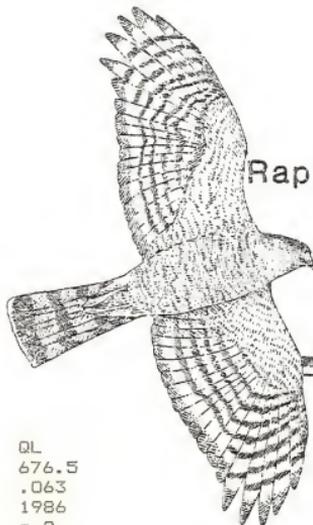




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Raptor Collisions with Utility Lines:  
An Analysis Using Subjective  
Field Observations

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RAPTOR COLLISIONS WITH UTILITY LINES:  
AN ANALYSIS USING SUBJECTIVE FIELD OBSERVATIONS

Final Report

Prepared by

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February, 1986

Submitted to: Pacific Gas and Electric Company  
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## EXECUTIVE SUMMARY

Data were collected on a total of 88 probable raptor collisions with utility lines. Peregrine Falcons, Bald Eagles, Golden Eagles, Red-tailed Hawks, and Ospreys were the species most commonly reported (Table 1). The reports were evenly distributed through the months, except for peaks during March and October (Figure 2). Of the 38 reports which included weather information, only 7 (18.4 percent) cited weather as a possible causal factor. Of 76 birds for which age class was recorded, 42 (55.3 percent) were adults and 34 (44.7 percent) were subadults.

The type of utility line apparently struck was known for 72 of the 88 suspected collisions (Table 3). Of the 72, 10 (13.9 percent) were telephone lines, 36 (50.0 percent) were electric distribution lines, and 26 (36.1 percent) were electric transmission lines. Twenty-seven (75.0 percent) of the distribution lines were pole-and-crossarm configurations; 17 (65.4 percent) of the transmission lines involved were supported by metal towers. No data were collected on the relative importance of static wires versus conductors as factors in these suspected strikes. The types of injuries sustained by the birds include 27.3 percent (N = 81) with head injuries and 75.6 percent (N = 81) with wing injuries (Table 4). Only 15.6 percent (N = 78) of the birds involved were uninjured or were later returned to the wild.

Type of line hit was recorded in 15 cases involving Peregrine Falcons. Three (20.0 percent) probably hit electric transmission lines, 11 (73.3 percent) electric distribution lines, and 1 (6.7 percent) telephone lines. Similar figures for Bald Eagles were 5 (33.3 percent), 8 (53.4 percent), and 2 (13.3 percent), respectively.

In California the wild population of Peregrine Falcons increased from 10 known pairs to 80 known pairs between 1975 and 1985. During the same time period 17 Peregrine Falcons were reported as possible utility line collisions. It is clear that this Peregrine Falcon population is recovering in spite of the randomly distributed (Figure 5) mortality due to utility line collisions.

Though raptor collisions with utility lines will always contribute to proximate mortality of individuals, it does not seem likely that collisions could become an ultimate cause of population declines, except for critically endangered species such as the California Condor. Collision with utility lines apparently is a random, low level, and inconsequential mortality factor of raptor populations. Any other conclusion is counter to available data.

The authors will continue to solicit new data on raptor collisions with utility lines and stand ready to reanalyze all available data when appropriate.



## INTRODUCTION

In transmitting electric power from production facilities to their users, utility companies have erected many thousands of miles of transmission and distribution lines worldwide. In flight, birds of prey (raptors) are usually able to avoid such obstacles; however, when preoccupied or distracted--e.g., when engaged in territorial defense or pursuing prey--the potential for line strikes increases. This was the conclusion of participants of the workshop on Impacts of Transmission Lines on Birds in Flight (Avery 1976: 106):

Raptors that actively pursue prey in flight are probably more vulnerable to a collision with transmission lines than those that do not, but factors such as size of bird, wing span, and maneuverability (erratic or straight flight) are also important. The group agreed that when birds pursue prey, engage in courtship flights, defend a territory, or escape from a predator, they are particularly prone to collide with a power line, because they are preoccupied and not very alert to the hazards that transmission lines pose.

The potential for line strikes appears to be more important to resource managers when power lines are near nest sites, roosts, or other high use areas of endangered species. In California, for example, the Pacific Gas and Electric Company and other utilities operate power lines in the densest, most productive population of Peregrine Falcons (Falco peregrinus anatum) in the continental United States. Peregrine Falcons are swift flying, power diving predators of other birds. Their hunting flights begin at high altitude, but frequently end close to the ground, often lower than existing electric transmission lines, and sometimes below the level of most electric distribution lines. Indeed, evidence contained in this report confirms that Peregrine Falcons do collide with power lines with enough frequency to concern some California biologists.

Although efforts to portray raptor/utility line collisions as a serious problem have not been convincing, it is still common to find recommendations to route power lines through less sensitive areas (Anderson and Kirven 1979, White and Cade 1975), to construct them at certain times of the year (Meyer 1979, Baldrige 1977, Thomas Reid Associates 1980), and to adorn them with large orange balls (for greater visibility) -- all in an effort to minimize the chance of collisions by endangered species. In addition, the circumstantial nature of the information and the lack of analysis of the known instances of raptor/power line collisions has too often resulted in indefensible positions in environmental analyses and land-use decisions relating to power line routing, design, and construction. The entire electric industry needs as much information as possible to make informed decisions.

In the fall of 1983, the Pacific Gas and Electric Company (PG&E), Department of Engineering Research, contracted with the U.S. Department of Interior, Bureau of Land Management (BLM), Sacramento, California, to initiate a comprehensive assessment of the collision problem. As proposed, the objectives of this study were:

1. To conduct a worldwide search for unpublished information concerning collisions of raptors with power lines and other utility lines; and
2. To analyze the assembled information, evaluate specific related raptor/power line interactions, and produce a definitive state-of-the-knowledge report on the subject.

This report summarizes the Methods used and work completed to date (February 1986) to accomplish the above goals. It is intended by the authors to continue data collection for the next decade or so and to produce other reports as appropriate, probably at three- to five-year intervals.

## METHODS

The key to acquisition of unpublished information on any subject is a broad-based search aimed at appropriate individuals and groups. As proposed, a Call for Information was distributed for publication in many biological and ornithological journals, newsletters, bulletins, and other periodicals throughout the country and world. In addition, personal contacts were made with specialized groups of raptor enthusiasts, including raptor researchers, falconers, and rehabilitators, and with government agencies and personnel responsible for wildlife. Electric industry personnel were contacted through the Edison Electric Institute in Washington, D.C.

To augment the acquisition of unpublished material as described above, additional published and unpublished material was acquired by making use of the 3,850 source documents in BLM's Raptor Management Information System housed in the California State Office, Sacramento, California. Other information pertinent to the subject was acquired by contacting the U.S. Bird Banding Laboratory, Washington, D.C., regarding verified cases of raptor mortality from band returns, and the National Wildlife Health Laboratory, Madison, Wisconsin, regarding the results of the hundreds of raptor necropsies (primarily eagles) performed there in recent years. Specific methods used to meet each of the study objectives are discussed below.

Objective 1. Conduct a worldwide search for unpublished information concerning collisions of raptors with power lines and other utility lines.

Work on this phase of the study began in January, 1984. A Call for Information (Appendix 1) was developed for distribution worldwide. It was circulated to the editors of biological and ornithological journals, raptor researchers, falconers, raptor rehabilitators, and electric industry personnel.

Distribution to Journals. The Call for Information was sent to the editors of 175 biological and ornithological journals, newsletters, bulletins, and other periodicals in the United States, Canada, and throughout the world (Appendix 2). The Call was sent to journals in all 50 states, 3 U.S. Trust Territories (Puerto Rico, the Virgin Islands, and Guam), most Canadian provinces, and 26 other countries. The only areas of the world which were poorly represented in this distribution were the Soviet Union and some parts of Asia, and Central and South America. Europe, Africa, and Australia were well represented.

It is not known how many of the 175 editors to which the Call for Information was sent printed it in issues of their journals. It has been confirmed that the Call appeared in 26 journals (Appendix 2). In addition, the Call appeared in eight journals to which it was not submitted (the editors apparently acquired it indirectly). Because many who responded to the Call commented on its widespread distribution, we feel certain that it appeared in dozens of other journals from which we received no confirmation. We did not make a special attempt at a large university library to verify publication of the Call for Information.

Distribution to Falconers. The Call for Information reached over 1,500 falconers by appearing in Hawk Chalk, the news magazine of the North American Falconer's Association (NAFA). It was also sent to the presidents of 13 hawking clubs in the United States for distribution to their memberships. Finally, the Call was sent to NAFA associate members in parts of the world where good representation was not achieved through distribution to journals: Bahrain, Brazil, Chile, Iceland, Mauritius, Mexico, New Zealand, Peru, Saudi Arabia, Sudan, Venezuela, and Zimbabwe.

Distribution to Raptor Rehabilitators. The Call for Information was sent to over 300 wildlife/raptor rehabilitation facilities throughout the United States. These included well-established facilities associated with universities, facilities associated with veterinary hospitals, and "backyard" facilities operated by nonprofessionals.

The Raptor Collision Report Form. A report form (questionnaire) was developed in February, 1984, for distribution to individuals responding to the Call for Information (Appendix 3). Almost 250 responses to the Call for Information were received. Over 400 report forms were distributed. One hundred twenty-one questionnaires were returned (see below). Reports continue to come in (three to five per month).

Other Methods Used to Meet Objective 1. Copies of the Call for Information and the Collision Report Form were sent to Richard S. Thorsell, Edison Electric Institute (EII), Washington, D.C., for distribution to EII member companies. They were also distributed at two annual meetings of the Raptor Research Foundation. The U.S. Bird Banding Laboratory (FWS) was contacted with regard to band returns from raptors found near power lines. The lab responded by providing a computerized summary of all band returns of raptors under "Code 54," i.e., "raptors recovered due to striking radio, TV, high tension, etc., wires or towers, or ceilometers," between the years 1943 and 1984. Finally, the National Wildlife Health Laboratory (NWHL) was contacted. A summary of Bald Eagle mortality between the years 1963 and 1984 prepared by the NWHL was obtained (U.S. Fish and Wildlife Service 1985). Summaries of other species were unavailable.

Many State and Federal agency biologists were contacted for additional information, though no systematic mailing was made. Given the many hundreds of Federal and State wildlife and land management offices throughout the country, such an effort was prohibitive. Further, given the widespread distribution which the Call for Information received, most agency biologists probably encountered the Call in the normal course of their work.

Objective 2: Analyze the assembled information; evaluate specific related raptor/power line interactions, and produce a definitive state-of-the-knowledge report on the subject.

Data from report forms were computerized on an IBM XT computer and were analyzed using dBase II software (Ashton-Tate 1982). The data base (Appendices 4 and 5) was characterized 1) by summarizing all categories (e.g., species, time of year, weather conditions, utility line type, type of injuries, etc.) with frequency distributions, and 2) by referencing data between categories (e.g., species with line type, species with type of injuries, etc.). These data are presented in the Results section of this paper.

## RESULTS

A total of 121 completed questionnaires were received, 33 of which were rejected because the information given was too incomplete or the cause of death was obviously not a collision with a utility line. Usually these unused data involved electrocutions, a subject that has been dealt with elsewhere (Olendorff et al. 1981). Three reports (two for Red-tailed Hawks and one for a Bald Eagle) included eyewitness accounts of simultaneous midspan collisions and electrocutions. These data were included in the final sample of 88 probable raptor collisions (see Appendix 4 for the data base structure and codes and Appendix 5 for raw data for all 88 reports).

### Species for Which Collisions Were Reported

Peregrine Falcons, Bald Eagles, Golden Eagles, Red-tailed Hawks, and Ospreys were the species most commonly reported (Table 1). This is not unexpected in light of the widespread concern for these species and because of the large body sizes in the case of eagles. The sample of 88 reports is undoubtedly biased toward these species. For example, 14 of the Peregrine reports came from one source, the Santa Cruz Predatory Bird Research Group, which has kept records of Peregrine mortalities in California for many years. No other single source accounted for more than three collision reports.

### Years Suspected Collisions Occurred

Of the 88 reports of suspected collisions, 75 (85 percent) were from the past ten years (Figure 1). These data are included only to characterize the data base, not to indicate that the occurrence of collisions is increasing as might be inferred from Figure 1. Obviously, the data are biased toward collisions still fresh in people's minds. The recency of the data does allow a measure of confidence that the observations were correctly recorded and reported, though the high subjectivity of most of the data remains.

### Months Suspected Collisions Occurred

Of the 88 collision reports, 75 gave the month in which the suspected collision occurred (the others gave season or just the year) (Figure 2). The reports were evenly distributed through the months, except for peaks during March and October. The extent that these peaks might be related to courtship and/or migration is not discernable from the data.

### Locations of Collisions

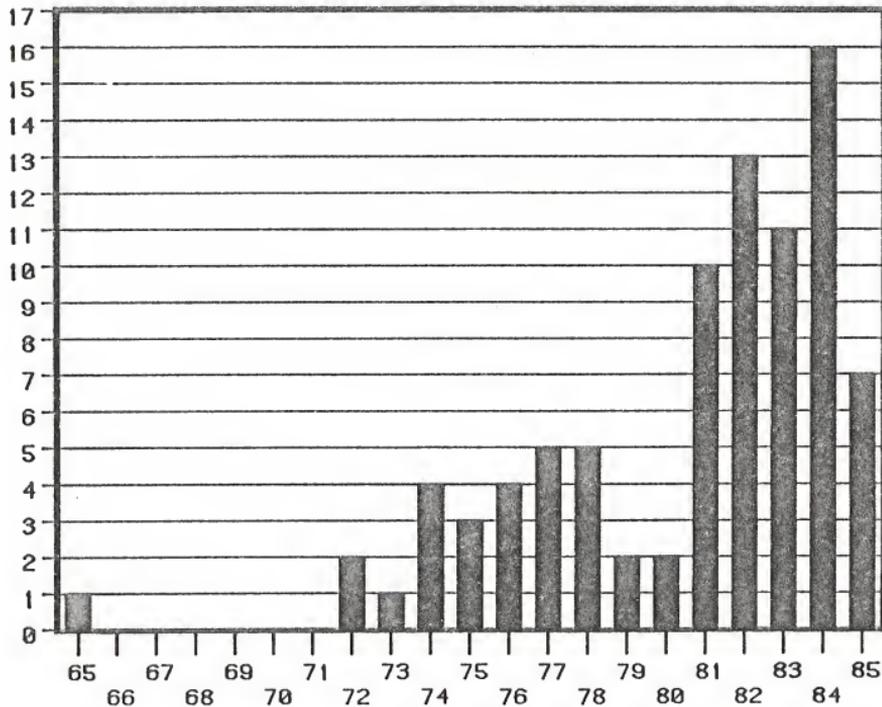
The locations of suspected collisions or the recovery sites of injured or dead birds were recorded in 87 of the 88 report forms received. Suspected collisions were reported from six countries (excluding the United States): Canada (all from Saskatchewan--4 reports); Great Britain (3 reports); Australia, Malawi, and Sicily (2 reports each); and Zimbabwe (1 report). Of the 87 reports for which location was recorded, 72 (82.7 percent) were from the United States; reports were received from 21 states.

Table 1. Species for which collisions were reported.

