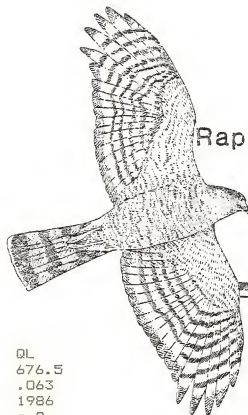




Gas and Electric Company

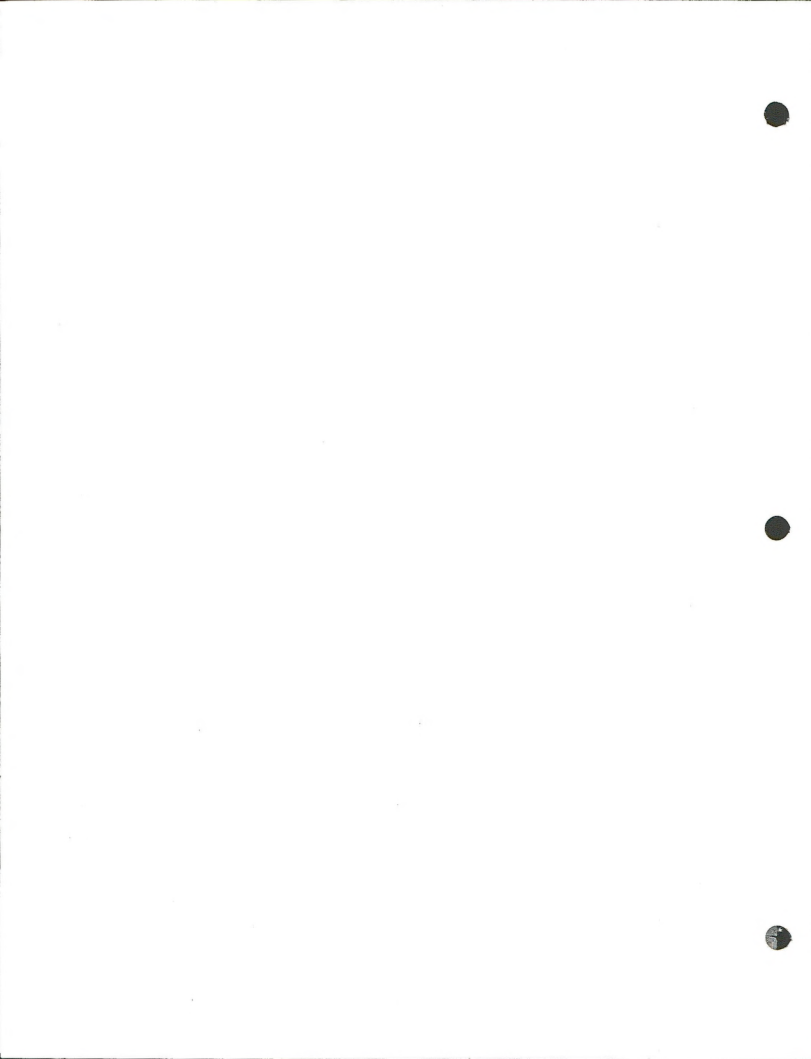
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Raptor Collisions with Utility Lines:
An Analysis Using Subjective
Field Observations

