices are commercially available products designed to increase the visibility of overhead wires to

birds. Examples of one type of swinging marker and a bird flight diverter are shown in Figure 11. While some older clamping devices could damage lines, some of the newer devices have been designed to prevent damage to lines.

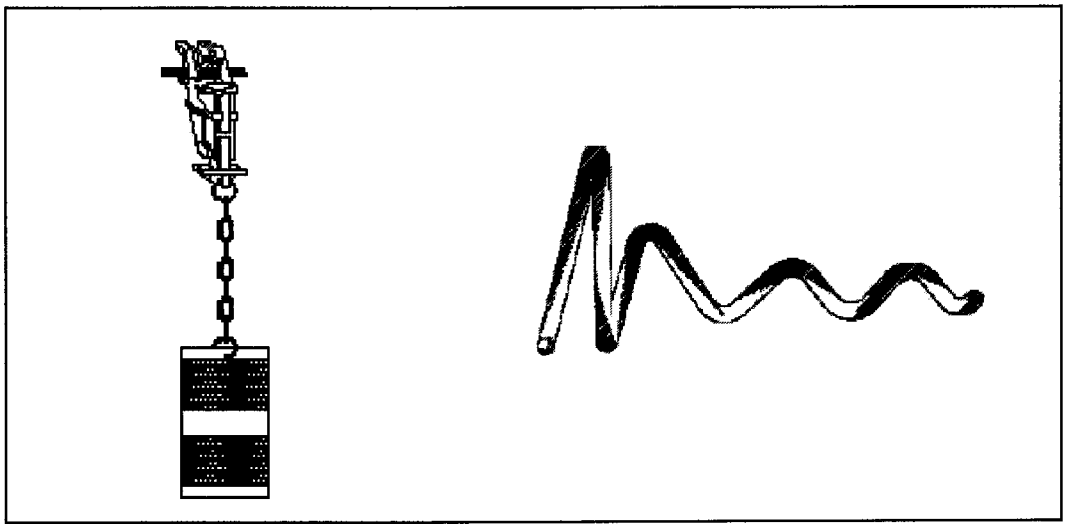

Figure 11. Swinging marker device (left) and bird flight diverter (right).

NEST MANAGEMENT

Raptors, and some other avian species, benefit from the presence of power lines by utilizing distribution poles and transmission structures for nesting. Although electrocution of birds that nest on transmission towers is infrequent, bird nests can cause operational problems. Removal of nests generally does not solve the problem because most species are site-tenacious and rebuild shortly after the nest material is removed. There are also regulatory and public relations components to nest removal (see Permit Compliance section for information on nest-related permits). Further, companies may experience public relations benefits by providing safe nesting locations. All active nests (eggs or young present) of designated migratory birds are protected by the Migratory Bird Treaty Act. A permit issued by USFWS may be required before managing an active nest. If a problem with a specific nest is anticipated, permit requirements may be avoided by removing the nest or taking the appropriate action during the non-breeding season while it is inactive (excluding eagles and endangered/threatened species). The breeding season and dates when nests may be active varies by location and species, but for most North American raptors falls between February 1 and August 31. However, a nest is considered active only when eggs or young are present. If there are questions whether a problem nest is active or inactive, company environmental staff, USFWS, or State wildlife agencies should be consulted.

A memorandum from USFWS on nest management and nest destruction is provided in Figure 12 (page 47). This document can also be accessed online at http://permits.fws.gov/mbpermits/PoliciesHandbooks/MBPM-2.nest.PDF.

Nesting platforms have proven to be valuable tools in dealing with problem nests, both in terms of reducing outages and increasing positive publicity. Nesting platforms are generally needed more often for problem nests on distribution poles (because of closely spaced conductors) than for those on transmission towers. Platforms provide for the needs of the birds, while preventing electrocutions and electrical outages. Artificial nesting substrates in a variety of designs are often accepted by nesting raptors, especially ospreys. Because birds usually tend to stay at the pole where the initial nesting attempt occurs, a nesting platform should be placed nearby on a new, non-energized pole and

perch discourager(s) installed on the existing structure. The new nest platform pole should be as tall as or taller than the existing pole and should be placed adjacent to or near the existing pole with the problem nest. In some cases a new pole cannot be installed so a nest platform can be mounted above the crossarm. Mounting a nest platform above energized equipment is not encouraged because birds are likely to drop nest materials that could cause a fire or outage. Nest discouragers should be erected on the original nest pole to prevent birds from rebuilding. The existing nest, or other nesting material, should be relocated to the new platform to attract the birds. Nest platforms are commercially available or can be constructed with materials on hand such as wire spool ends or wooden pallets. In addition, volunteers can be solicited to construct nest platforms. Dimensions for a raptor nest platform are provided in the Avian Enhancement Options section (see Figure 14 on page 65). Additional designs can be found in *Suggested Practices.*

There may be times when nesting should be discouraged to prevent avian electrocutions or risks to electrical equipment. Concerns of local customers should be considered and proper placement of perch discouragers is important. Plastic or metal spike discouragers are not recommended to prevent nesting because they may actually provide a nest substrate attachment point for some species. PVC or fiberglass material perch discouragers, mounted on the crossarm, will usually prevent the placement of nesting material. See *Suggested Practices* for additional recommendations on nest deterrents.

Figure 12. USFWS memo on migratory bird nest destruction.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Washington, D C 20240
MBPM-2
Date: APR 15, 2003

MIGRATORY BIRD PERMIT MEMORANDUM

SUBJECT: Nest Destruction

PURPOSE: The purpose of the memorandum is to clarify the application of the Migratory Bird Treaty Act (MBTA) to migratory bird nest destruction, and to provide guidance for advising the public regarding this issue.

POLICY: The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction To minimize MBTA violations, Service employees should make every effort to inform the public of how to minimize the risk of taking migratory bird species whose nesting behaviors make it difficult to determine occupancy status or continuing nest dependency.

The MBTA specifically protects migratory bird nests from *possession, sale, purchase, barter, transport, import,* and *export,* and *take.* The other prohibitions of the MBTA - *capture, pursue, hunt,* and *kill* - are inapplicable to nests. The regulatory definition of *take,* as defined by 50 CFR 10.12, *means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt hunt, shoot, wound, kill, trap, capture, or collect.* Only *collect* applies to nests.

While it is illegal to collect, possess, and by any means transfer possession of any migratory bird nest, the MBTA does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. The MBTA does not authorize the Service to issue permits in situations in which the prohibitions of the Act do not apply, such as the destruction of unoccupied nests. (Some unoccupied nests are legally protected by statutes other than the MBTA, including nests of threatened and endangered migratory bird species and bald and golden eagles, within certain parameters.)

However, the public should be made aware that, while destruction of a nest by itself is not prohibited under the MBTA, nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA.

Due to the biological and behavioral characteristics of some migratory bird species, destruction of their nests entails an elevated degree of risk of violating the MBTA. For example, colonial nesting birds are highly vulnerable to disturbance; the destruction of unoccupied nests during or near the nesting season could result in a significant level of take. Another example involves ground nesting species such as burrowing owls and bank swallows, which nest in cavities in the ground, making it difficult to detect whether or not their nests are occupied by eggs or nestlings or are otherwise still essential to the survival of the juvenile birds. The Service should make every effort to raise public awareness regarding the possible presence of birds and the risk of violating the MBTA, the Endangered Species Act (ESA), and the Bald and Golden Eagle Protection Act (BGEPA), and should inform the public of factors that will help minimize the likelihood that take would occur should nests be destroyed (i.e., when active nesting season normally occurs).

The Service should also take care to discern that persons who request MBTA permits for nest destruction are not targeting nests of endangered or threatened species or bald or golden eagles, so that the public can be made aware of the prohibitions of the ESA and the BGEPA against nest destruction.

In situations where it is necessary (i.e , for public safety) to remove (destroy) a nest that is occupied by eggs or nestlings or is otherwise still essential to the survival of a juvenile bird, and a permit is available pursuant to 50 CFR parts 13 and 21, the Service may issue a permit to take individual birds

Steve Williams
Director

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AVIAN REPORTING SYSTEM

USFWS Avian Mortality Reporting System

USFWS attempted in the 1970's, and again within the last few years, to estimate bird strike and electrocution mortality caused by power lines and utility structures nationwide. These estimates have been based on actual counts, extrapolations from industry, other data, and estimates based on the best information available. However, they cannot be considered conclusive, since a comprehensive nationwide study has not yet been conducted on power structures and their overall impacts on bird populations.

The former US Bureau of Sport Fisheries and Wildlife (now USFWS) published a one-time summary of bird mortality in 1979, entitled, *Human Related Mortality of Birds in the United States* (Banks 1979[1]). The report estimated annual avian mortality from varying causes between 1966 to 1972, mentioning strikes with electrical transmission wires as likely low at that time, while raising concerns about electrocutions from power transmission lines (now defined as power distribution lines) and electric fences (Banks 1979). Unfortunately, no updated mortality summary broadly encompassing hunting, scientific collecting, automobile collisions, communication tower strikes, picture window strikes, lead poisoning, electrocutions and power line strikes has been published more recently by USFWS. USFWS has published several papers on more current estimates of avian mortality, including estimates for power line strikes and electrocutions (Manville 2001a[2], 2001b[3], 2004[4]), but these publications are nowhere as comprehensive as the Banks (1979) paper. John Bridges of the Western Area Power Administration (Bridges

[1] Banks, R.C. 1979. Human related mortality of birds in the United States U S. Fish & Wildlife Service, National Fish and Wildlife Lab, Special Scientific Report -- Wildlife No. 215:1-16. GPO 848-972.

