Chancellor, R. D. & B.-U. Meyburg eds. 2004
Raptors Worldwide
WWGBP/MME

Bald Eagle *Haliaeetus leucocephalus* Electrocutions in Alaska and Florida - a comparison of retrofitting measures

Richard E. Harness

ABSTRACT

From March to September 2002, EDM biologists visited electric utilities in Alaska and Florida to inspect distribution three-phase power poles. These areas have a history of Bald Eagle electrocutions and the aim was to identify high-risk structures for electrocutions in order to develop retrofitting standards. In Alaska power line electrocution were centred at artificial food concentration areas such as canneries, fish cleaning stations and municipal landfills. When eagles concentrate in large numbers they land on a wide variety of problematic structure types and occasionally fly into energized wires. Alaska retrofitting includes the insulation of exposed jumpers and equipment, perch deterrents and, in some situations, the covering of conductors to prevent fly-ins. In Florida the problem is more dispersed. Because Florida experiences the highest lightning levels in the USA its utilities typically place lightning arresters on every third pole and on all equipment. Poles near the ocean also typically have bonded hardware due to salt contamination. Florida retrofitting requires a focus on covering exposed lightning arresters and associated jumpers. The lack of tall trees also results in an increased risk of fledgling birds using power lines near nest sites in Florida. Equipment poles and bonded metal brackets also are problematic and require bushing covers, perch deterrents and covered jumpers.

BACKGROUND

During the 1970s and early 1980s, electric industry efforts to reduce raptor electrocutions in the United States were widespread and coordinated, but predictions about mitigating the problem were overly confident and today raptors continue to be electrocuted, possibly in great numbers (Lehman 2001). Although there is no nationalized database of raptor mortality, the United States Fish and Wildlife Service (USFWS) maintains a centralized reporting system in Alaska. According to these database records, Alaska has documented 231 confirmed Bald Eagle *Haliaeetus leucocephalus* electrocutions from 1978 to 2002 (USFWS 2003). These records lack another 50 electrocution records between 2002 and 2003 (J. Birchell, USFWS, unpublished data). In bordering British Columbia, between 1986 and 1998 Wayland *et al.* (2003) documented electrocution as the number one cause of known mortality for Bald Eagles (n=50) with only the undetermined cause of death (n=123) exceeding documented electrocutions.

From 2001 to 2002 EDM International, Inc. (EDM) biologists worked with utility companies in Alaska to mitigate Bald Eagle electrocutions. A pattern analysis focusing on power line unit configuration, geographic location and habitat was used because not all utility poles are at equal risk. Raptors will select certain poles over others and these "preferred perches", if unprotected, are more likely to be involved in electrocutions (APLIC 1996). Because the power companies have thousands of miles of power lines, the surveys focused on lines near artificial food sources (e.g. landfills, fish canneries, sport fish-cleaning stations) and natural food sources (e.g. salmon streams, tidal flats). Power lines near nest locations were also surveyed, as were historic mortality sites. This strategy of focusing on specific areas was used because geographic location and habitat setting are as important as the technical utility pole design in determining the actual risk of electrocution (Mañosa 2001). This information was combined with the pole configuration risk to prioritize retrofitting. During this same time period EDM was also reviewing Bald Eagle electrocutions in Florida. The following is a comparison of the vastly different utility configuration problems encountered between two states with the same species.

ALASKA SURVEY AREA

According to Jacobson and Hodges (1999), the south-eastern Alaska adult Bald Eagle population in 1997 was 13,327. This is an increase of 92% from the 1967 population and is largely due to the repeal of the 1917-1953 Alaska eagle bounty (Hodges *et al.* 1979). The increasing number of birds has created problems for the electric utilities, particularly when birds concentrate near artificial food sources.

During 2001 and 2002, power lines were inspected in and around Homer, Ketchikan, Kodiak, Sandpoint, Sitka and Valdez, Alaska. During the 1990s these areas experienced significant increases in winter eagle numbers according to Christmas Bird Count (CBC) data (Sauer *et al.* 1996). According to these data, peak eagle numbers for Homer, Ketchikan, Kodiak, Sitka and Valdez were 499, 344, 733, 229, and 106 birds (Figure 1).