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

Final Report

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February, 1986

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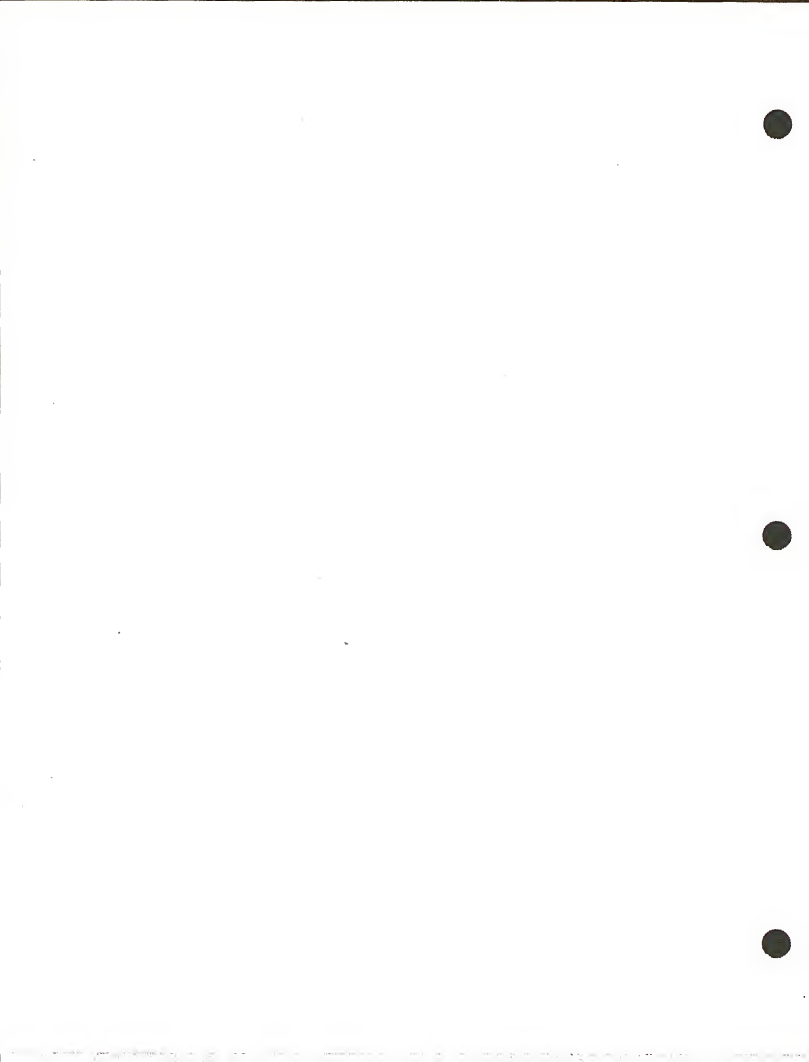


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EXECUTIVE SUMMARY

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.

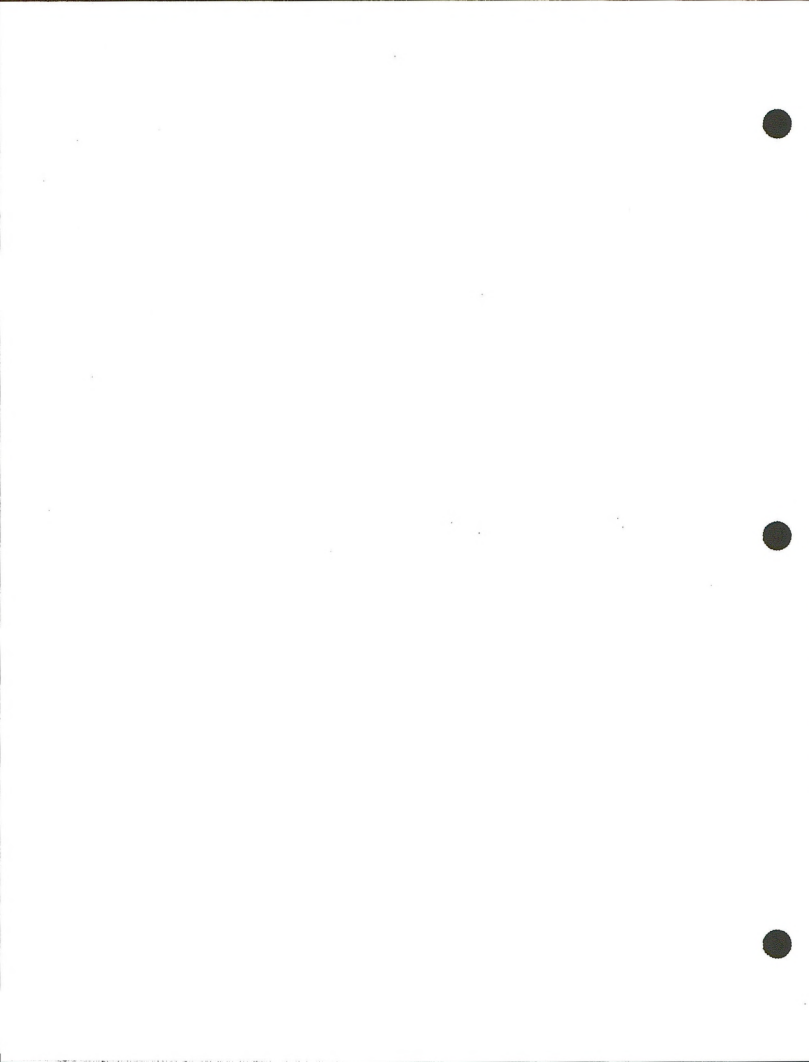
The type of utility line apparently struck was known for 72 of the 88 suspected collisions (Table 3). Of the 72, 10 (13.9 percent) were telephone lines, 36 (50.0 percent) were electric distribution lines, and 26 (36.1 percent) were electric transmission lines. Twenty-seven (75.0 percent) of the distribution 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, Baldridge 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 (EEI), Washington, D.C., for distribution to EEI 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 cellometers," 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