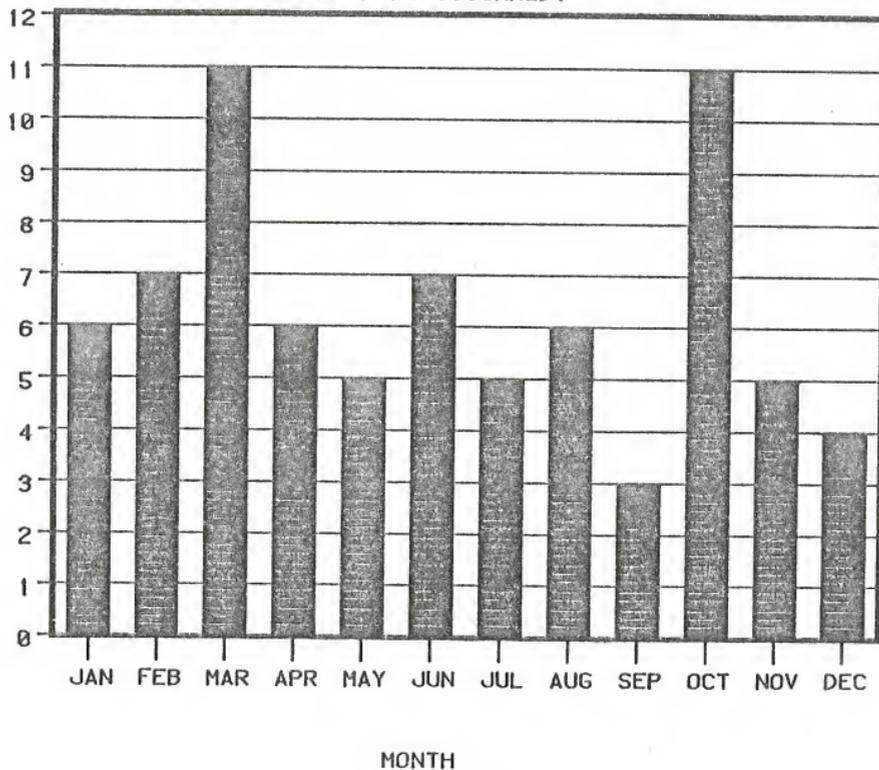
<u>Species</u>	<u>Scientific Name</u>	<u>Report Forms Received</u>	
		<u>Number</u>	<u>(%)</u>
Peregrine Falcon	<u>Falco peregrinus</u>	24	(27.3)
Bald Eagle	<u>Haliaeetus leucocephalus</u>	15	(17.1)
Golden Eagle	<u>Aquila chrysaetos</u>	9	(10.2)
Red-tailed Hawk	<u>Buteo jamaicensis</u>	7	(8.0)
Osprey	<u>Pandion haliaetus</u>	7	(8.0)
Short-eared Owl	<u>Asio flammeus</u>	4	(4.6)
Swainson's Hawk	<u>Buteo swainsonii</u>	3	(3.4)
Great Horned owl	<u>Bubo virginianus</u>	3	(3.4)
Long-eared Owl	<u>Asio otus</u>	2	(2.3)
Merlin	<u>Falco columbarius</u>	2	(2.3)
Prairie Falcon	<u>Falco mexicanus</u>	2	(2.3)
Common Kestrel	<u>Falco tinnunculus</u>	2	(2.3)
Gyr Falcon	<u>Falco rusticolus</u>	1	(1.1)
Little Falcon	<u>Falco longipennis</u>	1	(1.1)
Rough-legged Hawk	<u>Buteo lagopus</u>	1	(1.1)
Northern Harrier	<u>Circus cyaneus</u>	1	(1.1)
Secretary Bird	<u>Sagittarius serpentarius</u>	1	(1.1)
Spotted Eagle Owl	<u>Bubo africanus</u>	1	(1.1)
White-faced Scops Owl	<u>Otus leucotis</u>	1	(1.1)
Barn Owl	<u>Tyto alba</u>	<u>1</u>	<u>(1.1)</u>
	Total	88	(100.0)

FIGURE 1. THE YEARS DURING WHICH THE  
REPORTED COLLISIONS OCCURRED.

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YEARS: 1965-1985

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SFIGURE 2. THE MONTHS IN WHICH THE REPORTED  
COLLISIONS OCCURRED.

The greatest number of suspected collisions were reported from California (22 reports), followed by Idaho (7 reports), Montana, and Washington (5 reports each). One to three reports were received from each of the remaining 17 states.

#### Health of the Birds at the Time of the Suspected Collision

Of the 88 reports, 81 evaluated the health of the birds at the time of the suspected collision. Only one bird (1.2 percent) was cited as being in poor health. This bird was a slightly emaciated fledgling Bald Eagle that apparently struck a telephone line in Wisconsin. The bird was rehabilitated and released near its nest five days after the reported collision. It flew away strongly at the time of release.

#### Weather as a Contributing Factor

Of the 88 reports, 38 gave information about weather at the time of the suspected collision. Only 7 of the 38 (18.4 percent) cited weather as a possible causal factor. Six different species were represented.

A Golden Eagle and an Osprey were picked up under a transmission line near Eureka, California, on April 17, 1983, after a windstorm. The line was a wooden H-frame configuration with five wires. A second Golden Eagle collided with a transmission line (metal towers, six wires, eyewitness account) near Bishop, California, as it was being pursued by a trained Gyrfalcon. While the weather was good at the time of the collision, there was light snow on the ground that may have affected visibility. Undoubtedly, the pursuit was also a significant distraction.

Misty weather was reported at the time of a reported collision of a Short-eared Owl with a 6-wire transmission line (metal towers) in Britain. A Long-eared Owl in Ohio collided with a transmission line (metal towers) in windy and rainy weather.

Two birds (a Bald Eagle and a Red-tailed Hawk) were actually observed hitting electric distribution lines midspan (pole and crossarm configurations) in bad weather and immediately being electrocuted. In the case of the Bald Eagle, foggy conditions prevailed. The Red-tailed Hawk was blown into the wires.

#### Age Classes of the Birds Involved in Suspected Collisions

Age class (adult or subadult) was recorded for 76 of the 88 birds suspected to have collided with utility lines. Of the 76, 42 (55.3 percent) were adults; 34 (44.7 percent) were subadults. Species other than Peregrines, Bald Eagles, and Golden Eagles accounted for the greater number of adults (Table 2). Although the sample size is small, 5 of 8 (62.5 percent) Golden Eagles were subadults. For electrocution of Golden Eagles, one would expect 90 to 95 percent subadults (Olendorff et al. 1981).

Table 2. Age classes of the birds reported to have collided with utility lines.

	<u>Adult</u>	<u>Subadult</u>	<u>Unknown</u>
Peregrine	10	13	1
Bald Eagle	7	8	0
Golden Eagle	3	5	1
All Buteos	7	3	1
Osprey	4	1	2
All Others	<u>11</u>	<u>4</u>	<u>7</u>
Totals	42	34	12

### Types of Utility Lines Involved

Three types of utility lines are considered in this report: telephone lines, electric distribution lines, and electric transmission lines. Telephone line configurations vary depending on the number of phone lines carried. Everything from single lines on single poles to dozens of lines on several crossarms supported by one pole are used. Each phone wire is smaller in diameter than most electric lines.

Electric distribution lines are generally supported on a single pole with crossarms (multiple lines) or without crossarms (usually two lines) (Figure 3). They carry less than 69 kV and are by far the source of most raptor electrocutions (Olendorff et al. 1981).

Electric transmission lines are generally supported by two large poles with a heavy crossarm between them (H-frame) or by metal towers (Figure 4). They typically carry 69 kV or more, sometimes more than 700 kV. The diameter of electric transmission line conductors is the largest of the three types of lines considered here.

The type of utility line apparently struck was known for 72 of the 88 suspected raptor collisions (Table 3). Of the 72, 10 (13.9 percent) were telephone lines, 36 (50.0 percent) were electric distribution lines, and 26 (36.1 percent) were electric transmission lines (Table 3, Column I).

Of the 36 distribution lines supposedly struck, 27 (75.0 percent) were of the pole-and-crossarm configuration, and 5 (13.9 percent) were single poles. The configuration of the other 4 was unknown (Table 3, Column II).

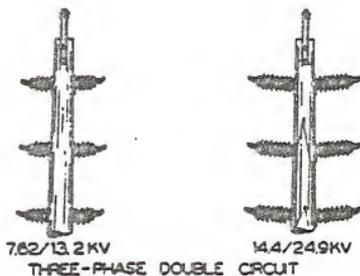
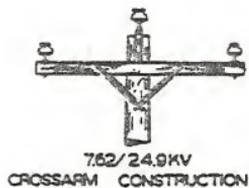
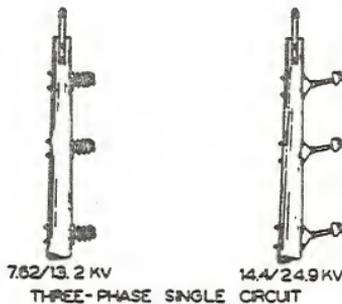
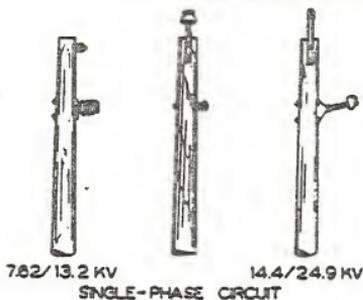
Of the 26 suspected transmission line strikes, 17 (65.4 percent) involved metal tower configurations. Five (19.2 percent) were of the wooden H-frame type. The rest (four) were of unknown configuration (Table 3, Column II). No data were collected on the relative importance of static wires versus conductors as factors in these suspected strikes.

### Habitat Conditions Near the Collision Sites

Each person responding with a questionnaire was asked to list any habitat conditions that may have contributed to the suspected collision. Of the 88, 20 did not characterize habitat conditions in any way. Of the remaining 68 questionnaires, 29 (42.6 percent) implied that abundant prey (an attraction to the raptors) or pursuit of prey was a possible factor. However, about half of these (15) questioned their own statements about prey involvement. A priori, one would expect abundant prey to be related because of the opportunistic nature of raptors in exploiting concentrations of prey.

Other habitat features of particular note included the presence of nests, roads, and urbanization. Of the 68 suspected collisions, at least 21 (30.9 percent) were near roads, implying only that that is where people are most likely to see a dead or injured raptor. Nests were present near the sites of 15 (22.1 percent) of the 68 suspected collisions. Vegetation, usually when the line is below treetop, is cited as a possible causal

FIGURE 3  
 TYPICAL DISTRIBUTION CONFIGURATION

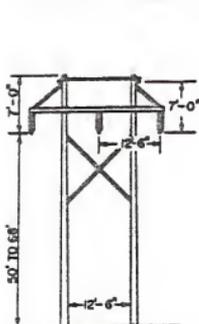


From: Olendorff et al. (1980).

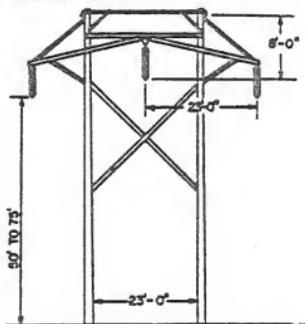
FIGURE 4

## HIGH VOLTAGE TRANSMISSION STRUCTURES

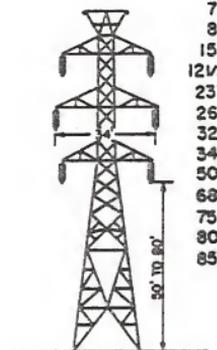
(SUFFICIENT CONDUCTOR SPACING PREVENTS  
PHASE-TO-PHASE OR PHASE-TO-GROUND CONTACT.)



TYPICAL 115KV WOOD H-FRAME

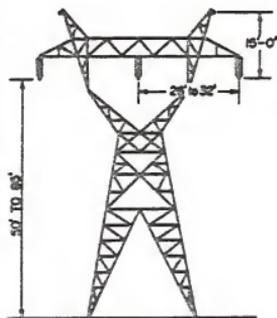


TYPICAL 230KV WOOD K-FRAME



TYPICAL 115KV  
DOUBLE CIRCUIT TOWER

7'	= 02.13 m.
8'	= 02.44 m.
15'	= 04.57 m.
12 1/2'	= 03.81 m.
23'	= 07.01 m.
26'	= 07.93 m.
32'	= 09.76 m.
34'	= 10.37 m.
50'	= 15.25 m.
66'	= 20.74 m.
75'	= 22.87 m.
80'	= 24.40 m.
85'	= 25.92 m.



TYPICAL 345/500KV  
TOWER CONFIGURATION

From: OIendorff et al. (1980).

Table 3. Line types presumably struck by raptors (each column represents a unique way of totaling the percentages).

	I Number <u>(% of Total)</u>	II Number <u>(% of Subtotal)</u>
Telephone Lines	10 (13.9)	10 (100.0)
<b>Electric Distribution Lines</b>		
Pole-and-Crossarm	27 (37.5)	27 (75.0)
Single Pole	5 (6.9)	5 (13.9)
Unknown	<u>4 (5.6)</u>	<u>4 (11.1)</u>
Subtotal	36 (50.0)	36 (100.0)
<b>Electric Transmission Lines</b>		
Metal Tower	17 (23.6)	17 (65.4)
Wooden H-frame	5 (6.9)	5 (19.2)
Unknown	<u>4 (5.6)</u>	<u>4 (15.4)</u>
Subtotal	26 (36.1)	26 (100.0)
Total	72 (100.0)	

factor in 11 (16.2 percent) of the instances. Seven (10.3 percent) were at river crossings. Light conditions or sun angle were implicated in four (5.9 percent) of the cases. Five others (7.4 percent) were in urban areas. Only one report was received from a hack site, though hack site attendants mention that young Peregrines, in particular, frequently hit lines. Most are not injured, however, and electrocution has apparently been more of a problem at hack sites.

#### Types of Injuries Sustained

For 7 of the 88 reported collisions, injuries were unknown. Of the remaining 81 birds, 8 showed no trauma, but some of these had burn marks caused by simultaneous collisions and electrocutions.

Of the 81 birds, 19 (23.5 percent) had head, beak, eye, or neck injuries (Table 4). By far the most common injuries in the sample were wing injuries. Of the 81 birds for which injuries were recorded, 62 (76.5 percent) had broken, dislocated, or bruised wings, or wing joint or wing tip problems.

The frequency of occurrence of other miscellaneous injuries is also shown in Table 4. Of particular note are the five birds (two subadult Bald Eagles and three owls) found hanging from wires at midspan. Four were on distribution lines, and one owl was on a telephone line.

The fate of 84 of the 88 birds suspected to have collided with utility lines was reported. Sixty-five (77.4 percent; N = 84) suspected collisions were biologically fatal (i.e., the birds died at the scene, died later, or never could be released back to the wild). This does not, however, indicate that 77.4 percent of all collisions are biologically fatal. The data are undoubtedly biased toward seriously disabled birds, since such birds are more likely to be found than are "soft" noninjurious collisions likely to be observed. These data do indicate, however, that once a bird is downed and discovered, it has about a 16 percent chance of being returned to the wild (84 with known fate, 7 uninjured, 77 birds taken in, 65 biologically dead; 15.6 percent returned to wild (N = 78)).

#### Species-specific Considerations

Peregrine Falcons. Of the 88 collision reports, 24 (27.3 percent) were for Peregrine Falcons (see Appendix 6 for raw data for all Peregrines). All Peregrine Falcon reports were from 1975 or after. Excluding reports from the Southern Hemisphere, all suspected collisions for which the month was recorded (N = 14) occurred between May and December (one or two reported each month). Additionally, four were reported as occurring in the fall, two in the winter, and one in the spring. The one record from Australia was in January.

All 24 Peregrines were in apparent good health at the time of their suspected collisions. Weather was reported in 12 cases, but was not considered a factor in any instance. Age class was known for 23 of the 24 Peregrines; 10 (43.5 percent) were adults, and 13 (56.5 percent) were subadults.

Table 4. The frequency of occurrence of specific injuries in 81 birds reported to have collided with utility lines. (NOTE: Many birds had more than one type of injury; thus, percents do not add to 100.0).

<u>Injury</u>	<u>Occurrence</u>	<u>% of Total (N = 81)</u>
No Trauma	8	9.9
Head Trauma	5*	6.2
Beak Broken	5*	6.2
Eye Injury	3*	3.7
Broken Neck	11*	13.6
Stunned	3*	3.7
Broken Wing	45**	55.6
Dislocated Wing	3**	3.7
Wing Joint Problem	4**	4.9
Bruised Wing	6**	7.4
Wing Tip Problem	4**	4.9
Plumage Damage	7	8.6
Internal Injuries	7	8.6
Burns	5	6.2
Broken Leg	2	2.5
Hanging on Wire	5	6.2

\* This group with head injuries represents 22 different birds or 27.3 percent (N = 81).