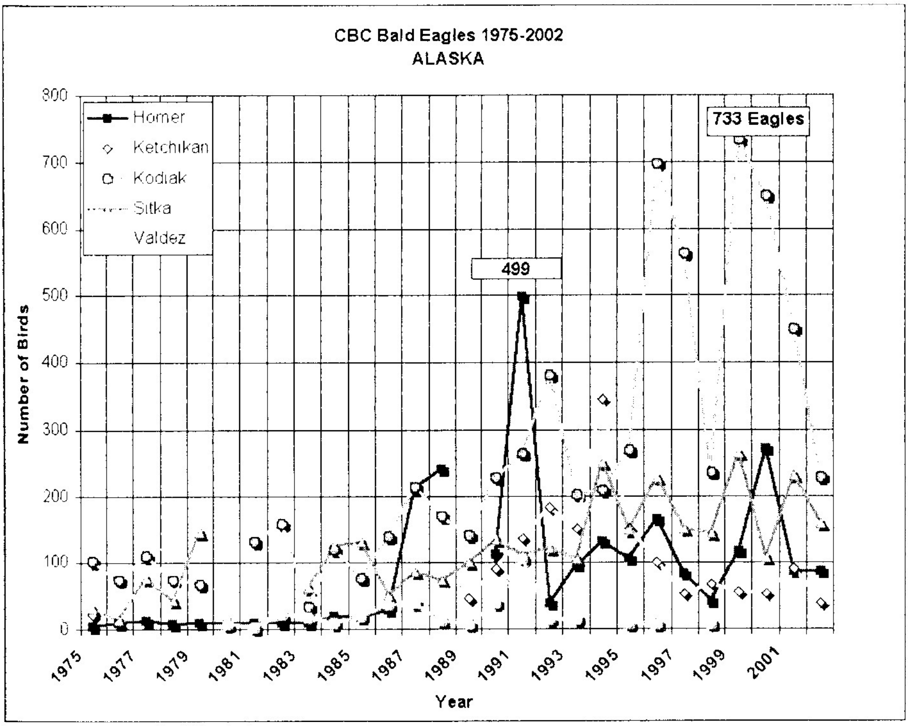
Artificial Food Sources and Eagle Mortality

USFWS historic electrocution mortality for Homer, Ketchikan, Kodiak, Sandpoint, Sitka and Valdez, Alaska are provided in Table 1 (USFWS 2003). USFWS records for the Alaskan Kenai Peninsula from 1990-2002 also include three additional eagle power line collisions (USFWS 2003). Municipal open waste facilities attract large numbers of birds and eight of the interactions along the Kenai Peninsula occurred at the Homer Landfill and three more at the Soldotna Landfill. These 11 deaths represent 35% of all detected interactions and were associated with only seven electric poles.

Table 1: Confirmed Alaska Bald Eagle electrocutions from 1990-2002

Confirmed Alaska Electrocutions 1990-2002	
Homer	26
Ketchikan	6
Kodiak	16
Sandpoint	21
Sitka	45
Valdez	1

Figure 1. National Audubon Society 1975-2002 Christmas Bird Count data.



Fish canneries in other Alaska areas also attract large numbers of eagles. During one week in 2000, five eagles were electrocuted in Sitka as herring boats returned to the port with their catch. The eagles were drawn to the processing plants to wait for scraps, perching on nearby poles for feeding opportunities (Federal Wildlife Officers Association 2000). Similarly, three eagles were killed near the Kodiak cannery and 12 eagles were electrocuted in Adak near the local fish processing plant. One eagle was killed after flying into a building after a fish tote spilled and a feeding frenzy ensued at a Kodiak cannery (Lanny Van Meter, Kodiak Electric Cooperative, pers comm.). In 1999 a total of 30 eagles were electrocuted in Adak and an additional five eagles were electrocuted near a Sand Point fish processing plant located on Unga Island (Federal Wildlife Officers Association 1998 & 2000). Approximately 23% of all eagle mortality detected on the Homer, Ketchikan, Kodiak, Sandpoint and Valdez electric systems occurred at a few poles at five locations near either fish processing plants or landfills.