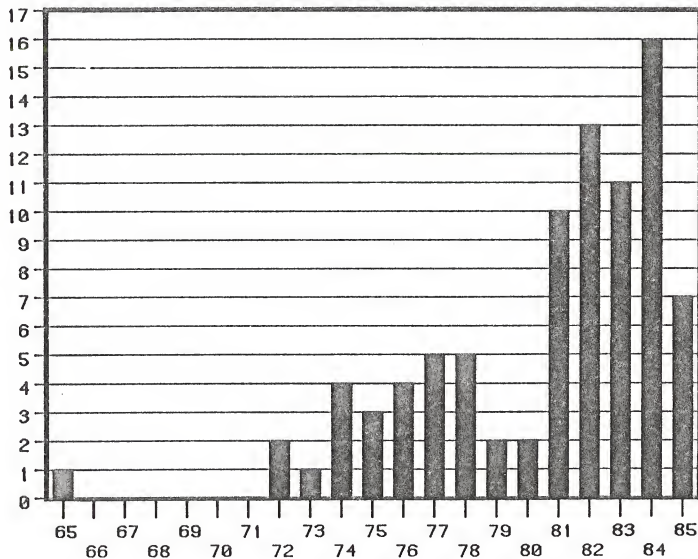
The locations of suspected collisions or the recovery sites of injured or dead birds were recorded in 87 of the 88 report forms received. Suspected collisions were reported from six countries (excluding the United States): Canada (all from Saskatchewan--4 reports); Great Britain (3 reports); Australia, 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)

7
NUMBER
OF
REPORTED
COLLISIONS

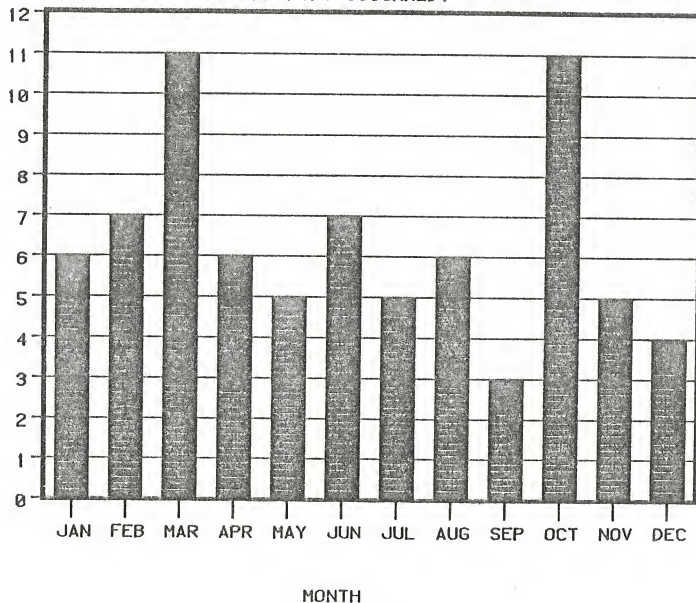
FIGURE 1. THE YEARS DURING WHICH THE
REPORTED COLLISIONS OCCURRED.