[2] Manville, A.M., II. 2001a The ABCs of avoiding bird collisions at communication towers: next steps. Pp 85-103 in R.L. Carlton (editor). Avian interactions with utility and communication structures. Proceedings of a workshop held in Charleston, South Carolina, December 2-3, 1999. EPRI Technical Report, Concord, CA. 343 pp.

[3] Manville, A.M., II. 2001b. Avian mortality at communication towers: steps to alleviate a growing problem. Pp 75-86 in B.B. Levitt (editor). Cell towers -- wireless convenience? or environmental hazard? Proceedings of the "Cell Towers Forum," state of the science/state of the law, December 2, 2000, Litchfield, Connecticut. New Century Publishing 2000, Markham, Ontario. 348 pp.

[4] Manville, A M., II. 2004. Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science -- next steps toward mitigation. Bird Conservation Implementation in the Americas, Proceedings 3rd International Partners in Flight Conference 2002. C J. Ralph and T.D Rich, Editors USDA Forest Service GTR- PSW-191, Albany, CA 14 pp. In press.

2002 and 2003, personal communication) has provided annual summaries for avian strike mortality at a power transmission line across the Audubon National Wildlife Refuge, ND. That information, however, is site- and project-specific. The Division of Migratory Bird Management (DMBM) maintains a mortality fact sheet (prepared and periodically updated by Al Manville for public dissemination), but it is not comprehensive.

Utility Bird Mortality Tracking System

An important part of an APP is a utility's system for documenting bird mortalities and nest management activities. This system should be designed to meet the needs of the specific utility and be compatible with other data management and analysis programs. The system could utilize paper forms such as the following examples or may be an internal web-based program. The information collected should be used to help a utility conduct risk assessments by identifying avian problem areas and potential or known high risks. To protect birds and minimize outages, these data can be prioritized for corrective actions. Avian information collected by a utility should be maintained internally. Data may be required as a condition of an annual Federal permit for direct take of birds or their nests. If a Federal permit is issued, an annual report is required. The USFWS does not issue "accidental, incidental or unintentional" take permits. Bird Mortality Tracking System software developed by APLIC is available upon request for free at http://*aplic.org*.

Example 7. Dead bird/nest reporting form. This form can be used in conjunction with the Bird Mortality Tracking System software available from APLIC.

Dead Bird/Nest Form

Operations Area:

Dead Bird (circle one)		**or**	**Nest (circle one)**
Crow/magpie/raven	Eagle		Active
Hawk/falcon/osprey	Owl		Inactive
Small bird (protected)	Waterfowl		
Unknown species			

Bird Count_____

Date Found_____**Time Found**_____

Sign of Death (circle one)

Collision Electrocution Shot Unknown

County_____

Finder's Name_____

Finder's Phone_____

Line Name/Circuit No._____

Pole Identification No._____

Recommended Action (circle)

Dead Bird Actions	*Nest Actions*
Cover transformer equipment	Install nest platform
Install insulator cover(s)	Relocate nest
Install triangle(s)	Trim nest
Reframe structure	Install nest guards
Replace structure	Remove nest
Remove pole	Evaluate to determine appropriate action
De-energize	No action
Install bird flight diverters/fireflies	
Evaluate to determine appropriate action (Provide action in comments)	
Continue to monitor line (Justification required)	
No action (Justification required)	

Comments_____

Example 8. Southern California Edison's reporting and training materials.*

Avian Protection

Electrocutions

Raptors often perch or nest on transmission or distribution towers or poles. Occasionally, the birds make accidental contact between phases or phase and ground, injuring or electrocuting the bird. These electrocutions are most common on distribution or subtransmission facilities where energized conductors are close together. The number of electrocutions can be decreased by either designing the line to minimize contact between phases, or by retrofitting existing lines where necessary with a protective device that prevents this contact. Studies have demonstrated that raptors prefer certain poles for nesting and perching. By identifying these preferred poles, we can modify them, and thus greatly diminish the potential for raptor electrocutions in a cost-effective manner.

Nest Protection

In the absence of other suitable nest sites, raptors (and other protected species such as ravens) often use transmission towers and distribution poles for nesting. State and federal laws and regulations protect these nests from removal at certain times of the year without first obtaining authorization from state and federal wildlife agencies. It is important that nests not be disturbed when eggs or young birds are in them. An important note is that **there are only a few species of birds that are NOT protected by law** in SCE's service territory: **house sparrow, European starling, rock dove (common pigeon)** and certain game birds. All other species, including crows and ravens are protected by law and cannot be moved without proper authorization.

If there is a threat to power operations SCE must sometimes move an active nest (a nest with eggs or young in it). If you must move an active nest ensure environmental compliance and contact an Environmental Affairs biologist for assistance. They will make the necessary contacts with the regulatory agencies to obtain authorization for the nest to be moved.

House sparrow

European starling

Rock dove (common pigeon)

* Note: information presented in this example is specific to Southern California Edison. Contact USFWS for information on permits related to transporting eagles.

***Example 8** (con't).*

Raptor Mortality Procedures

When a dead or injured raptor is found near or on SCE equipment and facilities (e.g., poles, towers, substations) an internal report must be filed with Environmental Affairs (EA). EA will make the determination if a report to government agencies must also be filed. This is a step-by-step guide to help in the process of completing the raptor mortality report.

Both bald and golden eagles occur within SCE's service territory. Though rare, eagle electrocutions do occur on our lines, especially golden eagles. When an eagle is electrocuted, EA must be contacted immediately and special arrangements must be made for transport of the bird. It is illegal to transport eagles in the U.S. **DO NOT transport any eagle unless authorized by EA.**

1. Identify the species of raptor.
Identify the species if possible, especially to determine whether the raptor is an eagle or other raptor. Adult bald and golden eagles range anywhere from 30" to 40" in length and have a 72" to 84" wingspan while other raptors, such as red-tailed hawks are considerably smaller at about 19" in length and a 48" to 56" wingspan. See the attached guide. Whenever there is a doubt, contact Environmental Affairs (EA) for guidance. Take pictures (digital preferred) and send to EA so we can identify the bird.

If the bird is an eagle, follow the instructions directly below. For all other species, go directly to Step Number 2.

Eagle electrocutions:
Call or page EA immediately. You will be given guidance on the next course of action to take. It is illegal to transport eagles in the U.S. Do NOT transport an eagle unless authorized by EA. If the incident occurs after business hours, have the Edison operator connect you with EA staff.

All structures where an eagle electrocution has occurred must be corrected right away. Please contact EA for assistance in making these corrections to the structures.

After contacting EA and following the instructions given, continue to number 2.

2. Fill out a Raptor Mortality Report.
This form is available through EA or can be found on the Environmental Affairs website on SCE's Intranet. Fill out the report as completely as possible. Include maps of the area and, if possible, pictures of the structure, the bird, and the surrounding area (so we have an idea of the habitat in the vicinity of the pole.) Submit this report to EA as soon as possible after the incident.

Whenever multiple electrocutions occur within a few span lengths or on the same structure, these structures should be made raptor safe as soon as possible. Please contact EA for assistance in making these corrections to the structures.
Species other than eagles can be buried on site (away from the pole). You should have a current copy of SCE's U.S. Fish & Wildlife Permit in your vehicle in order to do this legally.

This permit requires us to maintain records of electrocutions. If you do not have a copy of this document, please contact EA.

3. Send the completed form and attachments to EA.
Send the completed form and any pictures to:
Tracey Alsobrook, Environmental Affairs, G.O. 1

Remember, ordinary people and agencies are watching our activities. We must comply with the laws that protect almost all birds in the U.S. Report all known mortalities to EA. We need your assistance to keep the Company in compliance with the laws and in protecting these natural resources.

Call us when you need help with raptor mortality procedures or raptor protection.

	PAX		PAX
Daniel C. Pearson	29562	Janet Baas	29541
Tracey Alsobrook	27547	Jill Fariss	28545

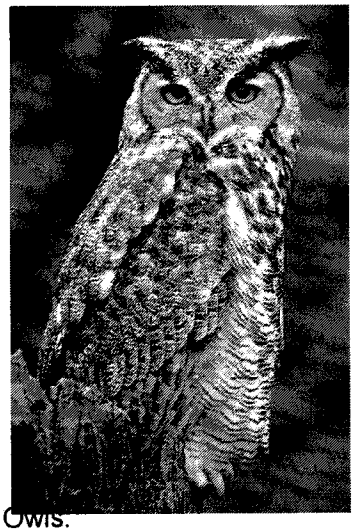
Golden Eagle

Eagles:
(e g , golden & bald eagles)
Length: 30-40"
Wingspan: 6½ to 7 feet

Red-Tailed Hawk

Hawks:
(e g. red-tailed & red-shouldered hawks)
Length: 15-23"
Wingspan: 4 to 4½ feet

Great-horned Owl



Owls:
(e.g , great-horned, barn & great gray owls)
Length: 16-27"
Wingspan: 3½ to 4 ½ feet

Golden Eagle Silhouette

General Hawk Silhouette

***Example 8** (con't).*

Animal/Bird Mortality Report

To: Tracey Alsobrook
Environmental Affairs (EA)
GO1, Quad 1A

Date: _____

From: Name _____
Work Location_____ PAX _____

Describe the species of the Animal or Bird that was mortally injured by SCE facilities (electrocuted/hit by a SCE vehicle, etc.).