Feeding by individuals can also lead to electrocution problems. In Eagle River an adult Bald Eagle was electrocuted after feeding on a pile of meat placed on the road by a 70-year-old woman. This was the second eagle killed by electrocution at this location within two months. A similar eagle electrocution occurred in Homer near a three-phase distribution power line at the water's edge. In both cases the utility company was informed of the need to insulate numerous power lines in the area and the landowners attracting the birds were not fined.

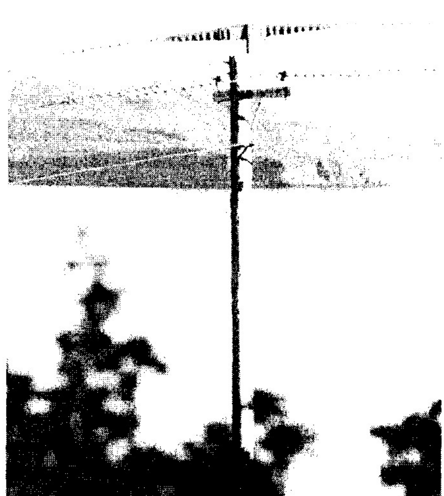
Alaska Perching and Nesting Trees

Eagles in Alaska frequently perch on whatever is available along the ocean, mud flats, or near a food source, thus requiring changes to poles in some areas. The U.S Forest Service (USFS) owns 80% of the land in south-east Alaska and requires a protection zone of 100m round an eagle nest site (Jacobson & Hodges 1999). This provides a buffer of tall trees and makes shorter power poles less attractive perch sites for fledgling birds. Power poles with open exposure near nest sites are at greater risk and should still be retrofitted. The protection of trees is an important component of reducing raptor electrocution mortality and other Alaska communities should encourage the protection of prime perching areas.

Alaska Retrofitting

Alaska retrofitting primarily includes perch management and the insulation of exposed jumpers and installing bushing covers on equipment. Conductor guards (Figure 2) were specified in areas where birds concentrate, as these devices allow birds to safely perch on crossarms.

Figure 2. Pole raptor protected with a conductor guard



Unfortunately the use of perch deterrents such as triangles reduces mortality, but will not eliminate it, especially when large numbers of birds congregate around a few poles (Harness & Garrett 1999). In some places the extreme density of eagles made retrofitting power lines a more difficult task with electrocutions persisting even after perch management, and covering jumpers and equipment. In these cases some line segments were ultimately placed underground despite the cost and difficulty of burying lines in rocky soil. Post retrofitting fly-ins also were reported on Kodiak Island near artificial food sources (pers. comm. Lanny Van Meter). In Sitka a Bald Eagle fly-in occurred this year on a line with 60 inches of separation. Despite the "raptor friendly" clearance, the colliding bird had enough force to push two midspan wires together, resulting in a collision and electrocution. Although retrofitting will reduce the risk of power line contacts, reducing artificial food sources is a critical component of reducing risks to eagles in Alaska.

FLORIDA SURVEY AREA

Bald Eagles have rebounded in Florida since DDT was banned (Nisbet 1989) and in 2002 there were 1,133 active nesting territories (pers. comm. Steve Nesbitt). According to Florida Fish and Wildlife Conservation Commission (FFWCC) estimates, 20 eagle electrocutions occur annually in Florida (pers. comm. Steve Nesbitt). The highest mortality cause is trauma caused by vehicular collisions.

During 2002, power lines were inspected from in and around Ft. Myers to the Everglades National Park. Unlike Alaska, eagle numbers have remained fairly constant in the Fort Myers area (Sauer *et al.* 1996). The surveyed areas do not have the large numbers of eagles seen in Alaska. According to CBC data, peak number for Fort Myers was 34 eagles in 2002.

Florida Perching and Nesting Trees

Nest site selection in Florida Bay from 1959 to 1990 was almost exclusively mangrove trees (Curnutt & Robertson 1994). This is important because nesting trees are often much shorter in Florida than Alaska. In the Fort Myers area, nearby distribution power poles were often as tall as nearby power poles. This makes the poles attractive perches for fledging birds. Mortality was detected near nest sites and accordingly these poles were given the highest retrofitting priority.