YEARS: 1965-1985

8
NUMBER
OF
REPORTED
COLLISIONS

FIGURE 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).

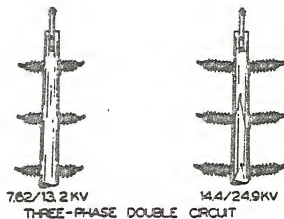
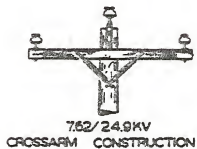
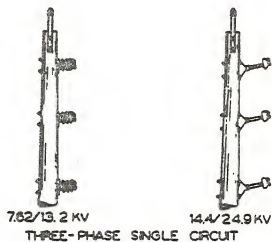
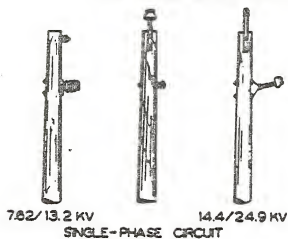
Of the 26 suspected transmission line strikes, 17 (65.4 percent) involved metal tower configurations. Five (19.2 percent) were of the wooden H-frame type. The rest (four) were of unknown configuration (Table 3, Column II). No data were collected on the relative importance of static wires versus conductors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

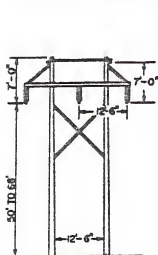


From: Olendorff et al. (1980).

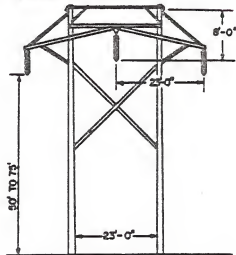
FIGURE 4

HIGH VOLTAGE TRANSMISSION STRUCTURES

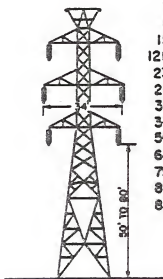
(SUFFICIENT CONDUCTOR SPACING PREVENTS
PHASE-TO-PHASE OR PHASE-TO-GROUND CONTACT.)



TYPICAL 115KV WOOD H-FRAME

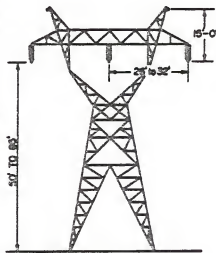


TYPICAL 230KV WOOD K-FRAME



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: Olendorff 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)
Electric Distribution Lines		
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)
Electric Transmission Lines		
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</u> <u>(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.

	<u>Total No. of Records With Known Line Type</u>	<u>% Colliding With Telephone Lines</u>	<u>% Colliding With Distribution Lines</u>	<u>% Colliding With Transmission Lines</u>
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:

Figure 5. Distribution of suspected Peregrine Falcon collisions with utility lines in California: 1975-1985.



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.