\*\* This group with wing injuries represents 62 different birds or 76.5 percent (N = 81).

In 15 cases the type of line apparently struck by Peregrines was known. One bird (6.7 percent) apparently struck a telephone line. Eleven (73.3 percent) were reported to have struck electric distribution lines. Three (20.0 percent) probably hit electric transmission lines. Of the 11 distribution line cases, 9 were pole-and-crossarm configurations; 2 were armless configurations. Two of the transmission line reports involved lines suspended from metal towers. The configuration of the third case was unknown.

The fate of all 24 Peregrines reported to have struck lines was known. Twenty (83.3 percent) of the suspected collisions were biologically fatal (dead at the scene, died later, or never returned to the wild). Four (16.7 percent) were uninjured or released after rehabilitation.

Bald Eagles. Of the 88 collision reports, 15 (17.0 percent) were for Bald Eagles, recorded mostly during the 1980s (one from 1965; another from 1974) (Appendix 7). The month during which suspected Bald Eagle collisions with lines occurred was recorded in 14 cases. Nine (64.3 percent) of these occurred in the spring (March-May), with six (42.9 percent) occurring in March alone. Only three cases (21.4 percent) occurred during winter (November-February).

Health was known for 14 of the 15 Bald Eagles. Only one (7.1 percent) was in questionable health, a slightly emaciated fledgling which received a bruised wing in an apparent collision. It was later released back to the nest area. Weather was a possible factor in only one of five reports for which weather was recorded. In April, 1985, an adult bird released several years earlier on the Channel Islands, California, struck a distribution line with three wires and was immediately electrocuted in foggy weather (eyewitness account). The age classes of Bald Eagles suspected of colliding with wires were 7 adults and 8 subadults.

The types of lines apparently struck by Bald Eagles were as follows (N = 15): two (13.3 percent) telephone lines, eight (53.4 percent) electric distribution lines, and five (33.3 percent) electric transmission lines. Of the eight distribution line cases, all were pole-and-crossarm configurations. Configurations of only three of the five transmission lines were known: two metal towers and one wooden H-frame.

The fate of the 15 Bald Eagles reported was known in all cases. Only two (13.3 percent) were returned to the wild following rehabilitation. All other cases were biologically fatal, though two were placed in captive breeding projects.

Golden Eagles. Of the 88 collision reports, 9 (10.2 percent) were for Golden Eagles (Appendix 8). The records ranged in date between 1971 and 1984. The suspected collisions were scattered throughout the year. The apparent health of Golden Eagles at the time of their suspected collisions was recorded in eight cases. All eight were in apparent good health. Weather was recorded in only three cases; in two of these cases (one involving high winds and one involving light snow) weather may have contributed to the collision. Age class was also recorded in eight of the nine cases; three (37.5 percent) were adults. The type of line involved in the suspected impacts by Golden Eagles was recorded in eight cases.

Four birds collided with distribution lines and four collided with transmission lines. Eight of the nine line strikes by Golden Eagles were biologically fatal. The bird's fate was not recorded in one case.

Ospreys. Of the 88 collision reports, 7 (7.9 percent) were for Ospreys (Appendix 9). All but two of the records were from the 1980's (one from 1973, another from 1977). The month in which the collision occurred was recorded in all seven cases: two in September, two in October, one in April, and one in July.

All seven Ospreys were in apparent good health at the time of their suspected collisions. Weather was recorded in four of the seven cases and was an apparent factor in one case. In April, 1983, near Eureka, Nevada, an adult Osprey apparently flew into a 230-kV transmission line during high winds. Age class was known in five of the seven cases; four (80.0 percent) of these were adults.

In six cases the type of line apparently struck by Ospreys was known. Four (66.6 percent) of the birds apparently struck transmission lines, and two (33.3 percent) were found near distribution lines.

The fate of six of the seven Ospreys suspected to have struck lines was known. Five of these suspected collisions were biologically fatal. In the remaining case, the bird was carrying a large fish at the time of the collision and was not flying at a high rate of speed. The bird was stunned by the impact, but recovered within three minutes and flew away (eyewitness account).

Red-tailed Hawks. Of the 88 collision reports, seven (7.9 percent) were for Red-tailed Hawks (Appendix 10). All but one record (an incident from 1976) occurred between 1982 and 1985. The month in which the collision occurred was recorded in all but one case: three from October, two from February, and one from June.

All seven Red-tailed Hawks were apparently in good health at the time of their suspected line strikes. Weather was suspected to be a contributing factor only once. In this incident the bird was apparently blown into wires during high winds. Age class was identified in all cases: five birds (71.4 percent) were adults.

Line type was identified in all seven cases. Four birds apparently collided with transmission lines, two with phone lines, and one a distribution line. Transmission lines were suspended from metal towers in the four relevant cases; the single incident involving a distribution line apparently occurred on a pole-and-crossarm configuration.

The fate of all seven Red-tailed Hawks was recorded. Four (57.1 percent) of the incidents were biologically fatal. Broken wing bones occurred in two cases; both of these birds were rehabilitated and returned to the wild. Minor injuries occurred in one case. This bird, a fledgling, was returned to the nest after 24 hours of observation.

### Generic and Other Group Considerations

Raw data for all falcons, all eagles, and all buteos are listed in Appendices 11, 12, and 13, respectively.

With regard to age class, more subadult than adult falcons and eagles are apparent victims of collisions with utility lines (Table 5). However, 70.0 percent of the buteos were adults.

Falcons and eagles apparently collide with distribution lines more often; buteos are more likely to strike transmission lines according to the reports received (Table 6). The high susceptibility of falcons to distribution line collisions may be related to the use of distribution lines, and the habitats they provide, by birds of the size preyed upon by Peregrines and other falcons. This may also relate to the fact that distribution lines are more prevalent in the environment, but one would not expect buteos to show the opposite trend (i.e., more apparently colliding with transmission lines). More data are necessary to establish these relationships with any certainty.

Buteos are also more likely to survive utility line collisions (Table 7), with a 60 percent biological survival rate (uninjured or later released) of those reported. The suspected collisions of falcons and eagles were biologically fatal much more often. In fact, no falcon or eagle for which both fate and line type were reported survived a collision with a transmission line uninjured or was later released back to the wild (Table 7). There is a small chance that falcons and eagles will survive distribution line collisions. We strongly believe that these high mortality figures are related to the momentum inherent in swift flying falcons and heavy bodied eagles; buteos fly more slowly and weigh less than eagles.

Table 5. Age classes of raptors which apparently collided with utility lines by group (falcons, eagles, and buteos).

	<u>Total No. With Known Age Class</u>	<u>% Adults</u>
All Falcons	29	41.4
All Eagles	23	43.5
All Buteos	10	70.0

Table 6. Types of lines with which raptors (by group) are suspected to have collided.

	Total No. of Records With Known Line Type	% Colliding With Telephone Lines	% Colliding With Distribution Lines	% Colliding With Transmission Lines
All Falcons	19	15.8 (N = 3)	68.4 (N = 13)	15.8 (N = 3)
All Eagles	23	8.7 (N = 2)	52.2 (N = 12)	39.1 (N = 9)
All Butecs	11	18.2 (N = 2)	27.3 (N = 3)	54.5 (N = 6)

Table 7. Fatality rates of raptor groups in relation to line type.

	Total With Known Fate and Line Type	% of Collisions With Distribution Lines Which Were Biologically Fatal	% of Collisions With Transmission Lines Which Were Biologically Fatal
All Falcons	16	76.9 (N = 13)	100.0 (N = 3)
All Eagles	20	90.9 (N = 11)	100.0 (N = 9)
All Buteos	8	50.0 (N = 2)	33.3 (N = 6)
All Species	59	81.8 (N = 33)	76.9 (N = 26)

## DISCUSSION

Considering the widespread (worldwide) distribution of the Call for Information for this study, it is surprising that only 88 suspected collisions were reported. The data span 21 years (1965-1985), with no more than six birds of any species being reported in one year.

Peregrine Falcons accounted for 24 (27.3 percent) of the 88 case histories reported, and among all raptors may be most prone to collisions with utility lines. Their great speed in flight and mode of hunting may predispose them to collision with stationary objects more so than other raptors (recognizing as well, that the frequency of Peregrines in the data base reflect, in part, a bias towards the species (page 6)). With respect to the possible effects of utility line collisions on raptor populations, and given the relative abundance of data which was available from one area, the case of Peregrine Falcons appears to be a good example.

### California Peregrines

Between 1975 and 1985, 17 Peregrine Falcons were reported as possible utility line collisions in California. Between 1970 and 1985 the wild population of Peregrines in California increased from 10 known pairs to 80 known pairs. This resulted from a combination of aggressive hands-on management and natural recovery. Recovery might have been slightly more rapid in the absence of collisions. However, recovery is occurring in spite of mortality due to utility line collisions, and in spite of all other proximate mortality factors including shooting, pesticides, and electrocution.

When mapped (Figure 5), Peregrine Falcon-utility line impacts in California appear to be random events. Such cases are distributed evenly throughout the range of the species in California. The only repeat location is near the nest site at Morro Bay where two Peregrines have apparently collided with distribution lines and one other is thought to have hit a line of unknown configuration. Peregrines were found after suspected collisions in a river bottom, near a house, in a street, in chaparral, at a hack site, and in mudflats. Four of the seventeen occurred near nests (including three at Morro Bay). No habitat trends seem able to dismiss the apparent randomness of suspected Peregrine Falcon collisions with utility lines, except that 6 of the 17 cases were thought to be related to the presence of abundant prey.

Peregrine Falcon populations are recovering in California in spite of the species' apparent vulnerability to power line collisions and in spite of all other natural and man-caused mortality factors. And if Peregrine collisions are simply random events, then there seems no possible way to construe the data to suggest 1) that collisions are potentially an ultimate cause of Peregrine population declines or even a significant limiting factor at the population level, or 2) that any mitigation over and above site-specific or special-case problems should be undertaken. Given that Peregrines are more susceptible than other raptors, yet are not being limited at the population level, several questions logically follow:



1. What characteristics of all raptors and their behavior combine to lower their susceptibility to collisions with utility lines (or any stationary object, for that matter)?
2. Under what circumstances might raptor impacts with wires become significant at the population level?
3. What can be done under those circumstances to reduce the potential of collisions?

#### Factors Which Decrease the Susceptibility of Raptors to Utility Line Collisions

There are several physical and behavioral attributes of raptors which decrease their susceptibility to collisions. These include the following:

1. Raptors have keen eyesight.
2. Many raptors soar or use relatively slow flapping flight.
3. Raptors in general are maneuverable while in flight.
4. Raptors learn to use utility poles and structures as hunting perches and as nest sites and probably become conditioned to the presence of lines.
5. Raptors, unlike waterfowl, do not fly in groups, with their position and altitude being at least in part determined by other birds of the flock.

Thus, raptors are not likely to collide with utility lines unless they are distracted in some way (e.g., while pursuing prey) and unless other environmental factors (e.g., weather) contribute to increased susceptibility. Though collisions with utility lines will always contribute to proximate mortality, it does not seem likely that collisions could become an ultimate cause of population declines, except under unusual or special circumstances.

#### Circumstances Under Which Collisions May Become a Significant Limiting Factor

In the case of a gravely endangered species, for example, the California Condor (*Gymnogyps californianus*), which has been reduced to just five surviving individuals in the wild, collisions with utility lines could obviously result in significant impacts at the population level. In the case of other endangered, threatened, or rare species, collisions with power lines could become significant if lines pass through or near important habitats where such species congregate. For example, Bald Eagles congregate in large numbers during the winter near abundant food sources and often roost communally at night. Flight corridors used during arrivals and departures at roost sites are usually quite distinct. Siting of utility line corridors near or through such areas would certainly be imprudent without extensive analysis of eagle flight behavior.

From a more general perspective, mortality associated with utility line collisions cannot be regarded apart from other types of proximate mortality. The sum total of all proximate mortality factors, e.g., starvation, disease, shooting, poisoning, electrocution, and collision with man-made objects, limits some raptor populations, and may result in population declines in some cases when endangered species are involved. In these cases, mitigation to reduce the potential of collisions with utility lines, may be justified with an overall program to reduce all proximate mortality factors.

#### Mitigation Under Such Circumstances

Given that raptor collisions with utility lines is a random and relatively infrequent event, and that raptors for the most part are naturally adapted against this type of mortality, there seems little that utility companies can or should do to reduce collision potential; nor do expensive measures to make lines more visible or to resite existing lines seem justified. Instead, attention should be focused on recognition of declines, ultimate causes of those declines, and mitigation opportunities directed at causal factors. Since collisions may be significant in the case of certain endangered species, and since the sum of all proximate mortality factors, including collision, may limit recovery potential of such species, mitigation prior to construction of new lines may be appropriate in certain cases. Proper siting of new lines so that habitats important to endangered raptors are avoided is an activity in which the electric industry has shown considerable willingness to take part. However, mitigation aimed at singular proximate causes of mortality, while marginally justifiable, may not be the best use of limited funding and manpower.

#### Summary

The conclusions drawn in this paper must always be considered subjective, because, except for the few eyewitness accounts, the data are not empirical. However, due to the low probability of one person observing a single collision (let alone a significant number), the best subjective data--some of which is also circumstantial--must be used. Thus, the information given herein characterizes the data set more than it provides definitive information on raptor collisions with utility lines. Nonetheless, the data are the best available; more definitive conclusions must await better awareness of observers and systematic recording of collision data over a decade or more.

On the basis of our data, collisions with utility lines do not result in a discernable effect on the population dynamics of raptors, except in the case of critically endangered species or when rare, threatened, or endangered species are experiencing population declines. Collision with utility lines apparently is a random, low level, and inconsequential mortality factor of raptor populations. Any other conclusion is counter to available data.

#### FUTURE DATA COLLECTION

The authors expect this report to generate more data--perhaps more than herein analyzed. We encourage those who disagree with our findings, those who observe or suspect raptor collisions with utility lines, and those who failed to respond to our first Call for Information to submit a completed report form copied from Appendix 3. Anyone with more complete information on the cases herein reported are also encouraged to respond. The data base on which this report is based will be maintained for the next several years, and an updated report will be prepared if and when appropriate.



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#### NOTE

Another part of this project involved the compilation of all published material concerning raptor collisions with power lines. A report entitled "Raptor Collisions with Utility Lines and Fences--an Annotated Bibliography" will be available from Pacific Gas and Electric Company (address on the cover of this report) in May, 1986.



APPENDIX 1:

The Call for Information sent to ornithological journals, falconer's associations, raptor rehabilitation facilities, and electric industry organizations throughout the country and world.



## RAPTOR COLLISIONS WITH UTILITY LINES

### A Call for Information

The U.S. Department of Interior, Bureau of Land Management, Sacramento, in cooperation with the Pacific Gas and Electric Company, is assembling all available published and unpublished information concerning collisions of raptors with power lines and other utility lines. Actual case histories--no matter how circumstantial or fragmentary--are needed. Please acknowledge that you have such information by writing to Dr. Richard R. (Butch) Olendorff, U.S. Department of the Interior, Bureau of Land Management, 2800 Cottage Way, Sacramento, California 95825 U.S.A. (Phone (916) 484-4541). A form on which to record your information will then be sent by return mail.



APPENDIX 2:

Biological and ornithological journals, newsletters, bulletins, and other periodicals throughout the country and world to which the Call for Information was sent. Countries of publication are indicated by parentheses.