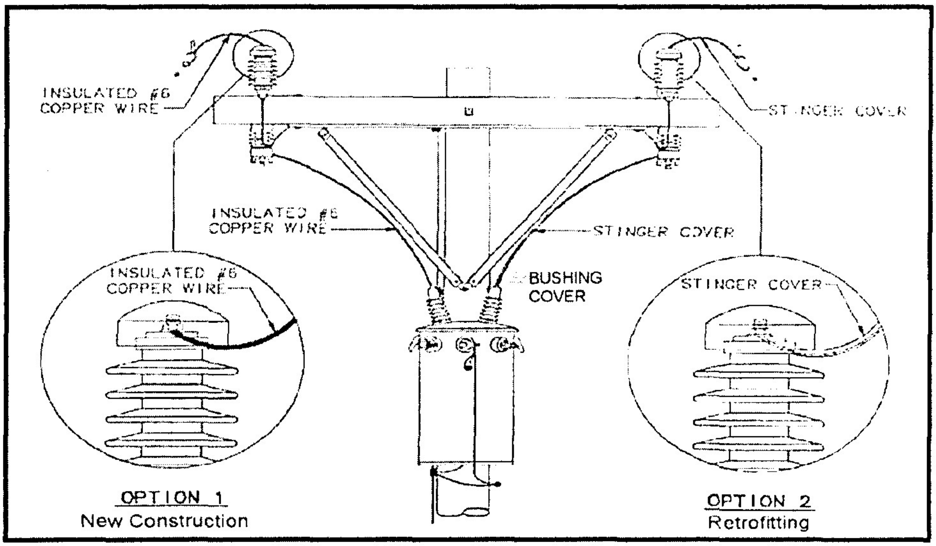
Power lines within 400m of active eagle nests were surveyed in order to protect fledgling birds. In the south-eastern United States the USFWS specifies a 229m primary protection zone around eagle nests. This zone stays in effect until the birds fledge. A Florida postfledging dependency study recorded a postfledging dependency period of 4-11 weeks with 80% of the fledgling birds staying within 229m of the nest (Wood *et al.* 1998).

Florida Retrofitting

In Florida the number of eagles is significantly less than in Alaska and the electrocution issue is more dispersed. Poles near known nest sites received the highest retrofitting priority because nearby poles sometimes offered attractive perches. As in Alaska, equipment poles and bonded metal brackets can be problematic and require bushing covers, perch deterrents and covered jumpers.

Unlike Alaska, Florida retrofitting requires a particular focus on covering exposed lightning arresters and associated jumpers. Because Florida experiences the highest lightning levels in the United States, Florida utilities typically place lightning arresters on every third pole and on all equipment. Arresters clear over-voltage problems such as lightning strikes. Arresters have a groundwire attached to one end leading to earth and another end either attached or in proximity (gapped) to an energized wire (Figure 3). The spacing of these arresters can be problematic for both medium and large birds. For this reason, all arresters should be installed with manufacturer-supplied wildlife caps. 600v rated insulated covering also should be used for all arrester hot leads. No exposed wire should extend beyond the wildlife cap, and leads should be kept as short as possible. Most poles near the Florida coastline also have bonded hardware due to salt contamination issues. Bonded hardware in proximity to energized wires can be problematic for large perching birds.

Figure 3. Installing new and retrofitting surge arresters



CONCLUSION

Although the utilities in Alaska and Florida use similar construction techniques, the most common structures associated with raptor mortality has varied. In Alaska power line electrocutions are centred at artificial food concentration areas such as canneries, fish cleaning stations and municipal waste facilities. These food sources attract large numbers of eagles in the winter, sometimes resulting in feeding frenzies. When eagles concentrate in large numbers they land on a wide variety of structure types and occasionally fly into energized wires. Alaska retrofitting includes the insulation of exposed jumpers, equipment, perch deterrents and, in some situations, the covering of primary conductors to prevent fly-ins. A critical component of solving this problem is to eliminate artificial food sources. When hundreds of eagles concentrate in a small area with power lines there will likely be negative interactions, despite the best retrofitting efforts. In these cases complete rebuilding or undergrounding is the only effective option, although very expensive.