_____
_____

If any bands or tags please return to EA or write number and agency here

_____
_____

Describe how the Animal or Bird was mortally injured by SCE facilities (bird contacted transformer bushings, etc.).

_____
_____
_____
_____

Weather Conditions (e.g. rainy and cold, sunny and warm, etc.)

_____
_____
_____

Circuit Name & Voltage_____

Specific Problem Location (e.g. Pole #/Address/Cross Streets, etc.)

_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)

_____
_____
_____

Please attach picture of the Bird or Animal if possible.

Example8 *(con't).*

Raptor/Bird Nesting Record

To: Tracey Alsobrook
Environmental Affairs
GO1, Quad 1A

Date: _____

From: Name _____
Work Location _____ PAX _____

Species of Raptor/Bird (if known) _____

Circuit Name and Voltage _____

Specific Nest Location (pole no.) _____

Condition of Nest

_____
_____

Are Eggs or Young Birds Apparent? If so, please describe.

_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)

_____
_____
_____

History of Previous Nesting on This Circuit

_____
_____
_____

History of Electrocutions/Mortality on This Circuit

_____
_____
_____

Recommendations

_____
_____
_____

Please attach picture of the Bird and/or Nest, if possible.

RISK ASSESSMENT METHODOLOGY

Thousands of utility poles occur in areas of suitable habitat for migratory birds. Because remedial actions on all poles in such areas are neither economically justifiable nor biologically necessary, a method is needed to identify configurations or locations of greatest risk. Risk assessment studies and models can be implemented to more effectively allocate resources to protect migratory birds. While risk assessment procedures will vary among utilities based on geographic scale, available data, and funding resources, included below are examples of risk assessment methods employed by different utilities.

Example 9. Risk Assessment Methodology Employed by PacifiCorp.

Reactive, preventative, and proactive measures can be adopted to minimize avian electrocutions. Reactive measures can be conducted at a structure after a mortality has occurred; preventative measures can be taken by constructing new structures to avian-safe standards in avian use areas; proactive measures can incorporate protocols to assess electrocution risk in an effort to prevent avian mortality on existing structures. Such risk assessment procedures can be useful aids when deciding where to allocate limited dollars over large geographic areas. The risk assessment methodology described in this example is based upon field surveys of poles, however, similar procedures could be followed using comparable GIS (Geographic Information System) data.

Based on a need to identify and quantify raptor electrocution risks throughout its service area, PacifiCorp implemented a program to assess electrocution risk, develop a scoring system to prioritize structures and circuits for remedial action, and create a GIS to assist in managing and analyzing spatial information regarding line locations, pole configurations, electrocutions, outages, and raptor distributions. Trained observers, while walking rights-of-way, recorded data on structure configuration, evidence of avian activity, and presence of dead birds. They searched an area encompassing 15 ft. on each side of the central line and a 25-ft. radius around each pole for carcasses, prey remains, pellets, and whitewash. At each pole, data were recorded on the pole location, habitat type, pole configuration, avian mortalities, live

species observed, evidence of raptor use, and presence of avian nests (see Example 10 for data sheet). In addition, the surveyor assessed whether or not each structure was avian-safe (based on current *Suggested Practices* standards).

Existing GIS data layers containing information on habitat type and raptor nest locations were compiled. State wildlife resource agencies, Natural Heritage Programs, universities, USFWS, Bureau of Land Management, U.S. Forest Service, and U.S. Geological Survey may serve as clearinghouses for such data. Pole locations and configurations, raptor nest site locations, habitat, and other field survey data were compiled and analyzed in ArcView GIS.

To assess the risk of electrocution, each non-avian-safe structure was assigned a score based on abundance (>50% total area) of suitable raptor habitat within a 1-km radius, evidence of raptor use, presence of raptor nests within 1 km, and presence of avian mortalities. Structures were assigned one point each for presence of suitable habitat, raptor nests, or evidence of raptor use. Structures at which non-eagle avian mortalities were documented were assigned four points. Structures with eagle mortalities were assigned five points. All scores of five or greater were lumped together in a "very high risk" category.

Using the above scoring method, non-avian-safe poles were assigned the following risk assessment scores:

Score	Risk Assessment
0	N/A
1	LOW RISK
2	LOW/MODERATE RISK
3	MODERATE RISK
4	HIGH RISK
5+	VERY HIGH RISK

These risk assessment scores are then used to target remedial actions. While structures with mortalities (risk scores ≥4) receive immediate attention, structures or circuits without mortalities are prioritized for ongoing remedial efforts based on their relative risk and circuit reliability. In addition to selecting poles that pose a moderate risk, other structures are selected for remedial actions based on a "common sense" review of the data. This "common sense" review applies additional data layers (i.e. outages and historical mortalities) and best

***Example 9** (con't).*

***Example 9** (con't).*

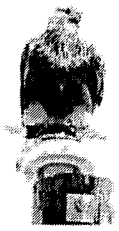
professional judgment to identify structures that warrant proactive remedial action. Below is a list of criteria that may elevate the risk scores of structures:

- Poles adjacent to mortality poles
- Poles near mortality poles with a similar configuration
- Circuits, lines, or taps where multiple mortalities have occurred
- Deadend equipment poles in remote or rural areas
- Configurations that have been documented to have a heightened risk in a particular district
- Non-raptor-safe poles in otherwise raptor-safe lines
- Non-raptor-safe poles adjacent to poles with perch discouragers
- Incomplete or improper installation of existing avian protection devices
- Circuits or lines with a history of bird-caused or unknown-cause outages
- Poles that pose other safety or reliability risks

Once all poles are identified, a comprehensive remedial action plan is developed with the appropriate service district that identifies a course of action, timeline, and resources required. The location and number of poles retrofitted, and associated costs are documented. Future monitoring is conducted to document the effectiveness of these efforts and to identify other areas that may require action. In addition, this methodology can be used to research electrocution risks associated with particular configurations or species. This risk assessment database is updated and refined as new information becomes available. For additional information on this risk assessment methodology, contact Jim Burruss (jim.burruss@pacificorp.com) or Sherry Liguori (sherry.liguori@pacificorp.com).

Example 10. PacifiCorp's Risk Assessment Data Sheet.

Avian Electrocution Risk Assessment
Data Sheet



Date_____

Observer(s) _____

Sheet _____ **of** _____

IF A MORTALITY WAS DOCUMENTED, CHECK HERE _____

Operations Area _____ **Circuit** _____ **Line** _____

HABITAT TYPE (Circle. If more than one apply, indicate percent of each.)

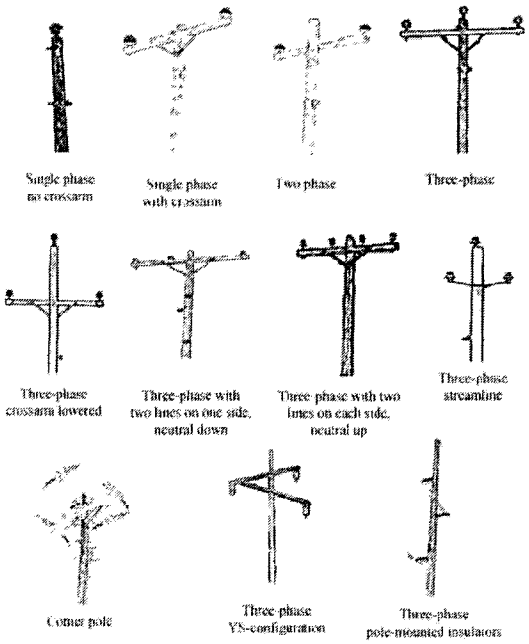
Grassland/ meadow Cropland/Pasture Scrub/shrub Barren Riparian Residential/developed Deciduous forest Coniferous forest Wet meadow Mudflat Open water Other _____

POLE LOCATION/IDENTIFICATION:

Structure Identification Number _____

GPS Coordinates: _____ Coordinate System: _____ Units: meters feet

POLE CONFIGURATION (Circle one. If pole does not match any shown, draw it on other side of sheet.)