Acta Biologica (Hungary)  
African Wildlife News (Kenya)  
Alabama Birdlife (USA)  
Alauda (France)  
Alberta Naturalist\* (Canada)  
American Birds (USA)  
American Midland Naturalist (USA)  
American Naturalist (USA)  
American Ornithologists' Union Ornithological Newsletter\* (USA)  
American Zoologist (USA)  
Archives of Natural History (England)  
Ardea (Netherlands)  
Arizona Wildlife News (USA)  
Arkansas Out of Doors (USA)  
Atlantic Naturalist (USA)  
Audubon Leader\* (USA)  
Audubon Newsletter (USA)  
Audubon Society of Rhode Island Report (USA)  
Auk (USA)  
Australian Birds (Australia)  
Australian Birdwatcher (Australia)  
Australian Natural History (Australia)  
Aves (Belgium)  
B.C. Naturalist\* (Canada)  
Beitrag zur Vogelkunde (East Germany)  
Biological Conservation (England)  
Bird Behavior (Singapore)  
Birding (USA)  
Birds (England)  
Birds and Country (England)  
Bird Study (England)  
Bird Talk (USA)  
Bird Watch (USA)  
Bird Watcher's Digest\* (USA)  
Bluebird (USA)  
Blue Bill (Canada)  
Blue Jay (Canada)  
Bokmakierie\* (South Africa)  
British Birds\* (England)  
British Ornithologist's Club Bulletin (England)  
Bulletin Ornithologique (Canada)  
California Fish and Game (USA)  
California Wildlife (USA)  
Canadian Field-Naturalist\* (Canada)  
Canadian Journal of Zoology (Canada)  
Cardinal (USA)  
Caribbean Journal of Science (Puerto Rico-USA)  
Chat (USA)  
Chihuahuan Desert Discovery (USA)  
Colorado Field Ornithologist's Journal (USA)  
Colorado Wildlife (USA)  
Condor (USA)  
Connecticut Warbler\* (USA)  
Conservation News (USA)  
Continental Bird Life (USA)

Corella (Australia)  
Delmarva Ornithologist (USA)  
Der Falke (East Germany)  
Der Ornithologische Beobachter (Switzerland)  
Die Gefiederte Welt (West Germany)  
Die Vogelwarte (West Germany)  
Duihengazet (Netherlands)  
Dutch Birding (Netherlands)  
Eagle Rare Bourbon Straight Notes\* (USA)  
Earthcare Northwest (USA)  
Earthwatch Oregon (USA)  
Econews (USA)  
Egretta (Austria)  
Elepaio\* (USA)  
El Zumbador Newsletter (Puerto Rico-USA)  
Emu (Australia)  
Environmental Conservation\* (Switzerland)  
Environmental Currents (USA)  
Ergonomija (Yugoslavia)  
Eyas\* (USA)  
Fauna Och Flora (Sweden)  
Field Studies (England)  
Flickertales (USA)  
Florida Naturalist (USA)  
Flower and Feather (USA)  
Forest and Bird (New Zealand)  
Fugle (Denmark)  
Georgia Wildlife (USA)  
Gosse Bird Club Broadsheet (Jamaica)  
Great Basin Naturalist (USA)  
Guam Rail (Guam-USA)  
Hawk Chalk\* (USA)  
Hawk Mountain News\* (USA)  
Honeyguide\* (Zimbabwe)  
Ibis (England)  
International Council for Bird Preservation Newsletter\* (England)  
Inland Bird Banding Newsletter (USA)  
International Osprey Foundation Newsletter (USA)  
Iowa Bird Life (USA)  
Jack Pine Warbler (USA)  
Journal Fur Ornithologie (West Germany)  
Journal of Field Ornithology (USA)  
Journal of Wildlife Management (USA)  
Kansas Ornithological Society Bulletin\* (USA)  
Kentucky Warbler (USA)  
Kestrel Karetaker News (USA)  
Kingbird (USA)  
Korean Nature (North Korea)  
Lark Bunting (USA)  
LeGerfaut (Belgium)  
L'oiseau et la Revue Franchaise D'Ornithologie (France)  
Loon (USA)  
Louisiana Out of Doors (USA)  
Luscinia (West Germany)  
Maine Audubon News (USA)

Man and Nature (USA)  
Maryland Birdlife (USA)  
Migrant (USA)  
Migrazione E Caccia (Italy)  
Murrelet (USA)  
Natura (Italy)  
Nebraska Bird Review (USA)  
Nevada Wildlife Newsletter (USA)  
New Brunswick Out of Doors (Canada)  
New Hampshire Audubon Newsletter (USA)  
News from the Mews (USA)  
Newsletter for Bird Watchers (India)  
Newsletter of the Center for Action on Endangered Species (USA)  
Newsletter of the Hawk Migration Association of American (USA)  
Newsletter of the Hawk Trust (England)  
North American Bird Bander\* (USA)  
Nos Oiseaux (Switzerland)  
Notornis (New Zealand)  
Ohio Biological Survey Bulletin (USA)  
Oikos (Sweden)  
Onze Vogels (Netherlands)  
Oricle (USA)  
Ornis Fennica (Finland)  
Ornis Scandinavica\* (Sweden)  
Ornithological Newsletter (USA)  
Ornithologische Arbeitsgruppe Mitteilungen (South West Africa)  
Ornithologische Mitteilungen (West Germany)  
Ostrich (South Africa)  
Outdoor News Bulletin\* (USA)  
Outdoor Reporter (USA)  
Outdoor Watchdog (USA)  
Passenger Pigeon (USA)  
Pavo (India)  
Province of Quebec Society for the Protection of Birds Newsletter (Canada)  
Raptor Research\* (USA)  
Raven (USA)  
Records of New Jersey Birds (USA)  
Records of Vermont Birds (USA)  
Redstart (USA)  
Ring (Poland)  
Rivista Italiana Di Ornithologia (Italy)  
Scissortail (USA)  
Scopus (Kenya)  
Scottish Birds (Scotland)  
Seasons\* (Canada)  
Sieboldia (Japan)  
South African Journal of Wildlife Research (South Africa)  
South Australian Ornithologist (Australia)  
South Carolina Out of Doors (USA)  
South Dakota Birds Notes (USA)  
Southwestern Naturalist (USA)  
Teva Va-Aretz (Israel)  
Tori (Japan)  
Urban Wildlife News\* (USA)  
Utah Wildlife News (USA)

Virgin Islands Conservation Society Newsletter (Virgin Islands-USA)  
Vulture News (South Africa)  
Vulture Watcher (USA)  
Western Birds (USA)  
Wielewaal (Belgium)  
Wildlife Crusader (USA)  
Wildlife Society Bulletin (USA)  
Wilson Bulletin (Canada)  
Wyoming Wildlife News (USA)  
Zambian Ornithological Society Newsletter (Zambia)

\* It has been confirmed that the Call for Information recently appeared in journals marked with an asterisk. In addition, the Call appeared in the following journals though it was not submitted (the editors apparently acquired it indirectly):

Anser (Sweden)  
Australasian Raptor Association News (Australia)  
British Falconer's Club Newsletter (England)  
Ecology USA (USA)  
Montana Wildlifer (USA)  
Nordic Ecology (Sweden)  
Pennsylvania Game News (USA)  
Wildlife Society Western Section Newsletter (USA)

APPENDIX 3:

Collision report form developed for distribution to individuals responding to the Call for Information.



RAPTOR/UTILITY LINE COLLISION REPORT FORM

Complete form to the extent possible even if the record is circumstantial or fragmentary. We are not concerned with electrocutions in this study. Mail completed forms to Richard R. Olendorff, U.S. Bureau of Land Management, 2800 Cottage Way, Sacramento, California 95825 USA. Use extra sheets, if necessary.

- |                               |  |
|-------------------------------|--|
| 1. Name of Contributor: _____ | Name of Observer (if different): _____ |
| Address: _____                | Address: _____                         |
| _____                         | _____                                  |
| _____                         | _____                                  |
| Phone: _____                  | Phone: _____                           |
| Affiliation: _____            | Affiliation: _____                     |

2. Species observed colliding with or suspected to have collided with utility line:

Common Name: \_\_\_\_\_  
 Scientific Name: \_\_\_\_\_

3. Date of Collision (or best estimate). Month/Day/Year: \_\_\_\_\_

4. Weather Conditions (describe):

Did adverse weather conditions contribute to the collision?

Yes  No  Unknown

If yes, explain:

5. Location of Observation:

State, Province, or Country: \_\_\_\_\_  
 County or Other Subdivision: \_\_\_\_\_  
 Nearest City or Town: \_\_\_\_\_  
 Legal Description (if known): \_\_\_\_\_  
 Other Geographic Information: \_\_\_\_\_

6. Was the bird an adult?   
subadult?   
bird-of-the-year?   
of unknown age?

7. Was the bird banded, radioed, or marked in any way? Yes  No   
If yes, explain (give band number, if appropriate):

8. Was the bird trained in falconry? Yes  No   
If yes, please give details.

9. Was the bird in apparent good health at the time of collision?  
Yes  No  If no, please give details:

10. With what type of utility line did the bird collide?

Telephone Line:  How many wires?

Transmission Line:  How many wires?   
(Large--115 kV or larger)

Metal Tower

Wooden H-Frame

Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please Draw

Distribution Line:  How many wires?   
(Small--69 kV or smaller)

Pole and Crossarm

Armless   
(Just pole & side-mounted insulators)

Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please Draw

Other Types of Lines (please describe any other types of utility lines not listed above):

11. What characteristics of the utility line's location contributed to the collision? Discuss any of the following that seem related to the collision: habitat (vegetation, terrain, abundant prey, etc.); time (season, time of day); behavior (territorial defense, pursuit of prey, courtship); etc.
  
  
  
  
  
  
  
  
  
  
12. If the actual collision was not observed, describe the circumstances surrounding recovery of the injured bird or carcass:

13. If bird was killed:

Was the carcass recovered? Yes  No

If Yes:

Describe external injuries:

If necropsy was performed, describe internal injuries:

Facility where necropsy was performed:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Necropsy performed by: \_\_\_\_\_

14. If bird was injured:

Was the bird recovered? Yes  No

If Yes:

Describe external injuries:

If rehabilitated, briefly describe rehabilitation procedures.  
What was the recovery time? Was the bird released? How? When?  
Where? Were follow-up studies performed?

Facility where rehabilitation took place:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Rehabilitation performed by: \_\_\_\_\_

APPENDIX 4:

Data Base Structure and Codes



Field Number	Field Content	Computer Field Name	Field Size	Codes	Printout Code
1	Contributor's Name	CNAME	24		CONTRIBUTOR'S NAME
2	Contributor's Institution	CINST	24		CONTRIBUTOR'S INST.
3	Contributor's Street	CSTREET	24		CONTRIBUTOR'S STREET
4	Contributor's City, St., Zip	CCTYSTZ	30		CONTRIBUTOR'S ADDRESS
5	Contributor's Phone	CTEL	12		PHONE
6	Species	SPECIES	5	RMIS CODE (see Attached)	SPEC
7	Collision Date	COLLDATE	8		COLLDATE
8	Weather a Factor?	WEATHER	1	Yes No Unknown	W
9	Observation--State	OBSTATE	2	2-Letter Postal Abbrev. for State, plus the following: AU = Australia EG = England ML = Malawi SI = Sicily SK = Saskatchewan ZI = Zimbabwe	ST
10	Observation--Nearest City	OBNCITY	16		NEAR CITY
11	Age of Bird	BAGE	1	Subadult Adult Unknown	A
12	Marks on Bird	BMARK	1	None Banded Colormarked Radioed	M
13	Bird Trained for Falconry?	TRAINED	1	Yes No	T
14	Bird in Good Health?	HEALTH	1	Yes No Unknown	H
15	Type of Line Involved	TYPELINE	1	Phone Transmission Distribution Other Unknown	L
16	Number of Wires	NOWIRES	2	No. or Unknown	#W
17	Configuration of Transmission Line	TCONFIG	1	Metal Tower H-frame (wooden) Unknown	C

<u>Field Number</u>	<u>Field Content</u>	<u>Computer Field Name</u>	<u>Field Size</u>	<u>Codes</u>	<u>Printout Code</u>
18	Configuration of Distribution Line	DCONFIG	1	Pole and Crossarm Armless Single Pole Other Unknown	D
19	Conditions Possibly Contributing to the Collision	HABCOND	20	AGR = Agricultural Area DEF = Territory Defense DIS = Avoiding Disturbance FOG = Foggy GRS = Grassland HAK = Hack Site LIG = Poor Light LUR = Flying to Lure MIG = Migration Corridor MST = Mist NES = Nest Terr. NGT = Night NUM = Numerous Lines NWR = Nat. Wildlife Ref. OWA = Lines Over Water PRY = Prey Abundance of or Pursuit of PUR = Being Pursued by by Other Raptor RAI = Rain RIV = River Xing ROD = Along Road SEA = Season SNO = Snowing SUB = Substation SUN = Sunlight Glare TER = Terrain URK = Unknown URB = Urban VEG = Vegetation WND = Wind Yes No Unknown	HABITAT CONDITIONS
20	Collision Biologically Fatal? (ever Released = Fatal)	FATAL	1		F

<u>Field Number</u>	<u>Field Content</u>	<u>Computer Field Name</u>	<u>Field Size</u>	<u>Codes</u>	<u>Printout Code</u>
21	Carcass Retrieved?	CARCRET	1	Yes No	C
22	Carcass Injuries	CARCINJ	20	AMP = Wing Amputated BEK = Beak Problem BLB = Broken Leg Bone BNK = Broken Neck BRW = Bruised Wing BUR = Burned BWB = Broken Wing Bone DIE = Died in Captivity DIW = Dislocated Wing EMA = Emaciated EUT = Euthanized EYE = Eye Injury HED = Head Injury HNG = Hanging INT = Internal Injuries JNT = Joint Problem (Wing) LEG = Leg Problem LES = Lesion-Breast & Wing Area NON = None Apparent NOT = No Trauma PLU = Plumage Damage SPW = Sprained Wing STN = Stunned, Concussion UNK = Unknown WTP = Wing Tip Damage	CARCASS INJURY
23	Necropsy Done?	NECROPSY	1	Yes No	N
24	Person Who Did Necropsy	NECNAME	24		NECROPSY--NAME
25	Phone	NECTEL	12		PHONE
26	Live Bird Retrieved?	LIVERET	1	Yes No	L
27	Live Bird Injuries	LIVEINJ	20	See Carcass Injuries	LIVE BIRD INJURY
28	Rehab. Attempted?	REHAB	1	Yes No	R
29	Was Bird Ever Released?	RELEASE	1	Yes No Died Captivity for Extended Period	R
30	Rehabilitator's Name	REHNAME	24		REHABILITATOR'S NAME
31	Rehabilitator's Phone	REHTEL	12		PHONE
32	Comments	COMMENT	60		COMMENTS



APPENDIX 5:

Raw Data--Total Sample (N = 88)



WUPOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1980

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLISION BY	HEAR CITY	ANTNL	BU C	INDIAT	CONDITIONS
Endangered Species Unit	Wildlife Resources Com.		Delmar, NY 12054	510-439-7635	PARUL 09/12/81	U NY Colonhill	U	N	N	U
Endangered Species Unit	Wildlife Resources Com.		Delmar, NY 12054	510-439-7635	FAPER 05/02/77	U NY Byron	A	N	N	U
Allan R. Smeal	Idaho Power Company	1020 Idaho Street	Boise, ID 83785	200-343-2729	WALEU 05/01/81	U ID Boise	A	N	N	U
Hrs. B.H. Houser	Socoma	Private Bag 50	Blantyre, Malawi	1	UTLEU 10/24/70	U ML Blantyre	A	N	N	U
Robert R. Sengul	Cleveland Mus. Nat. Hist	Metals Oval Drive	Cleveland, OH 44166	216-231-4500	WALEU 7/77/62	U IL U	S	U	U	U
M. Ryan	123 Green Street	Melbourne, Victoria	3004 Australia	1	FAPER 01/04/76	U AU Lonve	S	U	U	U
Hub L. Macdonald	Northwolds Natl. Cent.	Highway 70 West	Ninacque, MI 50458	715-336-7400	WALEU 07/04/84	U MI Norw	S	U	N	U
Carroll Henderson	U.S. Geol. Natl. Res.	640 119th Lane, N.E.	Bellevue, WA 98004	612-256-3344	WALEU 03/30/74	U WA Redondo	A	N	N	U
Edward P. Writon	U.S. Fish & Wildl. Serv.	Post Office Building	Sevenson, IL 61074	015-273-2732	WALEU 01/30/83	U IL Bolona	A	N	N	U
Thomas O'Hall	Kentone Power Company	40 East Broadway	Belle, NY 25761	466-723-5421	WALEU 04/07/83	U NY Judith Gap	A	N	N	U
E. Stuart Mitchell		Can Road	Portland, CT 06480	203-342-2908	BUS101 04/77/04	U CT Middletown	A	N	N	U
E. Stuart Mitchell		Can Road	Portland, CT 06480	203-342-2908	BUS100 08/10/76	U CT Colchester	A	N	N	U
Dr. Harry Johnson	Eden Val Clinic	Box 205	Easton, MD 66941	913-725-4333	BUS109 10/15/82	U MD Haskelo	A	N	N	U
Carl B. Hartl	Dept. of Zoology	Major State College	Opolis, WI 04168	601-626-6172	TY08 11/24/78	U NY Corvise	A	N	N	U
R. Rank Corvise	R. Amer. Falconers' Ass.	Box 4, Box 182	Balltown, OH 47535	518-775-4475	FAPER 12/17/78	U OH Sossell	A	N	N	U
Joy Inley	U.S. Army Corps Engin.	Rd. 4, Box 182	Balltown, OH 47535	503-593-1221	QW03 05/17/76	U OH Burtville	A	N	N	U
Jay Beauman	Rafers Denker	6763 Hinmick Rd, Box 102	Lockport, NY 14094	716-433-2636	BUS100 06/12/82	U NY Lockport	S	U	U	U
Paul T. Schmitt		Rte. 1, Box 64	St. John, WI 53171	209-648-3621	CIN04 03/77/76	U WA St. John	A	N	N	U
Constance E. Hughes			Hillington	901-876-5201	BUS101 7/77/83	U TN Hillington	A	N	N	U
Charles R. Rowell			Portland, MD 20702	504-231-2923	FAPER 01/77/75	U MD Millon	A	N	N	U
Jack Halvix	U.S. Fish & Wildl. Serv.	500 N.E. Hollomah St.	Reno, NV 89520	702-784-4039	BUS08 06/77/82	U NV Fallon	A	N	N	U
Gary Narves	Nevada Department Wildl.	P.O. Box 10570	Carper, NV 89502	207-472-7019	AG03R 11/01/80	U NV Sheridan	U	U	U	U
Lois L. Layton	Nevada Audubon Society	P.O. Box 2031	Carper, NV 89502	207-472-7019	FROD. 01/19/81	U NV Carper	U	U	U	U
Lois L. Layton	Nevada Audubon Society	P.O. Box 2031	Carper, NV 89502	207-472-7019	FAPER 05/06/81	U NV Sinclair	U	U	U	U
Lois L. Layton	Nevada Audubon Society	P.O. Box 2031	Carper, NV 89502	207-472-7019	FAPER 05/06/81	U NV Sinclair	U	U	U	U
Louis E. Clark		1114 Knoxville Rd. S S	Talahassee, FL 32303	904-222-2738	PARUL 07/05/73	U FL Miami	A	N	N	U
Allan R. Smeal	Idaho Power Company	1020 Idaho Street	Boise, ID 83707	200-343-2729	AGFLA 02/15/79	U ID Kona	A	N	N	U
Allan R. Smeal	Idaho Power Company	1020 Idaho Street	Boise, ID 83707	200-343-2729	BALRG 12/15/78	U ID Grandview	A	N	N	U
Allan R. Smeal	Idaho Power Company	1020 Idaho Street	Boise, ID 83707	200-343-2729	AGD18 12/26/72	U ID Jefferson County	A	N	N	U
Thomas O'Hall	Kentone Power Company	40 East Broadway	Dutton, NY 25781	466-723-5421	WATER 03/13/84	U NY Eureka	A	N	N	U
Michael M. Purkins	U.S. Bur. of Land Nght.	Star Rtn. 5, Box 1	Ely, NV 89301	702-509-4653	AG03R 04/17/83	U NV Eureka	S	U	N	U
Michael M. Purkins	U.S. Bur. of Land Nght.	Star Rtn. 5, Box 1	Ely, NV 89301	702-509-4653	PARUL 04/17/83	U NV Eureka	A	N	N	U
David G. Malher	Royal Soc. Prot. Birds	64 Burslem, Hampton	Purthth CH10 294, Centre, UK	1	AGFLA 06/77/82	U GB Ship	A	N	N	U
David G. Malher	Royal Soc. Prot. Birds	64 Burslem, Hampton	Purthth CH10 294, Centre, UK	1	AGFLA 06/77/83	U GB Husham	A	N	N	U
David G. Malher	Royal Soc. Prot. Birds	64 Burslem, Hampton	Purthth CH10 294, Centre, UK	1	FAPER 06/30/81	U GB Ship	A	N	N	U
Ron M. Harrington	U.S. Fish & Wildl. Serv.	P.O. Box 1910	Klamath Falls, OR 97601	303-863-6308	WALEU 03/19/84	U OR Dalry	A	N	N	U
Lynn Gilphank	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0J0	306-343-5705	FROD. 02/77/75	U SK Saskatoon	A	N	N	U
Lynn Gilphank	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0J0	306-343-5705	FROD. 11/77/81	U SK Saskatoon	A	N	N	U
Lynn Gilphank	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0J0	306-343-5705	FROD. 08/77/72	U SK Saskatoon	A	N	N	U
Michael M. Kuchart	U.S. Bur. Land Nght.	3948 Bevolozansk Ave.	Boise, ID 83705	200-343-2729	R030R 03/05/71	U ID Orco	A	N	N	U
Michael M. Kuchart	U.S. Bur. Land Nght.	3948 Bevolozansk Ave.	Boise, ID 83705	200-343-2729	FAPER 04/05/71	U ID Grandview	A	N	N	U
Steve Bann	Socoma	Private Bag 50	Blantyre, Malawi, Cent. Africa	1	BUS17 06/25/77	U ML Blantyre	A	N	N	U
Richard R. Sengul	Calif. Rep. Fish & Game	625 Pacific Ave.	Millons, CA 92038	916-934-2304	FAPER 01/01/84	U CA Orland	A	N	N	U
Russmary McNeil	Cleveland Mus. Nat. Hist.	Metals Oval Drive	Cleveland, OH 44166	216-231-4500	QW01 10/17/75	U OH Olmsted Falls	A	N	N	U
Alice Marie Tappan	Australian Raptor Ass.	18 Vasant St., B. Corner	Canberra, Act 2501, Australia	1	FALDH 01/23/79	U AU Canberra	A	N	N	U
K.V. Hurr	Washington Dep. of Game	1019 Coleraine	Baton Rouge, LA 70800	504-344-8235	FAPER 11/13/82	U LA Dar	A	N	N	U
Stuart Mitchell	Washington Dep. of Game	Rte. 1, Box 05-B	Brewster, MA 01801	509-609-2025	WALEU 01/77/81	U MA Brewster	A	N	N	U
Christopher I. S. Alan	Washington Dep. of Game	Rte. 1, Box 05-B	Brewster, MA 01801	509-609-2025	WALEU 03/17/84	U MA Carlton	S	U	N	U
	The Ross	Can Road	Portland, CT 06480	203-342-2908	PARUL 10/06/84	U CT East Haddam	A	N	N	U
		2636 Argyle Street	Regina, Sask. S4S 0K1	306-584-9564	RE01U 10/77/84	U SK London	U	U	U	U

ROTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1962

F C	CHECKED	INJURY	N	NECROPSY—NOTE	PHONE	L	LIVE BIRD	INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
Y XX			XX			Y	SHD BIE		Y	Dr. Ed Bucher	510-455-0851	Bad night of recovery. Broken humerus.
Y XX			XX			Y	JHT BHN EJT BIE		Y	Dr. Ed Bucher	510-455-0851	Found under power line. Euthanized 02/17/77.
Y YU			XX			XX			XX			Very incomplete. Called Rich Howard. No better data.
XX X			XX			Y	SHD PLU BHN		Y	Mrs. B.B. Houser		White-faced Owl.
Y XX			XX			Y	SHD		Y	Harvey Webster		Broke both wings. Was breeding in captivity.
Y XX			XX			Y	SHD BHD EYE		Y	Conny Dixon	652-283 J59	Eyelid torn. Now in captive breeding project. Banded
XX X			XX			Y	SHD BHN		Y	Mark L. Blackburn	715-255-7409	Returned to nest area. Flies away strongly. Banded 629-1482B.
Y XX			XX	Indl. WL Health Lab?		XX			XX			Could have been hit by a car. No apparent injuries.
Y XX			XX			XX			XX			Died after several hours. Compound wing fractures.
Y XX			XX			Y	SHD BHD		Y	Dr. Jordan	405-532-4139	Found below power line. Wing was amputated.
Y XX			XX			Y	SHD		Y	E. Stuart Mitchell	283-342-2938	Found near line. Wing banded in wild at sword angle.
XX X			XX			Y	SHD		Y	E. Stuart Mitchell	283-342-2938	Picked up under line soon after impact. Released 03/08/77.
XX X			XX			Y	SHD		Y	Dr. Harry Johnson	913-725-4035	Released in Nov., 1962. Found along road under lines
Y YSH			XX			XX			XX			Found dead below wire. No signs of injury. Banded 507-1752B.
XX X			XX			Y	SH		XX			No injury. Flies at quarry 24 hrs later.
Y YSH			XX			XX			XX			Raley tower, guy wires, T-lines all present. Almost recovered.
Y XX			XX			Y	SHD		Y	Senior Nature Center	303-340-1821	Picked up 1 mo after collision. Unable to fly after rehab.
XX X			XX			Y	SHD BHD BIE		Y	Paul T. Schmitt	716-433-8256	Eyelid torn. Young bird. Replaced in nest after 24 hrs.
Y XX			XX			Y	SHD BHD BIE		Y			Wing amputated. Found along rd with wires. Hays hit by car.
Y Y SH PLU			XX			XX			XX			Line broken between. Bright sun.
Y Y SH SHD			XX			XX			XX			Picked up near line near road. Hays sent to Polocant.
XX X			XX			XX			XX			Defending terr. against Hovrin. Not injured.
Y XX			XX			Y	SHD		Y			Wing broken at shoulder. Humid night. Found near line.
XX X			XX			Y	SHD		Y	Lola L. Layton	307-472-7059	Wing tip and toe fractures. Not as significant as second.
Y XX			XX			Y	SHD		Y	Lola L. Layton	307-472-7059	Wing completely snapped off. Hit line diving on prey?
XX X			XX			XX			XX			Eyelid torn. Stunned for 3 min. Flies off on its own.
Y Y SH LES			XX			XX			XX			Also open wounds on breast.
XX X			XX			XX			XX			Called Small and Howard. No better data.
XX X			XX			XX			XX			Called Small and Howard. No better data.
Y Y SH			XX			XX			XX			Not such information.
Y Y SH BHD BHN			XX			XX			XX			Picked up under line after wind storm.
Y Y SH BHN			XX			XX			XX			Picked up under line after wind storm.
Y Y SH BHN			XX			XX			XX			Found under line. Dirty.
XX X			XX			Y	SH		Y			Found under line. Returned to breeding area.
Y XX			XX			Y	SH BIE		Y	David S. Walker		Found within 3 hours. Bird in captivity.
Y LES BHN			XX	Indl. MIM. Health Lab. 680-252-5422		XX			XX			Possible strike 1 than observation. HSL No. PH 0378B.
XX X			XX			Y	SH BHN BIE		Y	Lynn Oliphant	356-243-5763	Released after 7 mo. Retrapped as breeding adult.
Y Y SH			XX			XX			XX			Bird recovered by radio-telemetry.
XX X			XX			Y	SH		XX			Falconer's bird. Flies into wires twice when flying to tower.
Y Y SH BHN			XX	Michael N. Kuchert 280-330-9279		XX			XX			Found 15 m east from the line.
Y Y SH			XX	Michael N. Kuchert 280-330-9279		XX			XX			No signs of bare work.
XX X			XX			Y	SH BHN		Y	Mrs. B.B. Houser		Released July 8.
Y XX			XX			Y	SH PLU WIP		Y	C.C. Davis		Wingtip removed. Was at Santa Cruz. Banded 507-5575B.
Y XX			XX			Y	SH BIE		Y			Wing almost severed. Bird seen night. Widy, rats.
Y XX			XX			Y	SH		Y			Broke wing near shoulder.
XX X			XX			Y	SH PLU EYE		Y	Donna Tappan	504-855-9418	Also abrasions on head.
Y Y SH			XX	V Connor Houser, MSU		XX			XX			Blood hemorrhage around neck vertebrae.
Y N SH? BHD			XX			XX			XX			Bird suspended from wire at midspan.
Y XX			XX			Y	SH		Y	C Stuart Mitchell	283-342-6572	Definite collision. River crossing. Compound wing fractures.
Y N SH			XX			XX			XX			Suspended from wire at midspan. Probably Long-eared Owl.

SEPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S BUSINESS	PHONE	SPEC. COLLIDE W ST	NEAR CITY	A N T H L R C D D	WIGWAY CONDITIONS
R. David Bishop	Team, Wildlife Res.	Rte. 1, Box 199	Tecumseh, KS 67464	608-332-6908	PAVBL 05/30/77	U TH Hurstman	A N H Y D 83 J P G D	
Mr. Kuro Mizel	Pacific Reptor Project	2050 Palmyra Ave. North	Seattle, WA 98103	913-263-4854	AGZM 10/25/64	W KS Clifton	S H N Y T 05 H X RIV PRT	
Walter English	Madison Park Zoo	P.O. Box 455	Escanaba, MI 49829	205-625-5482	WLEH 03/04/62	W MA Friday Harbor	S H N Y D 04 J P P RES RDD	
Rich Bartilla	Rupit. Natural Resources	2000 Galloway	Naphtis, TN 38112	505-705-2351	WLEH 07/25/64	U MI Truroy	S D H Y D 03 J P RES VEG	
John Gehan	Biological Zoo	Montana State University	Bozeman, MT 59717	501-726-4787	WLEH 11/07/62	U MI Truroy	A N H Y P 04 J P RES RDD	
A.R. Horvath	Biology Department	Montana State University	Bozeman, MT 59717	486-506-3747	WLEH 03/17/63	U MI Singling	S H N Y T 04 H X RES	
A.R. Horvath	Biology Department	Montana State University	Bozeman, MT 59717	486-506-3747	WLEH 03/17/63	U MI Singling	S H N Y T 04 H X RES	
A.R. Horvath	Biology Department	Montana State University	Bozeman, MT 59717	486-506-3747	WLEH 03/17/63	U MI Singling	S H N Y T 04 H X RES	
Salvo Giovanni	Via Capura 50	30220 Racalmoto	Agrigento Sicily	8932-941615	FRIH 05/17/61	U SI Racalmoto	S H N Y D 83 J P PRT GDS	
Salvo Giovanni	Via Capura 50	30220 Racalmoto	Agrigento Sicily	8932-941615	FRIH 03/17/61	U SI Racalmoto	S H N Y D 83 J P PRT VEG	
A.P.B. Irwin	Thu Huesoyaida, Editor	J Whitcombson Avenue	Hillsdale, Palmyra, Zibahna	304-880-5210	FIPER 12/02/64	U ZI Palmyra	U H N Y P 02 I U GDS	
C.A. Angillio		4943 Keyfous Ave.	Natalein, LA 70005	504-880-5210	FIPER 10/03/64	U U U	D H N Y U 0 J P PRT	
C.A. Angillio		4913 Keyfous Ave.	Natalein, LA 70005	504-880-5210	FIPER 10/03/64	U U U	S H N Y D 1 X U GSK	
B. Lee Nelson	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 06/15/63	U CA Horro Bay	A N H Y D 83 J P PRT RES	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 7/17/62	U CA Horro Bay	A N H Y D 1 X RES RDD UGD PRT RDD	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA Dushy	S H N Y T U 0 J PRT RIV	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA San Luis Obispo	S H N Y D 02 I P U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 10/17/62	U CA Fort Bragg	S H N Y D 01 I X U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA Willits	S H N Y D 01 I P U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA Poona	S H N Y T 01 U U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA Laxton	A N H Y D 01 I X U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 7/17/62	U CA San Diego	A N H Y U 1 X U GSK RDD	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 5/9/71/62	U CA Calistoga	A N H Y T 05 H X U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 11/17/77	U CA Garberville	A N H Y U 1 X U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	AGZM 02/27/60	U CA Bishop	A N H Y T 05 H X U GSK PRT	
Kelly Ingram, DM	Library H. Mohr. Food.	11825 H. 76th Street	Scottsdale, AZ 85254	602-938-2030	PAVBL 10/03/63	W AZ Bacheys	A N H Y D 05 I P PRT PRT	
Richard E. Fitzner	Conservation Department	Bellefleur Northwest Lake	Richland, WA 95332	775-443-7179	BLRTR 01/18/74	U ID Rancou	U H N Y D 1 I U GSK	
Richard E. Fitzner	Conservation Department	Bellefleur Northwest Lake	Richland, WA 95332	775-443-7179	AGFLR 02/28/74	U WA Peltan	U H N Y D 1 I U GSK	
Wayne Pitz	Publ. Serv. Co. H. Huz.	Avenida Square	Albuquerque, NM 87130	505-848-2811	BLRTR 06/17/64	W NM Clovis	S H N Y T 08 H X RDD RES PRT	
Wayne Pitz	Publ. Serv. Co. H. Huz.	Avenida Square	Albuquerque, NM 87130	505-848-2811	BLRTR 03/17/62	W NM Clovis	S H N Y T 08 H X RDD RES PRT	
Patrick L. McLaughlin	Calif. Rept. Fish & Game	619 2nd Street	Eureka, CA 95501	707-443-4771	FIPER 05/28/65	U CA Hapa Creek	A N H Y P 02 I X RES RDD	
Bruce Gordon	Inst. for Wildl. Studies	P.O. Box 127	Arcata, CA 95521	213-518-1702	FIPER 07/23/65	U CA Eureka	S H N Y D 03 I P U GSK	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 08/02/65	U CA Horro Bay	S D H N Y 03 I P PRT	
Brian J. Walton	SEFSD, Loner Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIPER 08/02/65	U CA Fort Madere	S H N Y D 03 I P PRT	
Bruce Gordon	Catalina Conservancy	Box 2739	Aspen, CO 80504	313-518-1702	WLEH 04/07/65	Y CA Swinton	A N H Y D 83 J P PRT GDN FUG	
Peter H. Gleich		1743 Cedar St.	Burlingay, OH 54183	415-642-6229	BLRTR 02/28/65	Y CA Burlingay	U H N Y T U 0 H DEF	
Peter H. Gleich		1743 Cedar St.	Burlingay, OH 54183	415-642-6229	BLRTR 02/28/65	Y CA Burlingay	U H N Y T U 0 H PUL	
Joseph P. Staropa	University of California	Dept. of Anthropology	Berke, CA 95616	916-752-8745	BLRTR 10/17/62	Y CA Berke	S H N Y D 03 J P U GSK	

AVIATOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

FC	AVIATOR INJURY	H	RECOVERY-NOTE	PHONE	L	LIVE BIRD INJURY	RR	REPAIR/INJURY'S NOTE	PHONE	COMMENTS
Y XX			Y Univ. Tenn. Vet. School	615-546-6892	Y HIT MED EYE DIE		Y B Knoxville Zool. Park	X		Abandon crowd left eye. Ruptured liver & gall bladder.
Y XX					X	Y BND	Y U W. Howe Helgal	X	513-283-4094	May still be released. Broken carotid.
Y XX					X	Y NND	Y Woodland Park Zoo	X	286-625-5482	Released 02/16/63. No scars. Probable myxomatosis.
Y Y BND					X	X X	X X X	X		Eye witness. Band 399-17676. Sent to BML.
Y Y BND					X	Y BND	Y C Memphis Zoo Rehab. Ctr.	X	501-725-4787	Unsuccessful release 10/63. Has in breeding chador.
Y XX					X	Y BND ENT DIE		X		Euthanized.
Y XX					X	Y BND ENT		X		Euthanized. Eye witness.
Y XX					X	Y BND ENT		X		Euthanized.
Y Y BND					X	X X	X X X	X		Found dead under lina.
Y Y BND					X	X X	X X X	X		Found dead under lina.
Y X X			Y Dr. Susan Helle	304-665-4418	Y BND ENT DIE			X		Bird entangled in saliva. Fate unknown.
Y X X			Y Dr. Susan Helle	304-665-4418	Y BND BDM DIE			X		Died 12/01/64. Band 597-76381.
Y X X					X	X X X	X X X	X		Sent at New Orleans Wild Bird Rehab. Center. Not each info.
Y X X					X	X X X	X X X	X		Eyewitness. Bird hit lina, flinched & fattured, but flew on.
Y X X					X	Y BND PLU WTP	Y H Alca. Lindsay Jr. Museum	X	6. Bogus	Power wing tip circ. May virus in urban area.
Y X X					X	X X	X X X	X		Found dying under lina in river bottom. Band 327-32838.
Y X X					X	Y BND	Y H Gail Haylor	X	480-429-2466	Bones wet, bird flown, sea in breeding project.
Y X X					X	Y BND PLU HIT MED DIE	Y H Dr. James Rousch	X		Found below wire, near house. Band 591-25227.
Y X X					X	Y BND DIE HIT	Y H U.C. Bevis.	X		Found below wire. Bird during wing repair operation.
Y Y BND					X	X X	X X X	X		Band veteran. Band 597-63082.
Y Y BND					X	Y BND WTP DIE	Y H Brian J. Walton	X	480-429-2466	Infection. Bird in truck. Band 616-42318. Fence? To 877
Y X X					X	Y BND ENT	Y H San Diego Zoo	X		Found in street below utility lina.
Y X X					X	Y BND BDK MED DIE		X		Bird on way to vet. Found below T lina in chapel.
Y X X					X	Y BND	Y H SCPSHD	X		Still captive. Telephone or distribution lina?
Y Y BND					X	X X	X X X	X		Pursued by trained Dr. Bird at scene. Lt. some visibility?
U X X					X	Y BND	U U Kathy Ingram, DSH	X	682-930-3328	Found below lina along road. Last page missing.
Y H BND					X	X X	X X X	X		Hung by neck at midspan.
Y H BND					X	X X	X X X	X		Hung by neck at midspan.
Y X X					X	Y BND	Y Y Jeremiah Johnson	X		Hit 3/5th lina adj. to 230k and dist. lina. Found midspan.
Y X X					X	X X	X X X	X		Struck wire on 3/5th lina, but not injured. Eyewitness.
Y X X					X	Y BND ENT	Y B Randolph WFL Care Center	X		Has photo lina 46 on 1. Picked at wing. Euthanized.
Y X X					X	X X	X X X	X		Killed bird. Hit wire upon landing. No injury.
Y X X					X	Y BND WTP WTP	Y H Brian Walton	X	480-429-2466	Band 597-77228. Chasing prey in muffin. Found below wire.
Y X X					X	Y BDK BDK MED DIE	Y H Brian J. Walton	X	480-429-2466	Bird at vet. Born Spring 1964. Found under lina. BML/Atk.
Y H BND HIT			Y Natl. B/L Health Lab.		X	X X	X X X	X		Eyewitness strike than electrocution. Fuzzy. Band 629-09988.
Y H BND HIT					X	X X	X X X	X		Courship. Falcon grappling. Collision than electrocution.
Y H BND HIT					X	X X	X X X	X		Courship. Falcon grappling. Collision than electrocution.
Y Y BND HIT					X	X X	X X X	X		Eyewitness. Bird blown into wires & electrocuted.

APPENDIX 6:

Raw Data--Peregrine Falcons (N = 24)



WFOPT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PAGE	SPEC. COLLATE N OF	HEAR CITY	A N T H L B U C D I S U B T Y C O N D I T I O N S
Endangered Species Unit	Wildlife Resources Dept.		Beinar, NY 12854	510-439-7635	FAPER 05/02/77	NY NY Byron	A N H Y U I X I I R K
M. Brown	123 Bonn Street	Heidelberg, Victoria	368A Australia		FAPER 01/04/76	M RI Lorne	D D H Y M I X I I T E R V E B
S. Hank Carnie	N. Austr. Falconers' Ass.	P.O. Box 67	Sirotia, NH 87535	505-757-6572	FIFER 12/77/70	M RI Rommel	A R Y Y D 02 X I P W Y
Jack Halvie	U.S. Fish & Wildl. Serv.	508 N.E. Moltzous St.	Portland, OH 57070	303-231-2231	FAPER 11/77/75	M CA Willcox	M H U Y D 04 X P P W Y A H D R E D
David B. Harker	Royal Soc. Prot. Birds	6A Boreham, Bangon	Perth D10 2HU, Cumbria, UK		FIFER 05/30/81	M EG Shep	D D H Y D 02 X P H E B
Steve Bann	Calif. Regl Fish & Game	625 Pacific Ave.	Willcox, CA 95703	516-534-0304	FAPER 07/01/70	M CA Orland	D D H Y D 03 X P H E B
Anne Marie Tappan		1619 Oulardis	Baton Rouge, LA 70808	504-344-8235	FAPER 11/13/82	M LA Belar	D D H Y M I X I I R K
C.A. Foglilio		4913 Dreyfous Ave.	Nataira, LA 70005	504-850-5510	FAPER 12/02/84	M LA Laville	D D H Y M I X I I R K
C.A. Foglilio		4913 Dreyfous Ave.	Nataira, LA 70005	504-850-5510	FAPER 10/05/84	U H H	D D H Y M I X I I R K
B. Lee Salomon	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA	408-429-2466	FAPER 06/15/83	M CA Hurro Bay	A H H Y D 03 X P T E R P W Y H E B
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 77/77/77	M CA Hurro Bay	A H H Y U I X I H E B R O D U S D P W Y
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 09/77/70	M CA Dobby	G Y H Y T M N P P W Y E I V
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER FA/77/82	M CA San Luis Obispo	M H H Y D 02 X P L G K
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER 10/77/80	M CA Fort Bragg	G Y H Y D 01 X P L G K
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER FA/77/80	M CA Milliman	D H H Y D 01 X P L G K
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER FA/77/84	M CA Puzosa	D Y H Y T 01 X I R E S I D E N T I A L A R E A
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER 09/77/82	M CA Lonsiton	A H H Y U I X I I R K
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER 77/77/82	M CA San Diego	A H H Y U I X I I R K R O D
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER FA/77/81	M CA Calistoga	A H H Y T 05 H N M O K
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 01/77/77	M CA Ashevilleville	A H H Y U I X I I R K
Patrick L. McLaughlin	Calif. Regl. Fish & Game	619 2nd Street	Escola, CA 95521	707-443-4771	FIFER 05/18/85	M CA Maple Creek	A H H Y P 02 X I P H E B
David Barcelona	Inst. for Wildl. Studies	P.O. Box 127	Escola, CA 95521	213-510-1702	FIFER 07/29/85	M CA Avicton	D D H Y D 03 X P H E B
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER 06/02/85	M CA Hurro Bay	D D H Y D 03 X P P W Y
Brian J. Walton	SCPSHS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FIFER 06/02/85	M CA Corto Madara	D H H Y D 03 X P P W Y

REPORT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	CIRCLES	INJURY	R	RECORDS#-HOWE	PHONE	L	LINE	BIRD	INJURY	R R	REGULATORY'S NAME	PHONE	COMMENTS
Y X X			X X			X		Y	WING END	Y H Dr. Ed Rucker		510-456-6251	Found under power line. Estimated 08/7/77.
Y X X			X X			X		Y	HEAD BIRD EYE	Y C Penny Olson		852-383 393	Eyeballs. Now in captive breeding project. Banded
H X X			X X			X		Y	SHIN	H X X			No injury. Flies at quarry 24 hrs later.
Y Y BIRD DEAD			X X			X		X		X X X			Picked up near line near road. Maybe sent to Pateman.
Y X X			X X			X		Y	BIRD BIED	Y B David G. Walker			Found within 3 hours. Bird in captivity.
Y X X			X X			X		Y	BIRD PLM WING-TIP	Y U C Davis			Wingtip removed. Was at Santa Cruz. Band 507-52958.
H X X			X X			X		Y	BIRD PLM	Y V Russ Tappan		504-866-4410	Rise abrasions on head.
Y X X			X X		504-866-4410	X		Y	BIRD SHW BIED	H N X			Died 12/04/04. Band 507-78283.
Y X X			X X		504-866-4410	X		Y	BIRD BIRD BIED	H X X			Died at San Bruno Wild Bird Rehab. Center. No catch info.
H X X			X X			X		X		X X X			Eyeballs. Bird hit line, flinched & fluttered, but flew on
Y X X			X X			X		Y	BIRD WING-TIP PLM	Y H Alex. Lindsay Jr. Hanson	G. Rogan		Poor wing tip circ. May stress in urban area.
Y H BIRD BLEED FN MOUTH			X X			X		X		X X X			Found dying under line in river bottom. Band 507-52856.
Y X X			X X			X		Y	BIRD WING?	Y H Gull Naylor		460-429-2466	Bones out, bird flown, now in breeding project.
Y X X			X X			X		Y	BIRD PLM JAW HED BIED	Y H R. James Rousch			Found below wire, near house. Band 507-53327
Y X X			X X			X		Y	BIRD SEVERELY BIED JAW	Y H R. C. Boris			Found below wire. Bird during wing repair operation.
Y Y BLEEDING FROM MOUTH			X X			X		H		H N X			Band return. Band 507-65932.
Y X X			X X			X		Y	BIRD WING-TIP BIED	Y H Brian J. Walton		460-429-2466	Infection. Bird in treatment. Band 846-49310. Feeder? Ter977
Y X X			X X			X		Y	BIRD BIED	Y H San Diego Zoo			Found in street below utility line.
Y X X			X X			X		Y	BIRD BIRD BIRD BIED	Y H X			Bird on way to vet. Found below T line in chaparral.
Y X X			X X			X		Y	BIRD	Y H RECORDS			Bird captive. Telegraph or distribution line?
Y X X			X X			X		Y	BIRD BIRD	Y B Randolphs W.L. Care Doctor			Was phone line 45 on L. Picked at wing. Estimated.
H X X			X X			X		H	NOISE	X X X			Kicked bird. Hit wire upon landing. No injury.
Y X X			X X			X		Y	BIRD BIRD	Y H Brian Walton		460-429-2466	Band 507-77220. Chasing prey in midair. Found below wire.
Y X X			X X			X		Y	BIRD BIRD BIRD BIED	Y H Brian J. Walton		460-429-2466	Bird at vet. Barr Spring 195A. Found under line. Half-life.