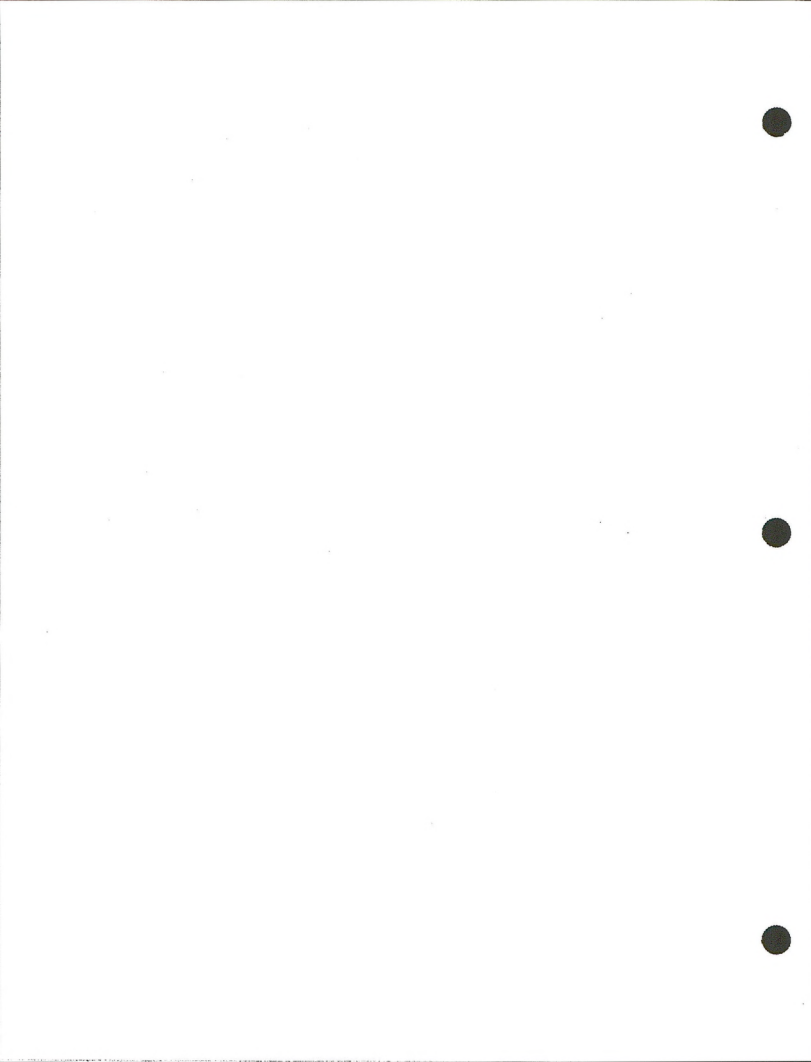
Summary

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.

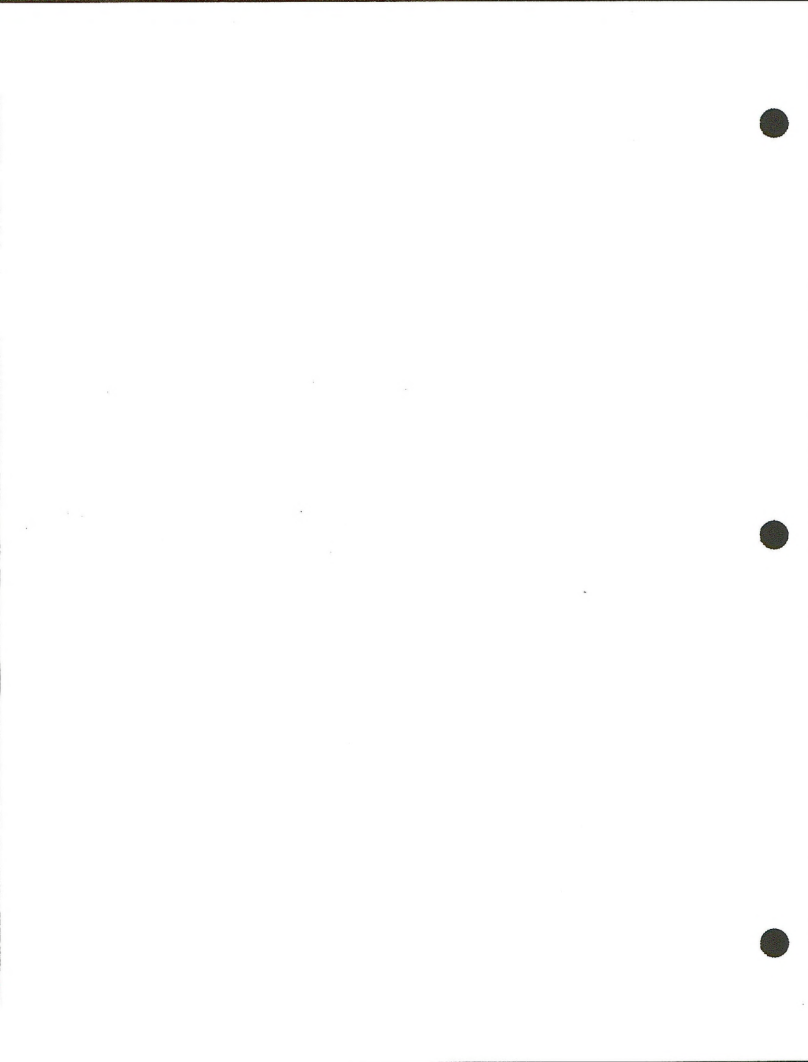


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NOTE

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:

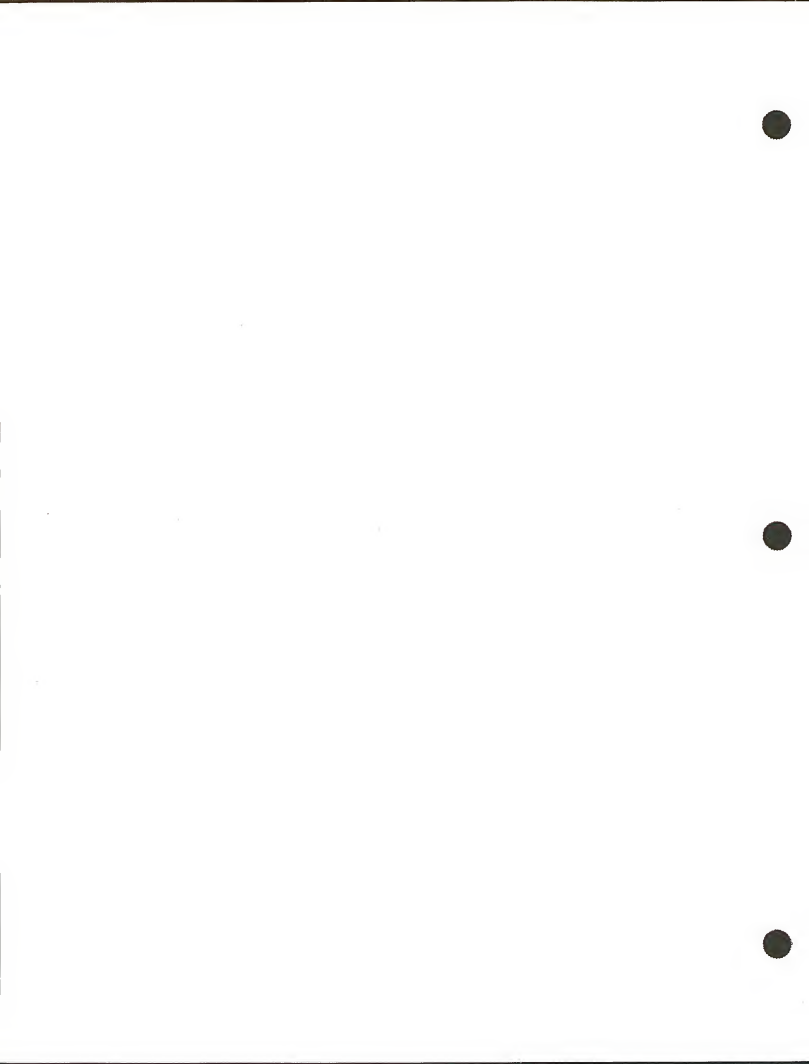
The Call for Information sent to ornithological journals, falconer's associations, raptor rehabilitation facilities, and electric industry organizations throughout the country and world.