Is structure raptor safe? Yes No

Total no. energized conductors _____

(if corner pole or underbuilt, indicate number phases in each direction, i.e. 3-3 or 3-2-1)

Number of transformers _____

Are there exposed parts? (circle all that apply)

transformers, capacitors, cutouts arresters, jumper wires

Crossarm material: wood metal fiberglass

Crossarm brace material: wood metal fiberglass

Location of ground wire:

Below crossarm At or above crossarm

Circle all that are present: Hose Bushing cap

Arrester cap Cutout cover Insulator cover

Perch guard Perch Down-guy insulator

Other protective devices: _____

Circle if present: Pellets Whitewash Prey remains

Are there live raptors, mortalities, nests, or pole damage? No Yes* (*if yes, continue on other side)

***Example 10** (con't).*

POLE CONDITION (Circle all that apply)

Broken insulator Broken crossarm Leaking transformer Broken/burned/leaning pole Broken guywire

Other

MORTALITIES/INJURIES

Status: dead injured **Number individuals** **Distance to nearest pole (ft.)**

Species (circle one): Red-tailed Hawk Ferruginous Hawk Swainson's Hawk Broad-winged Hawk Harris's Hawk

Red-shouldered Hawk Rough-legged Hawk Golden Eagle Bald Eagle Osprey Peregrine Falcon Prairie Falcon

Merlin American Kestrel Great Horned Owl Barn Owl Common Raven American Crow Great Blue Heron

Other

Cause of death/injury: Unknown Electrocution Collision Shot Roadkill Other

Evidence of electrocution: Burnt feathers Burnt talons Burnt bill Exit wound Other

Status of carcass/remains: Buried Collected Left on-site **Band number** (if applicable)

Directions

Photo number **Camera number**

Recommended remedial action

LIVE SPECIES OBSERVED

Species **Number of individuals** **Behavior**

Species **Number of individuals** **Behavior**

Species **Number of individuals** **Behavior**

Nest* **Species** **Is nest active?** Yes No

Nest location: Tree Cliff Ground Utility pole Other:

Pole Diagram:

NOTES

Record Tracking:

USFWS Notification Date

Bird Mortality Tracking System Entry Date

Remedial Action Status Date

MORTALITY REDUCTION MEASURES

A utility can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk to migratory birds. Therefore, as a general matter, mortality reduction plans should include a method for evaluating the risks posed to migratory birds in a manner that identifies areas and issues of particular concern. A risk assessment will often begin with an evaluation of available data addressing areas of high avian use, avian mortality, nesting problems, established flyways, adjacent wetlands, prey populations, perch availability, and other factors that can increase avian interactions with utility facilities. The assessment may also include outage and circuit reliability information. Mortality reduction plans should also utilize biological and electrical design information to prioritize poles most in need of repair and identify causes of avian mortality and benefits to utility customers. A successful APP and mortality reduction plan require management support as well as the following:

- assessment of facilities to identify risks;
- allocation of resources;
- standards for new or retrofit construction;
- budget for Operation and Maintenance (O&M) and Capital fixes;
- system for tracking remedial actions and associated costs;
- timely implementation of remedial measures;
- positive working relationship with agencies.

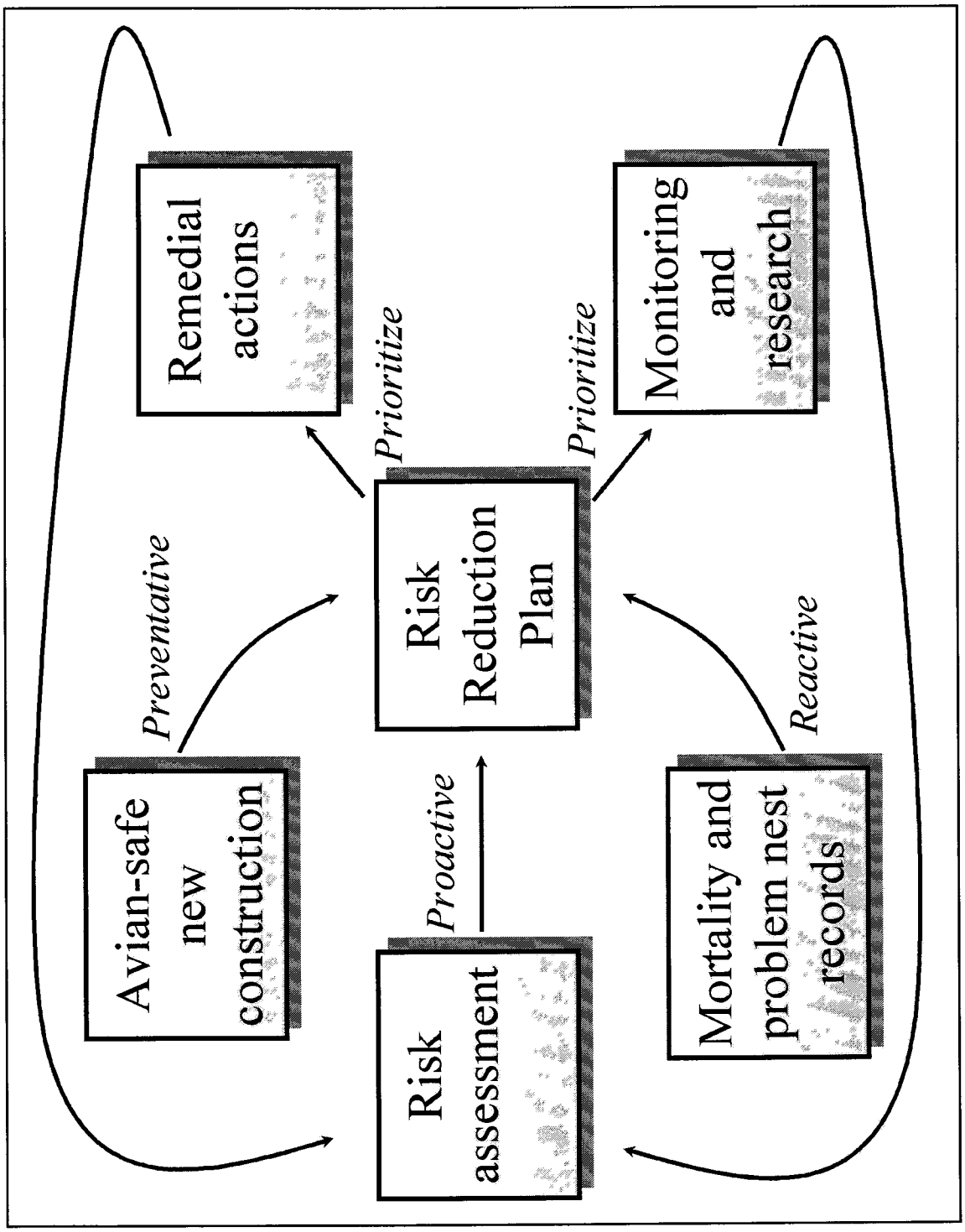
Mortality reduction plans may include a strategy that incorporates preventative, reactive and proactive measures that focus on issues, risks, and reliability commitments facing a utility (Figure 13). An example of how this multi-faceted approach might be used is as follows:

- **Preventative**: Construct all new or rebuilt lines in high avian use areas to Company avian-safe standards. Ensure APP is in compliance with applicable laws, regulations and permits.

- **Reactive**: Document bird mortalities and problem nests; conduct assessment of problems and apply remedial measures where appropriate. Notify resource agencies in accordance with Company's permits and policy.
- **Proactive**: Provide resources and training to improve employee's knowledge and awareness. Partner with organizations that conduct research on effects of bird interactions with power lines. Evaluate electrocution and collision risks of existing lines in high avian use areas and modify structures where appropriate.
- **Collaborative**: Collaboration with USFWS and State agencies on electrocutions reported and remedial actions undertaken. Annually review the APP in the context of risk assessment and electrocution and collision incidents and modify as appropriate, ideally with agency input.

Modification of existing facilities may be deemed necessary when dead and/or injured birds are found, high-risk lines are identified, or concerns of legal compliance are at issue. "Problem poles" or high-risk lines may be identified through bird mortality records, field surveys, or notifications from agency representatives or concerned customers. System reliability concerns due to bird interactions may also result in requests from field operations staff. Retrofitting to prevent electrocutions could include: 1) covering jumper wires, conductors and equipment; 2) discouraging perching in unsafe areas; 3) reframing; or 4) replacing a structure. Retrofitting to prevent collisions may include: 1) installing markers to enhance the visibility of lines; 2) managing habitats to reduce the likelihood of birds crossing lines during daily flights; or 3) managing human activity near collision risk areas to prevent flushing. Implementing preventative, reactive, and proactive measures to reduce avian mortality can benefit a utility through reduced long-term costs, improved reliability, positive public and agency relations, and conservation of migratory birds.

Figure 13. Roles of preventative, proactive, and reactive measures in a mortality risk reduction plan.



AVIAN ENHANCEMENT OPTIONS

While an APP will include measures to reduce avian mortality associated with electrical operations, it can also include opportunities to enhance avian populations through the creation of nest platforms, habitat improvements for migratory birds, or cooperative efforts with agencies or organizations. USFWS and State wildlife resources agencies, as well as other experts, can be consulted for recommendations on habitat enhancement projects. Nest platforms can be erected on poles for birds such as osprey, eagles, hawks, owls, herons, and cormorants, etc. (Figure 14). In addition, nest boxes can be erected for cavity-nesting species such as bluebirds, swallows, chickadees, wrens, and others. Such boxes may also benefit bats and flying squirrels. Construction designs for bird boxes can be found at http://50birds.com. Commercially-made nest boxes and platforms may also be available from local nature centers or specialty stores. The construction, maintenance, and monitoring of nest boxes can be done in conjunction with volunteers, such as scouts, or avian conservation organizations (see Key Resources for a list of bird conservation organizations/centers). Such collaborative efforts are excellent opportunities to educate the public about the company's avian protection plan and its partnerships with wildlife conservation agencies and organizations.