In Florida the problem is more dispersed. Because many Bald Eagle nests are located in vegetation not much higher than surrounding poles, an emphasis on retrofitting nearby poles is recommended. This is important because, historically, immature birds are most often involved in electrocutions. Although a Florida study recorded 80% of fledgling birds staying within 229m of the nest (Wood *et al.* 1998), poles within 400 m of an active nest should be surveyed. Poles outside this boundary should be reviewed if they have a commanding view of water.

Because Florida experiences the highest lightning levels in the United States, Florida utilities typically place lightning arresters on every third pole and on all equipment. Florida retrofitting requires a focus on covering exposed lightning arresters and associated jumpers. Equipment poles and bonded metal brackets also are problematic and require bushing covers, perch deterrents and covered jumpers.

REFERENCES

AVIAN POWER LINE INTERACTION COMMITTEE (APLIC) 1996. Suggested practices for raptor protection on power lines: the state of the art in 1996. Edison Electric Institute/Raptor Research Foundation. Washington, D.C. 125 pp.

CURNUTT, JOHN L. & WILLIAM B. ROBERTSON JR. 1994. Bald Eagle nest site characteristics in south Florida. *Journal of Wildlife Management 58*: 218-221.

FEDERAL WILDLIFE OFFICERS ASSOCIATION 2000. The Federal Wildlife Officer News Letter – Spring. Vol. 13, No. 2

FEDERAL WILDLIFE OFFICERS' ASSOCIATION 1998. The Federal Wildlife Officer News Letter – Fall. Vol. 11, No. 3

HARNESS, R.E. & M. GARRETT 1999. Effectiveness of perch guards to prevent raptor electrocutions. *Journal of Colorado Field Ornithologists Vol. 33, No 4:* 215-220.

HODGES, J.J., J.G. KING & F.C. ROBARDS 1979. Resurvey of Bald Eagle breeding population in southeastern Alaska. *Journal of Wildlife Management 43*: 219-221.

JACOBSON, M. J. & J. I. HODGES 1999. Population trend of adult bald eagles in southeast Alaska, 1967-97. *Journal of Raptor Research 33*: 295-298.

LEHMAN, ROBERT N. 2001. Raptor electrocution on power lines: current issues and outlook. *Wildlife Society Bulletin 29*: 804-813.

MAÑOSA, S. 2001. Strategies to identify dangerous electricity pylons for birds. Abstracts from the 4th Eurasian Congress on Raptors. Seville, Spain. 25-29 September 2001. *Raptor Research Foundation.*

NISBET, I. C. T. 1989. Organochlorines, reproductive impairment, and declines in Bald Eagle (*Haliaeetus leucocephalus*) populations: mechanisms and dose-response relationships. Pages 483-489 *in* B.-U. Meyburg and R.D. Chancellor (Eds.), *Raptors in the Modern World.* WWBP, Berlin, Germany.

SAUER, J. R., S. SCHWARTZ & B. HOOVER 1996. The Christmas Bird Count. Patuxent Wildlife Research Center, Laurel, MD, Version 95.1. (http://www.mbr-pwrc.usgs.gov/bbs/cbc.html (May. 8, 2003))

UNITED STATES FISH & WILDLIFE SERVICE (USFWS) 2003. USFWS Alaska Raptor Electrocution Database (Updated May 7 2003). USFWS - LE. Anchorage, Alaska

WAYLAND, M., L K. WILSON, J. E. ELLIOT, M. J. R. MILLER, T. BOLLINGER, M. MCADIE, K. LANGELIER, J. KEATING & J. M. W. FROESE 2003. Mortality, morbidity, and lead poisoning of eagles in western Canada, 1986-98. *Journal of Raptor Research 37:* 8-18.

WOOD, P. B., M. W. COLLOPY & C. M. SEKERAK 1998. Postfledging nest dependence period for bald eagles in Florida. *Journal of Wildlife Management 62*: 333-346.

WOOD, P. E. & M. W. COLLOPY 1993. Effects of egg removal on bald eagle productivity in northern Florida. *Journal of Wildlife Management 57*: 1-9.

Richard E. Harness
EDM International, Inc.
Fort Collins, CO 80525 USA
970-204-4001
Fax: 970-204-4001
E-mail rharness@edmlink.com