RAPTOR COLLISIONS WITH UTILITY LINES

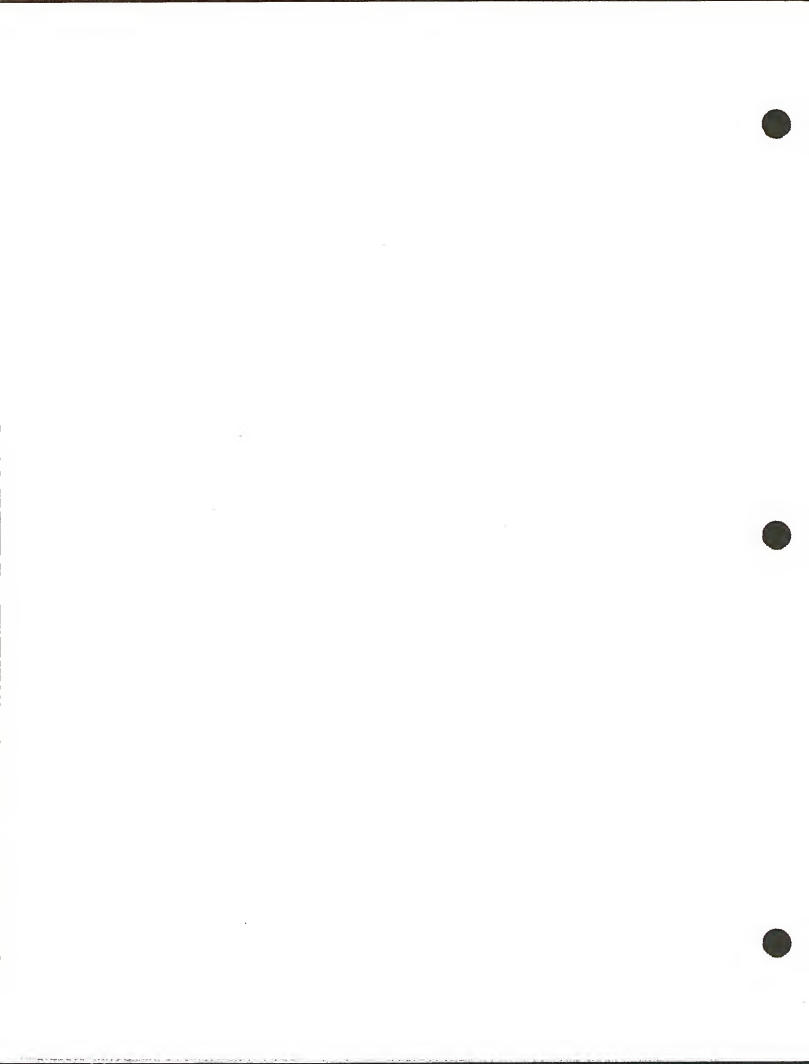
A Call for Information

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)
 Beitrage 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)
 Duivengazet (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)
 Oriole (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)

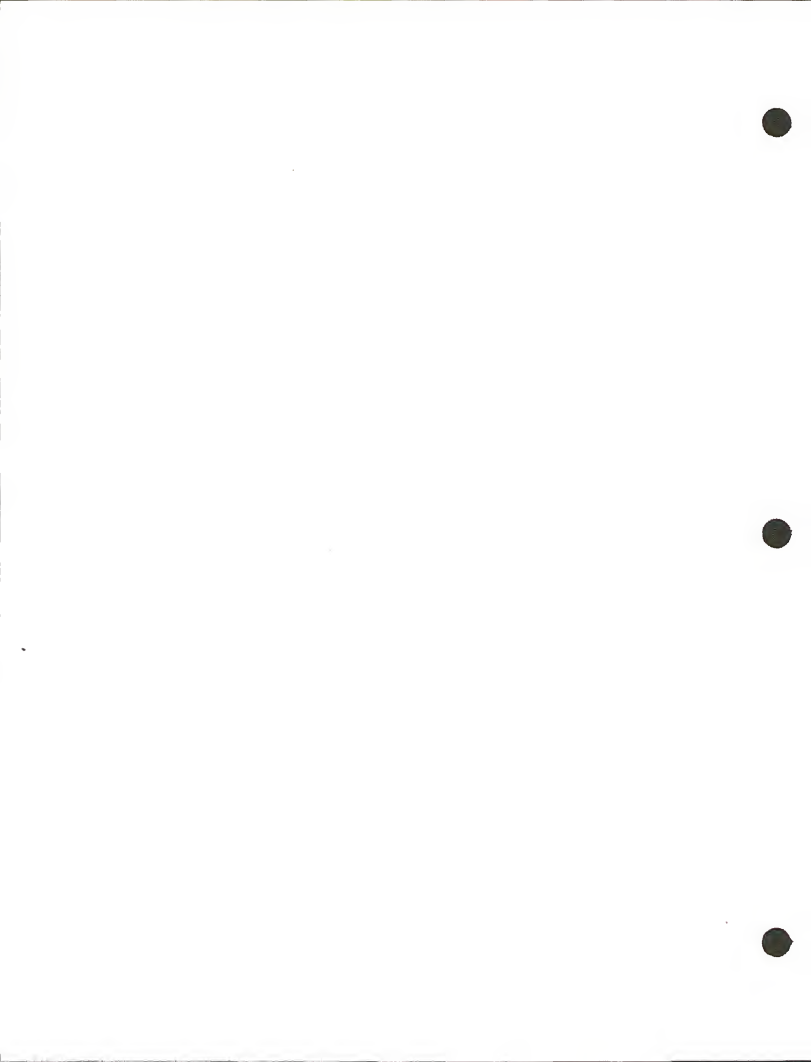
Virgin Islands Conservation Society Newsletter (Virgin Islands-USA)
Vulture News (South Africa)
Vulture Watcher (USA)
Western Birds (USA)
Wielewaal (Belgium)
Wildlife Crusader (USA)
Wildlife Society Bulletin (USA)
Wilson Bulletin (Canada)
Wyoming Wildlife News (USA)
Zambian Ornithological Society Newsletter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