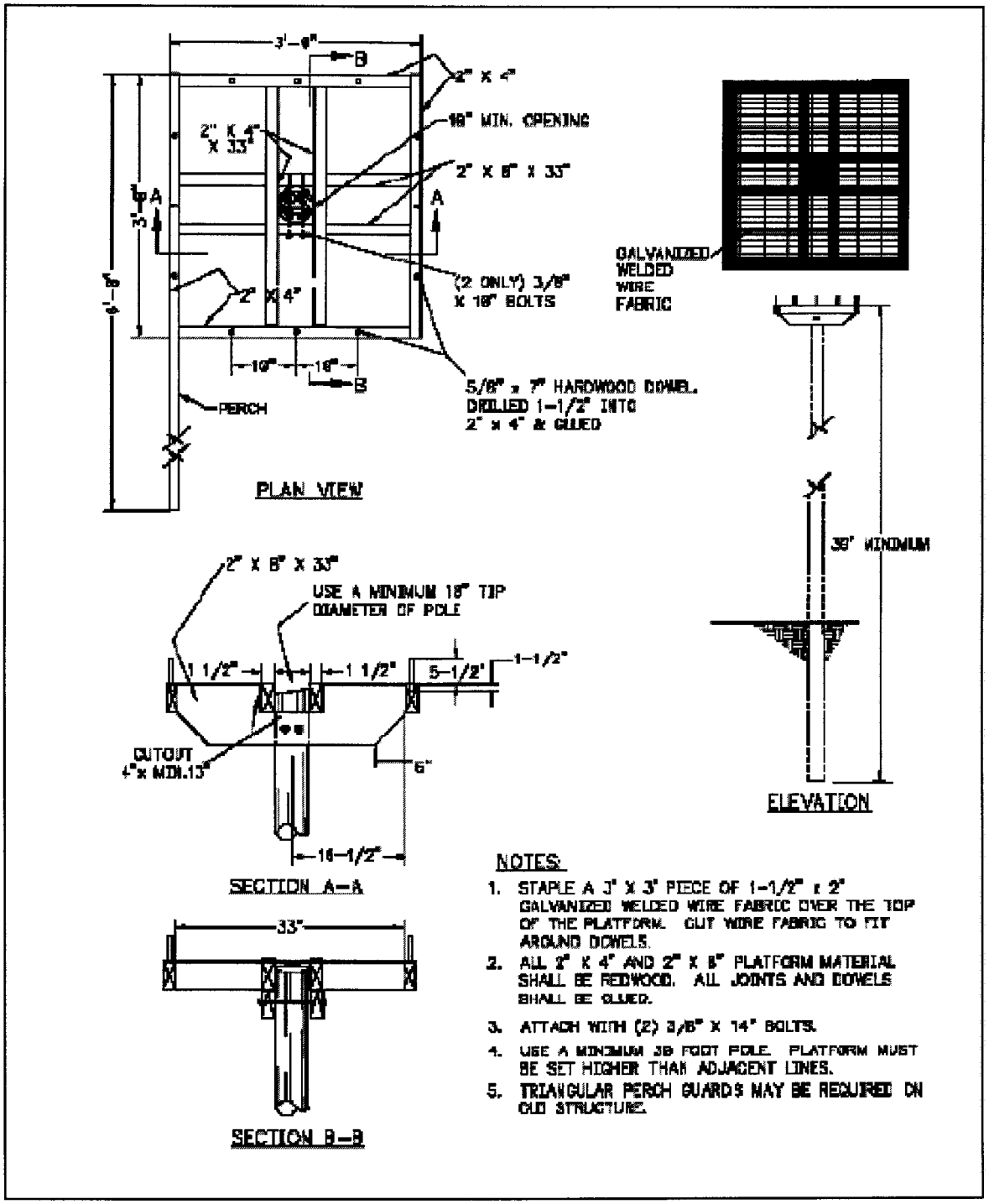


Figure 14. Raptor nest platform, pole mounted.

QUALITY CONTROL

A quality control mechanism can and should be incorporated into an APP to evaluate the effectiveness of a company's avian protection procedures. Some examples of quality control assessments include:

- assessing remedial action techniques through follow-up surveys to evaluate their effectiveness in reducing avian mortality;
- assessing avian protection devices to identify products preferred for avian protection as well as ease of application and durability;
- assessing mortality reporting procedures to ensure that discoveries of avian mortalities are properly documented;
- assessing response to avian mortalities to ensure that appropriate actions are taken in a timely manner;
- assessing compliance with company procedures to ensure that personnel are consistently following company methods for avian-safe construction, mortality reporting, nest management, etc.;
- assessing public and agency opinions on system reliability and avian protection.

The quality control component of an APP is an ongoing process. Information gathered during assessments of existing practices should be used to improve the effectiveness and timeliness of avian protection efforts, which, in turn, can help to reduce costs associated with such efforts.

PUBLIC AWARENESS

A public awareness program can be an integral part of an APP. This program can be used to enhance general public awareness and support for an electric utility's APP. It allows stakeholders such as government agencies, Tribes, non-profit organizations, wildlife rehabilitators and other interested parties an opportunity to provide input to the decision-making process, enabling all parties to work openly and collaboratively towards recommendations that can be effectively implemented. This collaboration often leads to improved relationships within the community and to more efficient and positive projects. The relationships developed through this process may also encourage the public to report bird mortalities and encourage them to seek assistance for birds that have been injured in power line related accidents.

Effectively communicating the components involved in an APP can be done through a variety of public outreach tools including fact sheets, newsletters, brochures, videos, websites and speaker bureau presentations. These tools can also be used to record the successes of an APP, thereby documenting the utility and electric industry's efforts to reduce avian mortalities. The goal of these outreach efforts is to convey to the public that electric utilities are responsible stewards of the environment working cooperatively with wildlife agencies towards reducing avian mortalities while continuing to provide safe, reliable, affordable electricity to their customers.

Many utilities have specific examples of their environmental stewardship and innovative ways they have taken into consideration reducing environmental impacts in their business decisions. A company's cooperative and innovative efforts to minimize avian mortalities should be shared with the public and resource agencies.

KEY RESOURCES

U.S. Fish and Wildlife Service Migratory Bird Permit Regional Offices

Region 1: (California, Hawaii, Idaho, Nevada, Oregon, Washington, Guam, CNMI, American Samoa)
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: permitsR1MB@fws.gov

Region 2: (Arizona, New Mexico, Oklahoma, Texas)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 709
Albuquerque, NM 87103
Tel. (505) 248-7882. Fax (505) 248-7885.
Email: permitsR2MB@fws.gov

Region 3: (Iowa, Illinois, Indiana, Minnesota, Missouri, Michigan, Ohio, Wisconsin)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
One Federal Drive
Fort Snelling, MN 55111
Tel. (612) 713-5436. Fax (612) 713-5393
Email: permitsR3MB@fws.gov

Region 4: (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virgin Islands, Puerto Rico)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 49208
Atlanta, GA 30359
Tel. (404) 679-7070. Fax (404) 679-4180
Email: permitsR4MB@fws.gov

Region 5: (Connecticut, District of Columbia, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, Vermont, West Virginia)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 779
Hadley, MA 01035-0779
Tel. (413) 253-8643. Fax (413) 253-8424
Email: permitsR5MB@fws.gov

Region 6: (Colorado, Kansas, Montana, North Dakota, Nebraska, South Dakota, Utah, Wyoming)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
P.O. Box 25486 DFC (60154)
Denver, CO 80225-0486
Tel. (303) 236-8171. Fax (303) 236-8017
Email: permitsR6MB@fws.gov

Region 7: (Alaska)
U.S. Fish and Wildlife Service Migratory Bird Permit Office
1011 E. Tudor Road
Anchorage, AK 99503
Tel. (907) 786-3693. Fax (907) 786-3641
Email permits: R7MB@fws.gov

U.S. Fish and Wildlife Service Office of Law Enforcement

National Headquarters:
Office of Law Enforcement
U. S. Fish and Wildlife Service
4401 North Fairfax Drive,
MS-LE-3000
Arlington, Virginia, USA 22203
Telephone: 703-358-1949
Fax: 703-358-2271

Regional Offices:

Pacific Region (1): California, Hawaii, Idaho, Nevada, Oregon, Washington, Guam, CNMI, American Samoa)
U. S. Fish & Wildlife Service
Office of Law Enforcement
911 N. E. 11th Avenue
Portland, Oregon, USA 97232-4171
Phone: (503) 231-6125 Fax: (503) 231-6197

Southwest Region (2): Arizona, New Mexico, Oklahoma, Texas
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 329
Albuquerque, New Mexico, USA 87103
Phone: (505) 248-7889 Fax: (505) 248-7899

Great Lakes - Big Rivers Region (3): Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin
U. S. Fish & Wildlife Service
Office of Law Enforcement
One Federal Drive
Fort Snelling, Minnesota, USA 55111-0045
Phone: (612) 713-5320 Fax: (612) 713-5283

Southeast Region (4): Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 49226
Atlanta, Georgia, USA 30359
Phone: (404) 679-7057 Fax: (404) 679-7065

Northeast Region (5): Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia,
U. S. Fish & Wildlife Service
Office of Law Enforcement
300 Westgate Center Drive
Hadley, Massachusetts, USA 01035
Phone: (413) 253-8274 Fax: (413) 253-8459

Mountain-Prairie Region (6): Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, Wyoming
U. S. Fish & Wildlife Service
Office of Law Enforcement
P.O. Box 25486 - DFC
Denver, Colorado, USA 80225
Phone: (303) 236-7540 Fax: (303) 236-7901

Alaska Region (7): Alaska
U. S. Fish & Wildlife Service
Office of Law Enforcement
1011 E. Tudor Road, Mail Stop 151
Anchorage, Alaska, USA 99503-6199
Phone: (907)786-3311 Fax: (907)786-3313

Other Resource Agency Contacts

BLM Snake River Birds of Prey National Conservation Area

- The Snake River Birds of Prey NCA is home to the largest concentration of nesting raptors in North America.
- http://id.blm.gov/bopnca/index.html