APPENDIX 7:

Raw Data--Bald Eagles (N = 15)



WATER COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLIDE W ST	NEAR CITY	A N T N L M C D	WHAIT CONDITION
Alan R. Ansell	Idaho Power Company	1200 Idaho Street	Boise, ID 83705	208-383-2729	WLEU 05/01/61	U 10 Boise	A N N Y D 03 I P	REV PRT7
Robert E. Sigodi	Cleveland Bus. Mat. Hlth	Udo Oval Drive	Cleveland, OH 44106	216-231-6686	WLEU 7/7/65	U 11 U	S N N U T U X U	UGK
Mark L. Blackburn	Northwoods Wildl. Cont.	Highway 70 West	Ninoyona, WI 54548	715-356-7468	WLEU 07/04/64	W 10 Washhold	S N N H P 02 I X	VEB RES RDD
Carroll Henderson	Miss. Dep. Natural Res.	640 119th Lane, N.E.	Blaine, MN 55434	612-256-3344	WLEU 03/20/74	U 10 H Mokenvideo	A N N Y D 04 I P	RED
Edward P. DeWise	U.S. Fish & Wildl. Surv.	Post Office Building	Savanna, IL 61074	615-273-2732	WLEU 01/30/63	U 11 Salena	A N N Y U N X U	UGK
Thomas D'Neil	Montana Power Company	48 East Broadway	Butte, MT 59701	406-723-5421	WLEU 04/07/63	U 11 Judith Gap	A N N Y U X U	UGK
Ken H. Harrington	U.S. Fish & Wildl. Surv.	P.O. Box 1910	Klamath Falls, OR 97601	503-883-6960	WLEU 03/19/64	U 08 Bairy	A N N Y D 03 I P	UGK
H.V. Harr	Washington Dep. of Game	Rte. 1, Box 05-0	Bremerton, WA 98012	360-689-2835	WLEU 01/77/61	W 08 Bremerton	D N N Y D 03 I P	REV RDD
H.V. Harr	Washington Dep. of Game	Rte. 1, Box 05-0	Bremerton, WA 98012	360-689-2835	WLEU 03/17/64	W 08 Carlton	S N N Y D 03 I P	RIV
Malter English	Woodland Park Zoo	3500 Phinney Ave. North	Seattle, WA 98103	206-625-5402	WLEU 03/04/62	W 08 Friday Harbor	D N N Y D 04 I P	REV RDD
Bick Arvilla	Dep. Natural Resources	P.O. Box 425	Essexville, NJ 45629	364-766-2351	WLEU 07/25/64	U 11 Treasury	D N N Y D 03 I P	RES VEB
John Stehns	Nashville Zoo	2800 Gallwey	Nashville, TN 38112	901-726-4787	WLEU 11/07/62	U 10 Sandburg	A N N Y P 04 I X	VEB RDD
R.R. Harvata	Biology Department	Montana State University	Bozeman, MT 59717	406-585-3747	WLEU 03/77/63	U 11 Ringling	D N N Y T 04 N X	UGK
R.R. Harvata	Biology Department	Montana State University	Bozeman, MT 59717	406-585-3747	WLEU 03/77/63	U 11 Tomcadd	D N N Y T 04 N X	UGK
David Marcelon	Calafia Conservancy	Box 2739	Swain, OR 97074	213-510-1702	WLEU 04/07/65	Y 08 Swain	A N N Y D 03 I P	RES PRT7

SPRIG COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1960

F C	ORIGINS INJURY	N	NECROPSY--HOWE	PHONE	L	LIVE BIRD INJURY	R R	REGULATORY'S NAME	PHONE	COMMENTS
Y Y U			X X			X X		X X X		Very incomplete. Call Rich Howard.
Y X X			X X			Y B D		Y C Harvey Whalar	U	Broke both wings. Has breeding in captivity.
N X X			X X			Y B D 630		Y Mark L. Blackbourn	715-336-7408	Returned to nest area. Flee very strongly. Band 629-14828.
Y X X			X Natl. W.L. Health Lab??			X X		X X X		Could have been hit by a car. No apparent injuries.
Y X X			X X			Y B D D I E N		H X I		Died after several hours. Compound wing fracture.
Y X X			X X			Y B D 65 P		Y H Dr. Jordan	465-228-4129	Found holes power line. Wing was amputated.
Y Y L E S T E L E			Y Natl. W.L. Health Lab.	629-252-5422		X X		X X X		Possible strike & then electrocution. NCR. No. PG 63768.
Y Y B D			Y Connor Hanson, MSU			X X		X X X		Blood hemorrhage around each vertebra.
Y H B A Y H O U S I N G			N X			X X		X X X		Bird suspended from wire at midpoint.
N X X			X X			Y M E R E		Y Y Woodland Park Zoo	295-625-5462	Released 02/15/63. No horns. Probable eyestrain.
Y Y B K			N X			X X		X X X		Eye strabismic. Band 599-17678. Band to BSL.
Y X X			X X			Y B D		Y C Nauphia Zoo Rehab. Ctr.	581-725-4787	Unsuccessful release 10/63. Has in breeding chamber.
Y X X			X X			Y B D		N H I		Euthanized. Eye strabismic.
Y X X			N X			Y B D		N H I		Euthanized.
Y Y P L U B I R			Y Natl. W.L. Health Lab.			X X		X X X		Eyestrabismic strike than electrocution. Foggy. Band 629-08956.

APPENDIX 8:

Raw Data--Golden Eagles (N = 9)



WATER COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLIDE N ST	NEAR CITY	A N T H L M C D	WINDST	CONDITION
Jay Roszman	Nature Center		Seaside, OR 97138	503-293-1221	REC'D 06/17/76	U OR Seaside	A N N Y D	03 I P	REV RES
Lois L. Layton	Marie Robison Society	P.O. Box 2051	Casper, WY 82502	307-472-7009	REC'D 11/07/68	U WY Sheridan	U N N N U	I I I I	
Alan R. Smeal	Idaho Power Company	1520 Idaho Street	Boise, ID 83707	208-363-2729	REC'D 12/26/72	U ID Jefferson County	A N N Y D	02 I P	DRK
Michael M. Purkins	U.S. Bur. of Land Mgmt.	Star Bldg. 5, Box 1	Ely, NV 89301	702-209-1825	REC'D 04/17/63	Y NV Eureka	0 N N Y T	03 N I	PRY?
Michael M. Hochart	U.S. Bur. Land Mgmt.	3548 Development Ave.	Boise, ID 83705	208-334-9279	REC'D 03/05/71	U ID Arco	0 N N Y D	U I U	DRK
Michael M. Hochart	U.S. Bur. Land Mgmt.	3548 Development Ave.	Boise, ID 83705	208-334-9279	REC'D 04/02/71	U ID Arco	0 N N Y D	03 I P	PRY?
Mr. Klaus Heigel	Private Raptor Project	Bldg. 1, Box 199	Yonkers, NY 10544	913-283-4051	REC'D 10/26/64	U NY Cliffon	0 N N Y T	03 N I	REV PRY?
A.R. Horvath	Biology Department	Montana State University	Bozeman, MT 59717	406-286-3747	REC'D 03/17/63	U MT Ringling	0 N N Y T	04 N I	REV
Brian J. Malton	USFWS, Leuser Quarry	University of California	Santa Cruz, CA 95064	406-429-2466	REC'D 02/17/63	Y CA Bishop	A N N Y T	05 N I	SHAWB

AVIATION COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	OPERATOR	HEAVY	N	NECROPOY-CODE	PHONE	L	LIVE BIRD	MARK	R R	RESCUE/LIBRARY'S NAME	PHONE	COMMENTS
Y X X			X X		X	Y B/D			Y C	Dawson Motors Center	503-503-1021	Picked up 1 on after collision. Unable to fly after rehab.
Y X X			X X		X	Y B/D			Y C X		X	Wing broken at shoulder. Banded at IFF. Found near line.
M X X			X X		X	X X			X X X		X	Called Humil and Howard. No further data.
Y Y B/D	B/D	B/D	X X		X	X X			X X X		X	Picked up under line after wind storm.
Y Y B/D	INT		Y Michael R. Nechert		208-334-9279	X X			X X X		X	Found 15 m out from the line.
Y Y B/D			Y Michael R. Nechert		208-334-9279	X X			X X X		X	No signs of burn marks.
Y X X			X X		X	Y B/D (CONVICTED)			Y G Hr.	Nure Thiget	913-283-4594	My still is released. Broken carcass.
Y X X			X X		X	Y B/D (CAF B/D)			M X X		X	Euthanized.
Y Y B/D	SEVERE?		X X		X	X X			X X X		X	Paroled by trained Op. Bird at scene. Lt. was visibility?

APPENDIX 9:

Raw Data--Ospreys (N = 7)



REPORT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1963

CONTRIBUTOR'S NAME	CONTRIBUTOR'S DIST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLDATE	W OF	NEAR CITY	A N T H L O C D	HABITAT	CONDITIONS
Endangered Species Unit	Wildlife Resources Dist.		Delmar, NY 12054	518-439-7635	PAUL	09/12/61	W NY	Cobleskill		U N N Y U I I I M K
Lloyd Isley	U.S. Army Corps Engin.	Rte. 4, Box 182	Sallisaw, OK 74935	518-775-4475	PAUL	??/??/61	W OK	Sallisaw		A N N Y T O A N I M K
Louis E. Clark		1114 Homosville Rd. S O	Tallahassee, FL 32303	904-222-2738	PAUL	07/05/73	W FL	Miami		A N N Y T 63 N I P W T O D L I O
Michael H. Perkins	U.S. Dep. of Land Mgmt.	Star Str. 5, Box 1	Ely, NV 89301	702-289-4625	PAUL	04/17/63	W NV	Eureka		A N N Y T 05 N I P W T
Sherril Mitchell	The Hum	Con Road	Portland, CT 06480	203-342-2958	PAUL	10/06/64	W CT	East Haddam		S N N Y T 05 N I V E D R I V U N D R O D
R. David Bishop	form. Middlefle Bus.			800-332-6988	PAUL	09/30/77	W TN	Norristown		A N N Y D 03 I P O W E R W A T E R
Kathy Ingram, BSN	Liberty M. Babak. Found.	11825 N. 70th Street	Scottsdale, AZ 85254	602-958-2059	PAUL	10/03/83	W AZ	Duckeye		U N N Y D 05 I P R O D

ROPIOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	ORIGINS BUNNY	H	NECROLOGY--HIVE	FADE	L	LIVE BIRD BUNNY	R R	REHABILITATOR'S HIVE	FADE	COMMENTS
Y X X		X X		X	Y RD BEEH		Y B Dr. Ed Ancker	518-456-6851		Bird slight of recovery. Broken humerus.
Y Y BLD		X X		X	X X		X X X			1 Ring tumor, grey virus, Y-lives all present. Blood secured.
X X X		X X		X	H SEM		X X X			1 Erythema. Bleemed for 3 min. Flew off on its own.
Y Y BLD BUN		X X		X	X X		X X X			1 Picked up under lites after wind storm.
Y X X		X X		X	Y BUN		Y C Stuart Mitchell	283-342-2572		Infected calluses. River crossing. Compound wing fracture.
Y X X	Y Univ. Tenn. Vet. School	X X		X	613-546-6492	Y NY HED BEEH	Y B Knoxville Zool. Park			1 Swollen around left eye. Ruptured liver & gall bladder.
U X X		X X		X	Y BUN (KINGDOM)		U U Hobbs Ingram, BHI	602-928-2520		Found talon line along rostr. Last page missing.

APPENDIX 10:

Raw Data--Red-tailed Hawks (N = 7)



RAPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S IND.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLL DATE	W OF	NEAR CITY	A N T H L O U C D I N S T R U C T I O N S
E. Stuart Mitchell		Cor Road	Portland, CT 06480	203-342-8550	011001	10/18/76	U CT Colchester	A N H Y T 03 N H P W 7
Dr. Harry Johnson		Box 286	Esbon, KS 66541	913-723-4825	011001	10/15/82	U MO Rankola	A N H Y P 05 X I P W 82D
Paul T. Schull	Esbon Vet Clinic	6763 Hinrich Rd, Box 102	Lockport, NY 14094	716-433-2696	011001	06/12/82	N NY Lockport	S D H Y P 04 N H X NES 0004-LINES
Charles A. Howell	Howson Sholly St. Park		Willington	901-676-5201	011001	??/??/83	U TN Willington	A N H Y P 04 X X VES? SUI
Peter H. Blatch		1743 Cedar St.	Berkeley, CA 94703	415-642-8829	011001	02/20/85	N CA Berkeley	A U H Y T U N H NES? 7
Peter H. Blatch		1743 Cedar St.	Berkeley, CA 94703	415-642-6629	011001	02/20/85	N CA Berkeley	A U H Y T U N H NES? 7
Joseph P. Sharpe	University of California	Dept. of Anthropology	Berke, CA 95616	916-752-4745	011001	10/??/82	Y CA Davis	S H N Y D 03 X P 80R

REPORT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1966

F C	CHUCKER INJURY	H	NECKEY-NEVE	PHASE	L	LIVE BIRD INJURY	B B	REGULIATOR'S NAME	PHASE	COMMENT
H X X		X X		X	Y 000		Y Y E. Stuart Mitchell	283-342-2728		Picked up under line soon after impact. Released 01/08/77.
H X X		X X		X	Y 000		Y Y Dr. Harry Johnson	913-725-4635		Released in Nov., 1962. Found along road under lines
H X X		X X		X	Y 000		Y Y Paul T. Schell	716-433-2536		Eynmitron. Young bird. Released in nest after 24 hrs.
Y Y 000 FLB		H X		X	X X		X X X		X	Line takes horizon. Bright sun.
Y H 02		X X		X	X X		X X X		X	Courship. Tail grasping. Collision then electrocution.
Y H 00		X X		X	X X		X X X		X	Courship. Tail grasping. Collision then electrocution.
Y Y 000 NO TUNER		H X		X	X X		X X X		X	Eyoditron. Bird blown into wires & electrocuted.

APPENDIX 11:

Raw Data--All Falcons (N = 32)



## RAPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLAPSE	U SE	NEW CITY	A N T H L	W C D	HEALTH CONDITIONS	
Endangered Species Unit	Wildlife Resources Cent.		Rehau, NY 12854	518-439-7635	FAPER 05/02/77	U NY Byron		A N H Y U	I I	UNK	
H. Bren	123 Brown Street	Haidelsberg, Victoria	3804 Australia		FAPER 01/05/76	U MI Lorne		S N H Y U	I I	TER MED	
S. Kent Carnie	M. Amer. Falconers' Ass.	P.O. Box 57	Glorieta, NM 87535	505-757-6572	FAPER 12/17/78	U MI Russell		A R Y U D	02	I A PV	
Jack Helvie	U.S. Fish & Wildl. Serv.	500 N.E. Hawthorn St.	Portland, OR 97209	503-231-2211	FAPER 01/17/75	U CA Willson		U D U Y D	04	I P PVY MED RSD	
Lois L. Layton	Norie Robson Society	P.O. Box 2651	Casper, WY 82502	307-472-7009	FACEL 01/19/81	U MI Casper		U D U U U	I I	UNK	
Lois L. Layton	Norie Robson Society	P.O. Box 2651	Casper, WY 82502	307-472-7009	FACEL 05/05/81	U MI Sinclair		U D U U U	I I	UNK	
David B. Walker	Royal Soc. Prot. Birds	64 Burvicks, Bampton	POW/143 GR10 254, Cambria, UK		FAPER 06/29/81	U UK Shep		S N H Y D	02	I P PVY	
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 02/17/75	U SK Saskatoon		S N H Y U	I I	UNK	
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 11/17/81	U SK Saskatoon		B R Y Y U	I I	UNK	
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 06/17/72	U SK Saskatoon		B Y Y P	10	I I	UNK
Steve Bam	Calif. Royal Fish & Game	625 Pacific Ave.	Willson, CA 95508	916-234-2304	FAPER 07/01/80	U CA Grand		S N H Y D	03	I P RSD	
Rosemary Metcalf	Australian Raptor Ass.	18 Hazzard St., U. Corner,	Camberra, Act 2601, Australia		FALDN 01/23/79	U AU Camberra		A N H Y P	05	I I	NER SCH PVY
Rose Marie Tappan		1619 Ochsedale	Baton Rouge, LA 70808	504-384-0235	FAPER 11/13/82	U LA Bator		B N H Y U	I I	UNK	
Salvo Giovanni	Via Capura 59	50018 Scacalento	Ogrignoto Sicily	0932-91845	FALDN 08/17/81	U SI Scacalento		A N H Y D	02	I B PVY	
Salvo Giovanni	Via Capura 59	50018 Scacalento	Ogrignoto Sicily	0932-91845	FALDN 03/17/74	U SI Scacalento		A N H Y D	02	I B PVY	
C.A. Rogillo		4313 Bryvofous Ave.	Metairie, LA 70006	504-886-5510	FAPER 12/02/84	U LA Louisville		A N H Y U	I I	I	
C.A. Rogillo		4313 Bryvofous Ave.	Metairie, LA 70006	504-886-5510	FAPER 10/09/84	U M U		B R H Y U	I I	I	
D. Lee Robson	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA	408-429-2466	FAPER 06/15/83	U CA Marro Bay		A N H Y D	03	I P TER PVY MED	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 11/17/77	U CA Marro Bay		A N H Y U	I I	NER SCH RSD PVY	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 09/17/78	U CA Cadeby		B Y Y T U	H I	PVY RIV	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/82	U CA San Luis Obispo		S N H Y D	02	I P RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/82	U CA Fort Bragg		B Y N Y D	01	I P RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/82	U CA Williams		S N H Y D	01	I P RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/84	U CA Panama		B Y N Y T	01	I I	REDUCED/INTL. AREA
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 03/17/82	U CA Livingston		A Y N Y U	U	I RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 03/17/82	U CA Livingston		A N H Y U	U	I RSD RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 11/17/82	U CA San Diego		A N H Y T	06	H I	UNK
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/77	U CA Calistoga		A N H Y U	U	I RSD	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 10/17/82	U CA Barboursville		A N H Y P	02	I I	UNK
Patrick L. McLaughlin	Calif. Rapt. Fish & Game	619 2nd Street	Eureka, CA 95501	707-443-6774	FAPER 05/08/85	U CA Regle Creek		S N H Y D	03	I P RSD	
David Barcelona	Inst. for Wildl. Studies	P.O. Box 127	Arcola, CA 95021	213-810-1702	FAPER 07/29/85	U CA Boston		S N H Y D	03	I P PVY	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 08/02/85	U CA Marro Bay		S N H Y D	03	I P PVY	
Brian J. Malton	SDPWS, Lessor	Quarry	University of California Santa Cruz, CA 95064	408-429-2466	FAPER 08/02/85	U CA Corte Madera		S N H Y D	03	I P PVY	