Canadian Wildlife Service

- http://cws-scf.ec.gc.ca/index_e.cfm

Code of Federal Regulations (CFR) websites

- Main CFR webpage
  - http://gpoaccess.gov/cfr/
- List of migratory birds, 50CFR10.13
  - http://a257.g.akamaitech.net/7/257/2422/01dec20031500/edocket.access.gpo.gov/cfr_2003/octqtr/50cfr10.13.htm
- General permit procedures, 50CFR13
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr13_03.html
- Endangered and threatened wildlife and plants, 50CFR17
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfrv2_03.html
- Migratory bird permits, 50CFR21
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr21_03.html
- Eagle permits, 50CFR22
  - http://access.gpo.gov/nara/cfr/waisidx_03/50cfr22_03.html

International Association of Fish and Wildlife Agencies

- The International Association of Fish and Wildlife Agencies (IAFWA) was founded in 1902 as a quasi-governmental organization of public agencies charged with the protection and management of North America's fish and wildlife resources. The Association has been a key organization in promoting sound resource management and strengthening federal, state, and private cooperation in protecting and managing fish and wildlife and their habitats in the public interest. The Association's governmental members include the fish and wildlife agencies of the states, provinces, and federal governments of the U.S. and Canada. All 50 states are members.
- http://iafwa.org

National Biological Information Infrastructure

- The National Biological Information Infrastructure (NBII) is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find,

integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.

- http://birdcon.nbii.gov

NOAA Photo Library

- Public domain images for download
- http://photolib.noaa.gov/index.html

U.S. Fish and Wildlife Service

- http://fws.gov

U.S. Fish and Wildlife Service National Eagle Repository

- http://mountain-prairie.fws.gov/law/eagle

U. S. Fish and Wildlife Service
National Eagle Repository
Rocky Mountain Arsenal, Building 619
Commerce City, Colorado 80022
phone: (303) 287-2110
fax: (303) 287-1570

U.S. Fish and Wildlife Service National Image Library

- Public domain images for download
- http://images.fws.gov

USGS Bird Banding Laboratory

- http://pwrc.usgs.gov/bbl/

USGS Patuxent Bird Identification InfoCenter

- Presents photographs, songs, videos, identification tips, maps, and life history information for North American birds.
- http://mbr-pwrc.usgs.gov/id/framlst/framlst.html

USGS Patuxent Wildlife Research Center

- Patuxent's mission is to excel in wildlife and natural resource science, providing the information needed to better manage the nation's biological resources
- http://pwrc.usgs.gov

USGS Raptor Information System

- The Raptor Information System (RIS) is a computerized literature retrieval system. It deals with raptor management, human impacts on raptors, the mitigation of adverse impacts, and basic raptor biology (with an emphasis on population dynamics and predation). The RIS may be the largest collection of literature on birds of prey found anywhere in the world, with approximately

30,000 references on raptor biology and management. RIS staff members regularly update the files and accompanying data base with recently published and/or newly acquired references on raptors. The collection includes reprints of published papers as well as a significant amount of "gray literature" in the form of popular articles, theses, dissertations, unpublished government reports, and progress reports.
http://ris.wr.usgs.gov

State Agencies

Alabama Division of Wildlife and Freshwater Fisheries
- http://dcnr.state.al.us/agfd/index.html

Alaska Department of Fish and Game
- http://adfg.state.ak.us

Arkansas Game and Fish Commission
- http://agfc.com

Arizona Game and Fish Department
- http://gf state.az.us

California Department of Fish and Game
- http://dfg.ca.gov

Colorado Division of Wildlife
- http://wildlife.state.co.us

Connecticut Bureau of National Resources, Wildlife Division
- http://dep.state.ct.us/burnatr/wildlife/wdhome.htm

Delaware Division of Fish and Wildlife
- http://dnrec.state.de.us/fw

Florida Fish and Wildlife Conservation Commission
- http://floridaconservation.org

Georgia Division of Wildlife Resources
- http://georgiawildlife.dnr.state.ga.us

Hawaii Department of Land and Natural Resources
- http://state.hi.us/dlnr

Iowa Department of Natural Resources
- http://iowadnr.com

Idaho Fish and Game
- http://state.id.us/fishgame

Illinois Department of Natural Resources
- http://dnr.state.il.us

Indiana Department of Natural Resources
- http://in.gov/dnr

Kansas Department of Wildlife and Parks
- http://kdwp.state.ks.us

Kentucky Department of Fish and Wildlife
- http://kdfwr.state.ky.us

Louisiana Department of Wildlife and Fisheries
- http://wlf.state.la.us/apps/netgear/page1.asp

Massachusetts Division of Fisheries and Wildlife
- http://state.ma.us/dfwele/dfw/dfw_toc htm

Maryland Department of Natural Resources
- http://dnr.state.md.us

Maine Department of Inland Fisheries and Wildlife
- http://state.me.us/ifw

Michigan Department of Natural Resources
- http://michigan.gov/dnr

Minnesota Department of Natural Resources
- http://dnr.state.mn.us/index.html

Missouri Department of Conservation
- http://conservation.state.mo.us

Mississippi Department of Wildlife, Fisheries and Parks
- http://mdwfp.com

Montana Department of Fish, Wildlife and Parks
- http://fwp.state.mt.us

Nebraska Game and Parks Commission
- http://ngpc.state.ne.us/homepage.html

Nevada Department of Wildlife
- http://ndow.org

New Hampshire Fish and Game Department
- http://wildlife.state.nh.us

New Jersey Division of Fish and Wildlife
- http://state.nj.us/dep/fgw

New Mexico Game and Fish Department
- http://gmfsh.state.nm.us

New York Division of Fish, Wildlife and Marine Resources
- http://dec.state.ny.us/website/dfwmr/index.html

North Carolina Wildlife Resources
- http://ncwildlife.org

North Dakota Game and Fish Department
- http://state.nd.us/gnf

Ohio Division of Wildlife
- http://ohiodnr.com/wildlife/default.htm

Oklahoma Department of Wildlife Conservation
- http://wildlifedepartment.com

Oregon Department of Fish and Wildlife
- http://dfw.state.or.us

Pennsylvania Fish and Boat Commission
- http://pgc.state.pa.us

Rhode Island Division of Fish and Wildlife
- http://state.ri.us/dem/programs/bnatres/fishwild/index.htm

South Carolina Department of Natural Resources
- http://water.dnr.state.sc.us

South Dakota Department of Game, Fish and Parks
- http://state.sd.us/gfp

Tennessee Wildlife Resources Agency
- http://state.tn.us/twra/index.html

Texas Parks and Wildlife Department
- http://tpwd.state.tx.us

Utah Division of Wildlife Resources
- http://wildlife.utah.gov

Virginia Department of Game and Inland Fisheries
- http://dgif.state.va.us

Vermont Department of Fish and Wildlife
- http://vtfishandwildlife.com

Washington Department of Fish and Wildlife
- http://wdfw.wa.gov

Wisconsin Department of Natural Resources
- http://dnr.state.wi.us

West Virginia Division of Natural Resources
- http://wvdnr.gov

Wyoming Game and Fish Department
- http://gf.state.wy.us

Bird Conservation Organizations/Centers/Resources
(Includes organization's mission statement/description followed by website)

Alaska Bird Observatory
- The Alaska Bird Observatory is an Alaska nonprofit corporation. The mission of ABO is to advance the appreciation, understanding, and conservation of birds and their habitats through research and education.
- http://alaskabird.org

American Bird Conservancy
- American Bird Conservancy (ABC) is a 501(c)3 not-for-profit organization, whose mission is to conserve wild birds and their habitats throughout the Americas. It is the only U.S.-based, group dedicated solely to overcoming the greatest threats facing birds in the Western Hemisphere.
- http://abcbirds.org

Cornell Lab of Ornithology
- The Lab is a nonprofit membership institution whose mission is to interpret and conserve the earth's biological diversity through research, education, and citizen science focused on birds. Our programs work with citizen scientists, government and nongovernment agencies across North America and beyond.
- http://birds.cornell.edu

50 Birds
- Wood bird house designs for more than 50 North American birds
- http://50birds.com/Default.htm

Gulf Coast Bird Observatory
- The mission of the Gulf Coast Bird Observatory is the study and conservation of birds and their habitat in and around the Gulf of Mexico. Our purpose is to be a catalyst for bird conservation through individual and community partnerships and the sharing of expertise and knowledge.
- http://gcbo.org

Hawk Mountain Sanctuary Association
- Hawk Mountain's mission is to foster the conservation of birds of prey worldwide and to create a better understanding of, and further the conservation of, the natural environment, particularly the Central Appalachian region.
- http://hawkmountain.org

Hawks Aloft, Inc.
- Hawks Aloft, Inc. (HAI) was founded in February of 1994 in Albuquerque, New Mexico. Our mission is to conserve indigenous wild birds and their habitats through research and public education. HAI projects take place almost entirely within the state of New Mexico. We have become a leader in providing quality

education programs and field research. Using live raptors as educational aids, our naturalists reach more than 30,000 students annually. Our long-term research projects monitor raptor and songbird populations, as they relate to land management practices.

- http://hawksaloft.org

HawkWatch International

- Mission: To monitor and protect hawks, eagles, and other birds of prey and their environment through research, education, and conservation.
- http://hawkwatch.org

Idaho Bird Observatory

- IBO's Mission: To contribute to the conservation of western migratory birds and their habitats through cooperative research and public education.
- http://boisestate.edu/biology/ibo

Klamath Bird Observatory

- A nonprofit research and educational organization
- http://klamathbird.org/kbohome.htlm

Massachusetts Audubon Society

- Massachusetts Audubon Society is the largest conservation organization in New England, concentrating its efforts on protecting the nature of Massachusetts for people and wildlife. Mass Audubon protects more than 30,000 acres of conservation land, conducts educational programs for 250,000 children and adults annually, and advocates for sound environmental policies at the local, state, and federal levels. Established in 1896 and supported by 68,000 member households, Mass Audubon maintains 42 wildlife sanctuaries that are open to the public and serve as the base for its conservation, education, and advocacy work across the state.
- http://massaudubon.org

Montana Raptor Conservation Center

- Mission: Montana Raptor Conservation Center was founded in response to the rapid development of southwest Montana and resulting negative conflicts between humans and birds of prey. Through education, habitat enhancement, research, and the rehabilitation and release of injured birds of prey, our mission is to conserve and restore raptors, as well as other avian species that are endangered, threatened or of special concern.
- http://montanaraptor.org

National Audubon Society

- Audubon's mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.

- http://audubon.org

National Fish and Wildlife Foundation

- The National Fish and Wildlife Foundation conserves healthy populations of fish, wildlife and plants, on land and in the sea, through creative and respectful partnerships, sustainable solutions, and better education. The Foundation meets these goals by awarding matching grants to projects benefiting conservation education, habitat protection and restoration, and natural resource management.
- http://nfwf.org

The Nature Conservancy

- Mission: To preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.
- http://nature.org

New Jersey Audubon Society

- The New Jersey Audubon Society fosters environmental awareness and a conservation ethic among New Jersey's citizens; protects New Jersey's birds, mammals, other animals, and plants, especially endangered and threatened species; and promotes preservation of New Jersey's valuable natural habitats.
- http://njaudubon.org

North American Bird Conservation Initiative (NABCI)

- US NABCI Vision: Populations and habitats of North America's birds are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management. US NABCI Goal: To deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.
- http://nabci-us.org

Partners in Flight

- Partners in Flight (PIF) is a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. PIF's goal is to focus resources on the improvement of monitoring and inventory, research, management, and education programs involving birds and their habitats.
- http://partnersinflight.org

Partners in Flight – Canada

- http://cws-scf.ec.gc.ca/birds/lb_ot_e.cfm

Partners in Flight – International

- http://partnersinflight.org/pubs/latangara.htm

The Peregrine Fund/World Center for Birds of Prey

- Established in 1970, The Peregrine Fund works nationally and internationally, working to conserve birds of prey in nature. We conserve nature by achieving results - results restoring species in jeopardy, conserving habitat, educating students, training conservationists, providing factual information to the public, and by accomplishing good science. The World Center for Birds of Prey in Boise, Idaho is The Peregrine Fund's world headquarters. At the World Center we propagate birds of prey for release to the wild. Research and educational programs are also conducted.
- http://peregrinefund.org

Point Reyes Bird Observatory

- PRBO Conservation Science is dedicated to conserving birds, other wildlife, and ecosystems through innovative scientific research and outreach. Founded in 1965 as Point Reyes Bird Observatory, our 120 staff and seasonal biologists study birds to protect and enhance biodiversity in marine, terrestrial and wetland systems in western North America.
- http://prbo.org

The Raptor Center

- The Raptor Center at the University of Minnesota College of Veterinary Medicine specializes in the medical care, rehabilitation, and conservation of birds of prey. Working with about 30 eagles, hawks, owls, and falcons that are permanent residents, we reach 250,000 people each year through educational programs and events. The essence of our mission is to strengthen the bond between humans and birds, to improve the quality of life for both, and to contribute to the preservation of the natural world.
- http://raptor.cvm.umn.edu

Rocky Mountain Bird Observatory (formerly Colorado Bird Observatory)

- RMBO was founded in 1988 to address a bird conservation and related public education need in the western U.S. Our mission is the conservation of Rocky Mountain and Great Plains birds through research and public education. We accomplish our mission through numerous research and public education programs which have dual goals: to conserve birds and bird habitat, and to increase people's understanding of birds--how they interact with humans, what habitats they use, and what factors threaten their survival.
- http://rmbo.org

Smithsonian Migratory Bird Center

- Dedicated to fostering greater understanding, appreciation, and protection of the grand phenomenon of bird migration.
- http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds

Southeast Arizona Bird Observatory

- The Southeastern Arizona Bird Observatory (SABO) is a non-profit organization dedicated to the conservation of the birds of southeastern Arizona, their habitats and the diversity of species that share those habitats through research, monitoring and public education.
- http://sabo.org

Vermont Institute of Natural Science

- Protecting Vermont's natural heritage through education and research designed to engage individuals and communities in the active care of their environment.
- http://vinsweb.org

Whitefish Point Bird Observatory

- WPBO is a non-profit membership organization established in 1978 to document and study the birds in the Great Lakes Region, with special emphasis on migration.
- http://wpbo.org

Wildlife Rehabilitation Resources

How to contact a wildlife rehabilitator

- http://tc.umn.edu/~devo0028/contact.htm

National Wildlife Rehabilitators Association

- http://nwrawildlife.org

Wildlife International

- http://wildlife-international.org

The Wildlife Rehabilitation Information Directory

- http://tc.umn.edu/~devo0028/

Utility Resources

Avian Power Line Interaction Committee (APLIC)
- http://aplic.org

Edison Electric Institute (EEI)
- http://eei.org

Electric Power Research Institute (EPRI)
- http://epri.com

Institute of Electrical and Electronics Engineers (IEEE)
- http://ieee.org

National Rural Electric Cooperative Association (NRECA)
- http://nreca.org

Rural Utilities Service (RUS)
- http://usda.gov/rus

V. LIST OF ACRONYMS

APLIC – Avian Power Line Interaction Committee

APP – Avian Protection Plan

BGEPA – Bald and Golden Eagle Protection Act

BMTS – Bird Mortality Tracking System

DMBM – Division of Migratory Bird Management

EEI – Edison Electric Institute

EPRI – Electric Power Research Institute

ESA – Endangered Species Act

GIS – Geographic Information System

HCP – Habitat Conservation Plan

MBTA – Migratory Bird Treaty Act

NESC – National Electric Safety Code

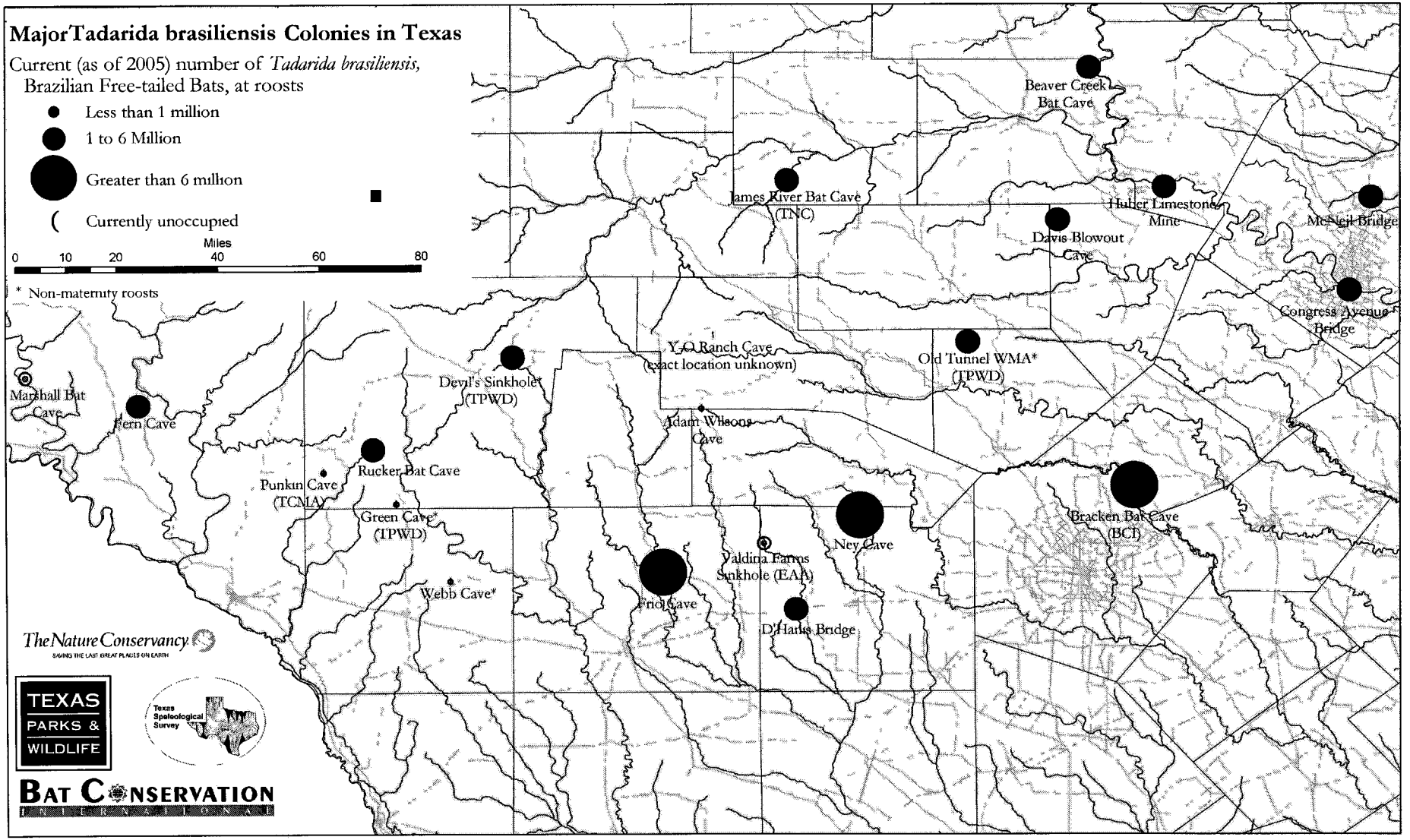
NMFS – National Marine Fisheries Service

NRECA – National Rural Electric Cooperative Association

REA – Rural Electricification Association (currently RUS)

RUS – Rural Utilities Service

USFWS – U.S. Fish and Wildlife Service



Data compiled by Bat Conservation International and Texas Speleological Survey.