WILSON COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1968

F C	CATEGORY	INJURY	H	NECKPOY-HANE	PHONE	L	LIVE BIRD	INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
Y	X	X				X	Y JHT DM	EXIT	Y	H Dr. Ed Bucher	518-456-6851	Found under power line. Euthanized 08/17/77.
Y	X	X				X	Y BKX DM	EYE	Y	C Penny Olson	662-383 350	Eyeball torn. Now in captive breeding project. Banded
N	X	X				X	Y STUN		N	X	X	No injury. Flown at quarry 24 hrs later.
Y	Y	DM	DM			X	X	X	X	X	X	Picked up near line near road. Maybe sent to Putnam.
N	X	X				X	Y DM		Y	Y Lois L. Layton	387-472-7039	Wing tip and toe fractured. Not an eyewitness account.
Y	X	X				X	Y DM		Y	C Lois L. Layton	387-472-7039	Wing completely snapped off. Hit line diving on prey?
Y	X	X				X	Y DM	DIED	Y	D David G. Walker	X	Found within 3 hours. Died in captivity.
N	X	X				X	Y DM	BKX	Y	Y Lynn Bliphant	305-343-5785	Released after 7 mo. Inbreeding an breeding adult.
Y	Y	SGR				X	X	X	X	X	X	Bird recovered by radio-telemetry.
N	X	X				X	Y NOME		X	X	X	Falconer's bird. Flown into wires twice when flying to lure.
Y	X	X				X	Y DM	PLJ WING-TIP	Y	C UC Davis	U	Wingtip removed. Now at Santa Cruz. Band 507-55938.
Y	X	X				X	Y DM		Y	C Barry Olson	X	Brown wing near shoulder.
N	X	X				X	Y DM	PLJ	Y	Y Ann Tappan	504-855-4418	Also abrasions on head.
Y	Y	SGR				X	X	X	X	X	X	Found dead under line.
Y	Y	SGR				X	X	X	X	X	X	Found dead under line.
Y	X	X		Y Dr. Susan Wells	504-856-4418	Y	DM	JHT DIED	N	X	X	Died 12/04/78. Band 507-76283.
Y	X	X		Y Dr. Susan Wells	504-856-4418	Y	DM	SGR DIED	N	X	X	Died at New Orleans Wild Bird Rehab. Center. Not such info.
N	X	X				X	X	X	X	X	X	Eyeball torn. Bird hit line, flunked & flattened, but flew on
Y	X	X				X	Y DM	WING-TIP PLJ	Y	H Alex. Lindsay Jr. Houston G. Bujan	X	Four wing tip circ. Many wires in urban area.
Y	N	DM BLEED FN MOUTH				X	X	X	X	X	X	Found dying under line in river bottom. Band 507-55928.
Y	X	X				X	Y DM	HAND?	Y	H Gail Taylor	408-429-2465	Wound cut, bird flown, now in breeding project.
Y	X	X				X	Y DM	PLJ JHT HED DIED	Y	H Dr. James Ruesch	X	Found below wire, near house. Band 507-55927
Y	X	X				X	Y DM	SEVERE! DIED	JHT	Y H U.C. Davis.	X	Found below wire. Died during wing repair operation.
Y	Y	BLEEDING FN MOUTH				X	N	X	N	X	X	Band returns. Band 507-55932.
Y	X	X				X	Y DM	WING-TIP DIED	Y	H Brian J. Walton	408-429-2466	Infection. Died in treatment. Band 816-49510. Fences? Tor877
Y	X	X				X	Y DM	DIED	Y	H San Diego Zoo	X	Found in street below utility line.
Y	X	X				X	Y DM	BKX SGR DIED	Y	N	X	Died on way to vet. Found below Y line in chaparral.
Y	X	X				X	Y DM		Y	H HOPKINS	X	Still captive. Telephone or distribution line?
Y	X	X				X	Y DM	EXIT	Y	D Humboldt MA. Care Center	X	Was phone line (4 ex. 1). Picked at wing. Euthanized.
N	X	X				X	N	NOME	X	X	X	Hatched bird. Hit wire upon landing. No injury.
Y	X	X				X	Y DM	ASP	Y	H Brian Walton	408-429-2465	Band 507-77238. Chasing prey in mallot. Found below wire.
Y	X	X				X	Y BKX	SGR DIED	Y	H Brian J. Walton	408-429-2465	Band at vet. Burn Spring 1964. Found under line. Wallfats.

APPENDIX 12:

Raw Data--All Eagles (N = 24)



NORPA COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1983

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PAGE#	SPEC. COLLATE W RT	HEAR CITY	A N T H L W C D	MOBITY	CONTRIBUTOR
Allan R. Russell	Idaho Power Company	1208 Idaho Street	Boise, ID 83705	280-383-2729	NOLEM 05/01/80	U ID Boise	A N H Y D 03	I P	PRY?
Robert R. Spigall	Cleveland Bus. Mut. Hist	Made Oval Drive	Cleveland, OH 44106	216-231-4680	NOLEM 7/7/76	U IL U	D U N U T U	X I	UAK
Nark L. Blackburn	Northwoods Natl. Oak.	Highway 70 West	Hancock, MI 50408	216-335-7468	NOLEM 07/04/80	MI Niskold	D D N H P 02	X I	VED NEB 820
Carrol Henderson	Nim. Sup. Mineral Res.	648 19th Lane, N.E.	Blaine, MI 55434	612-296-3394	NOLEM 03/20/74	MI Nookavideo	A N H Y D 04	I P	830
Edward P. DuVivian	U.S. Fish & Wildl. Serv.	Post Office Building	Scranton, IL 61874	615-273-2732	NOLEM 01/20/83	U IL Gaiusa	A N H Y T U	X I	UAK
Thomas O'Hell	Montana Power Company	48 East Broadway	Butte, MT 59701	405-723-5421	NOLEM 04/07/83	U MT Judith Gap	A N H Y T U	X I	UAK
Jay Fournier	Native Center		Swanton, VT 57702	503-293-1221	NOGCH 05/17/76	VT SW Swriver	A N H Y D 03	I P	RIV NE3
Lola L. Layton	Marin Redwood Society	P.O. Box 2851	Capson, VT 05682	387-472-7629	NOGCH 11/07/80	VT SW Sheridan	U N H U U X	X I	X
Rhian R. Russell	Idaho Power Company	1208 Idaho Street	Boise, ID 83707	200-383-2729	NOGCH 12/25/72	U ID Jefferson County	A N H Y D 03	I P	M61
Michael W. Perkins	U.S. Bur. of Land Mgt.	Star Sta. 5, Box 1	City, NY 05301	702-203-4625	NOGCH 04/17/83	VT SW Eureka	A N H Y T 05	X I	PR1?
Kan H. Harrington	U.S. Fish & Wildl. Serv.	P.O. Box 1910	Klamath Falls, OR 97601	503-863-6500	NOLEM 03/15/84	U OR Selry	A N H Y D 03	I P	U61
Michael R. Kochert	U.S. Bur. of Land Mgt.	3948 Development Ave.	Boise, ID 83705	200-334-3279	NOGCH 04/02/71	U ID Eveso	A N H Y D 03	I P	U61
H.V. Hurr	Washington Dep. of Game	Sta. 1, Box 05-0	Branster, WA 98012	503-649-2835	NOLEM 01/77/81	WA SW Branster	A N H Y D 03	I P	PRY 820
H.V. Hurr	Washington Dep. of Game	Sta. 1, Box 05-0	Branster, WA 98012	503-649-2835	NOLEM 03/17/84	WA SW Carlton	A N H Y D 03	I P	RIV
Dr. Klaus Meigel	Prairie Dogger Project	Sta. 1, Box 159	Tenocott, KS 67404	913-203-4094	NOGCH 08/25/74	KS SW Clifton	A N H Y T 05	X I	RIV PRY?
Mollie English	Woodland Park Zoo	2050 Phoenyx Rm. North	Seattle, WA 98103	206-425-5482	NOLEM 03/06/82	WA SW Friday Harbor	A N H Y D 04	T P	PRY 820
Dick Carlisle	Biol. Natural Resources	P.O. Box 495	Esconcho, HI 45029	505-795-2351	NOLEM 07/25/80	HI SW Tevany	D H Y D 03	I P	NE3 820
John Michas	Roughs Zoo	2000 Ballouy	Memphis, TN 38112	901-726-4787	NOLEM 11/07/82	TN SW Samsburg	A N H Y P 04	X I	VE3 820
A.R. Harvata	Biology Department	Montana State University	Bozeman, MT 59717	406-566-3747	NOGCH 03/77/83	MT SW Ringling	A N H Y T 04	X I	R10
A.R. Harvata	Biology Department	Montana State University	Bozeman, MT 59717	406-566-3747	NOLEM 03/77/83	MT SW Ringling	A N H Y T 04	X I	R10
A.R. Harvata	Biology Department	Montana State University	Bozeman, MT 59717	406-566-3747	NOLEM 03/77/83	MT SW Tevany	A N H Y T 04	X I	R10
Brian J. Walton	SDPS&L, Lower Quarry		University of California	409-429-2456	NOGCH 02/17/82	VT SW Ch Bishop	A N H Y T 05	X I	SDPS&L
David Barclon	Catalina Conservancy	Box 2735	Avellan, CA 95064	213-510-1762	NOLEM 04/07/83	VT SW Avellan	A N H Y D 03	I P	823 PRY?

WATER COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1948

F C	CARRIER NUMBER	N	NECESSARY—NOTE	PAGE	L	LIVE BIRD INJURY	R R	REHABILITATOR'S NAME	PAGE	COMMENTS
V Y U		X X		X	X X		X X X		X	Very incomplete. Called Rich Hunsell. No better data.
V X X		X X		X	V BUD		V C Harvey Gubator		U	Broke both wings. Was branding in captivity.
H X X		X X		X	V BUD 538		V Y Mark L. Blackbourn		715-256-7488	Retained to nest area. Flies away strongly. Band 659-14828.
V Y X		X Natl. Wfl. Health Lab??		X	X X		X X X		X	Could have been hit by a car. No apparent injuries.
V X X		X X		X	V BUD BIED		H X X		X	Band after several hours. Compound wing fracture.
V X X		X X		X	V BUD RCP		V W Dr. Jordan		466-258-4129	Found broken power line. Wing was amputated.
V X X		X X		X	V BUD		V C Survivor Holers Center		503-953-1823	Picked up 1 mo after collision. Unable to fly after rehab.
V X X		X X		X	V BUD		V C		X	Wing broken at shoulder. Banded 6/17/47. Found near line.
U X X		X X		X	X X		X X X		X	Called Hunsell and Hunsell. No better data.
V Y BUD BLD BAR		X X		X	X X		X X X		X	Picked up under line after used storm.
V Y LED YEL E		Y Natl. Wfl. Health Lab.		658-232-2462	X X		X X X		X	Punctured struts & then electrocuted. WFL No. PD 83768.
V Y BUD HW		Y Michael H. Kochart		608-334-2879	X X		X X X		X	Found 15 m east from the line.
V Y BUD		Y Michael H. Kochart		608-334-2879	X X		X X X		X	No signs of burn marks.
V Y BUD		Y Connor Hansen, MSB		X X	X X		X X X		X	Band hemorrhage around each vertebrae.
V W ONLY HUNSDAD		H X		X	X X		X X X		X	Bird amputated from wire at sideman.
V X X		X X		X	V BUD 438/438/438		V W Dr. Rura Weigel		913-883-4894	By 4/11/48 released. Broken recovered.
H X X		X X		X	V HWE		V Y Woodland Park Zoo		686-625-5462	Released 6/21/48. No burns. Probable amputation.
V Y BUD		H X		X	X X		X X X		X	Eyes eaten. Band 529-17878. Sent to WFL.
V X X		X X		X	V BUD		V C Memphis Zoo Babak. Ctr.		901-726-4787	Unsuccessful release 10/6/48. Was in breeding chamber.
V X X		X X		X	V BUD ELY BIED		H X X		X	Exhausted.
V X X		X X		X	V BUD		H X X		X	Exhausted. Eye eaten.
V X X		X X		X	V BUD		H X X		X	Exhausted.
V X X		H X		X	X X		X X X		X	Perched by trained sp. Band at scene. Lt. nose visibility?
V Y BUD-BENEVE!		H X		X	X X		X X X		X	Eyes eaten struts than electrocution. Foggy. Band 659-65988.
V Y FLD BAR		Y Natl. Wfl. Health Lab.		X X	X X		X X X		X	

APPENDIX 13:

Raw Data--All Buteos (N = 11)





OPTIC COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC.	COLLIDE W OF	NEAR CITY	A N T H L W C B INDUSTRY CONDITIONS
E. Stuart Mitchell		Con Road	Portland, CT 06480	203-342-2950	BLJ300	10/18/76	N CT Colchester	A N N Y T 05 N I P W T
Dr. Harry Johnson		Box 206	Essex, MS 36941	913-725-4825	BLJ300	08/13/82	U MS Huxedo	A N N Y P 05 X I P W R 000
Paul T. Schwall	Essex Vet Clinic	6763 Nimick Rd, Box 102	Lockport, NY 14094	716-433-2636	BLJ300	06/12/82	N NY Lockport	G D N Y T 04 N I N E S N O W Y - L I N E S
Charles A. Norvell		Monroe Shelby St. Park	Willington	910-676-5201	BLJ300	77/77/83	U TN Hallington	A N N Y P 04 X I N E S? S M A
Gary Herron		Nevada Supermarket Bldg.	Reno, NV 89520	702-784-4635	BLJ300	06/77/82	N NV Fallon	A N N Y D 03 X P N E S D E N R 000
Allen R. Aomil		Idaho Power Company	Boise, ID 83707	208-383-2729	BLJ300	12/15/78	N ID Grandview	U N N Y D 03 X P U
Wayne Piliz		Publ. Serv. Co. R. Hst.	Albuquerque, NM 87150	505-648-2011	BLJ300	03/77/84	N NM Clovis	S N N Y T 06 N I R 000 N O W - W I R E S P W T
Wayne Piliz		Publ. Serv. Co. R. Hst.	Albuquerque, NM 87150	505-648-2011	BLJ300	03/77/84	N NM Clovis	A N N Y T 08 N I R 000 N O W - W I R E S P W T
Peter H. Bleick		1743 Cedar St.	Berkeley, CA 94703	415-642-6329	BLJ300	02/20/85	N CA Berkeley	A N N Y T U N N I N E S T
Peter H. Bleick		1743 Cedar St.	Berkeley, CA 94703	415-642-6629	BLJ300	02/20/85	N CA Berkeley	A N N Y T U N N I N E S T
Joseph P. Sharspe		University of California Dept. of Anthropology	Davis, CA 95616	916-752-0743	BLJ300	10/77/82	Y CA Davis	G N N Y D 03 X P R 00