Map generated by The Nature Conservancy of Texas Science Department, March 2006.

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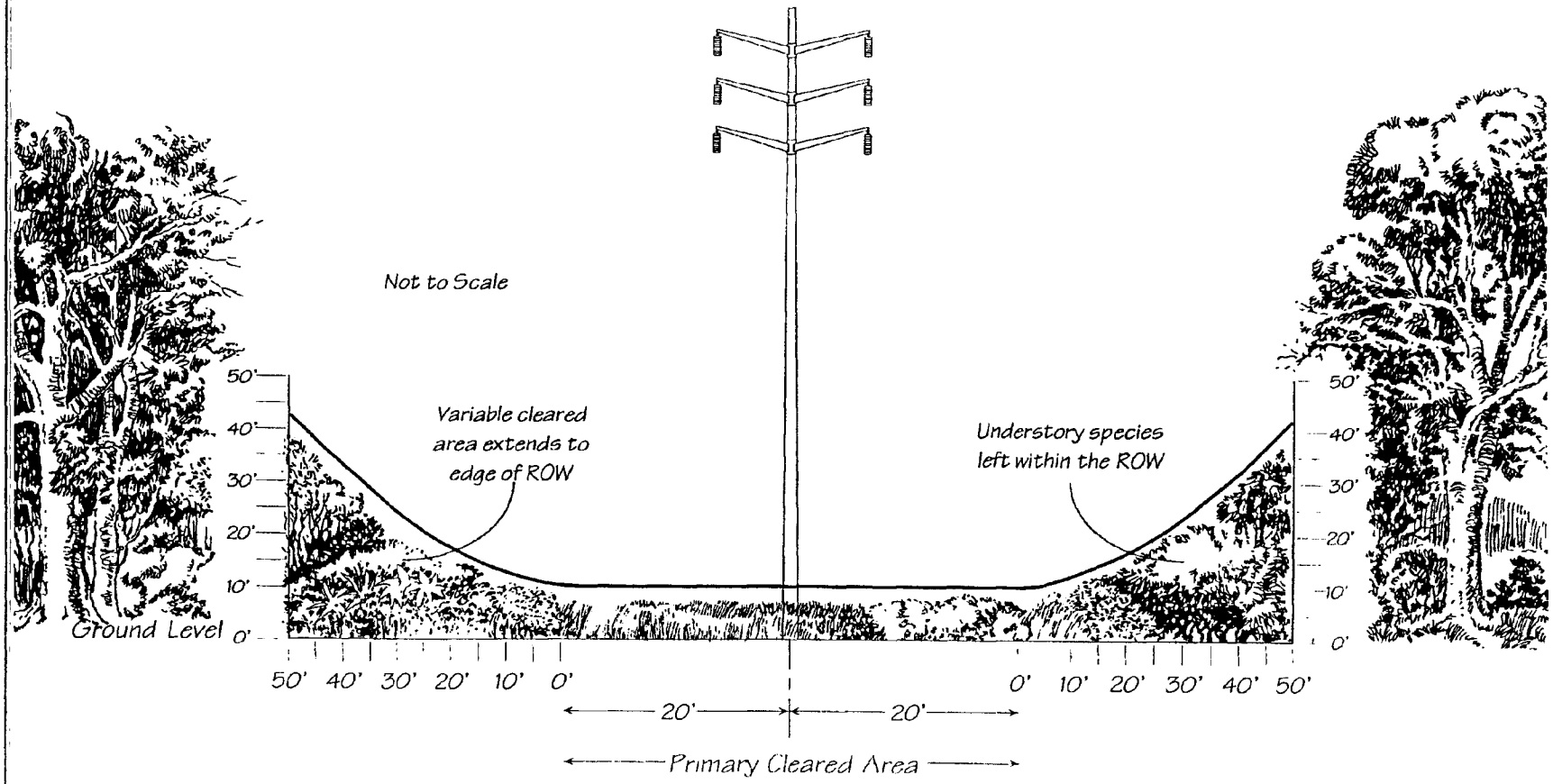
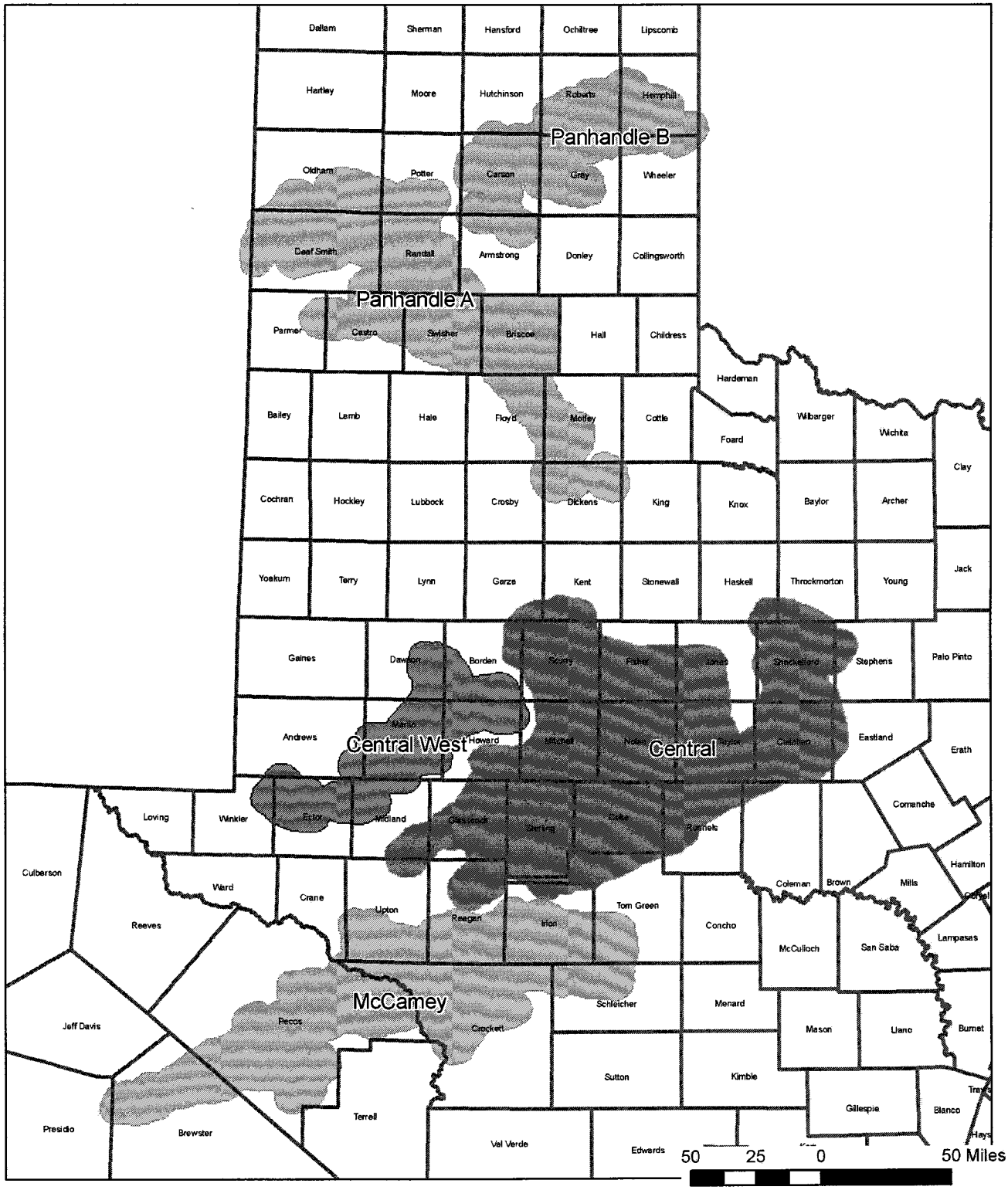
AN ALTERNATIVE TO EDGE-TO-EDGE ELECTRIC TRANSMISSION LINE ROW CLEARING

MAXIMUM HEIGHT OF TIMBER LINE FOR RIGHT-OF-WAY CLEARING
IN SELECTIVE CUT CLEARING AREAS



Source: Electric Engineering

Figure 1. CREZ



23 December 2008
Projection: Texas State Mapping System

Map compiled by the Texas Parks and Wildlife Department, Wildlife Habitat Assessment Program. No claims are made to the accuracy of the data or to the suitability of the data to a particular use.