- Name of Contributor: _____

Address: _____

Phone: _____

Affiliation: _____

Name of Observer (if different): _____

Address: _____

Phone: _____

Affiliation: _____

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

Common Name: _____

Scientific Name: _____

- Date of Collision (or best estimate). Month/Day/Year: _____

- Weather Conditions (describe):

Did adverse weather conditions contribute to the collision?

Yes ☐ No ☐ Unknown ☐

If yes, explain:

- 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: _____

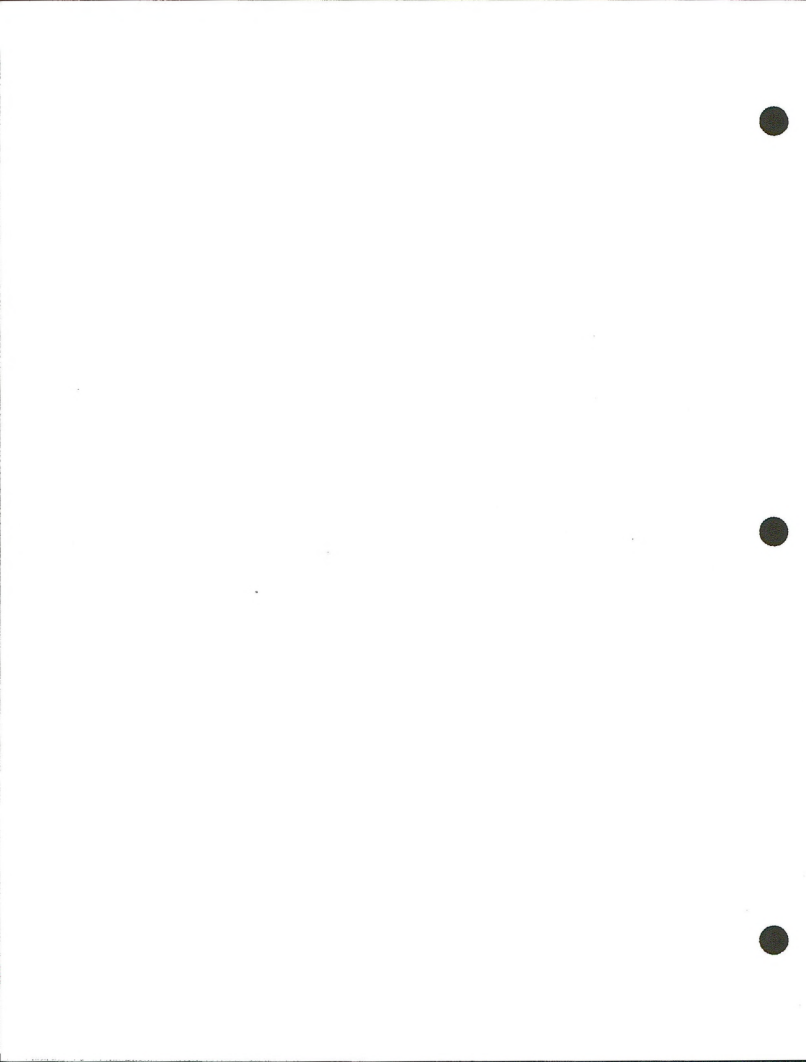
APPENDIX 4:

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	OBNRCITY	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

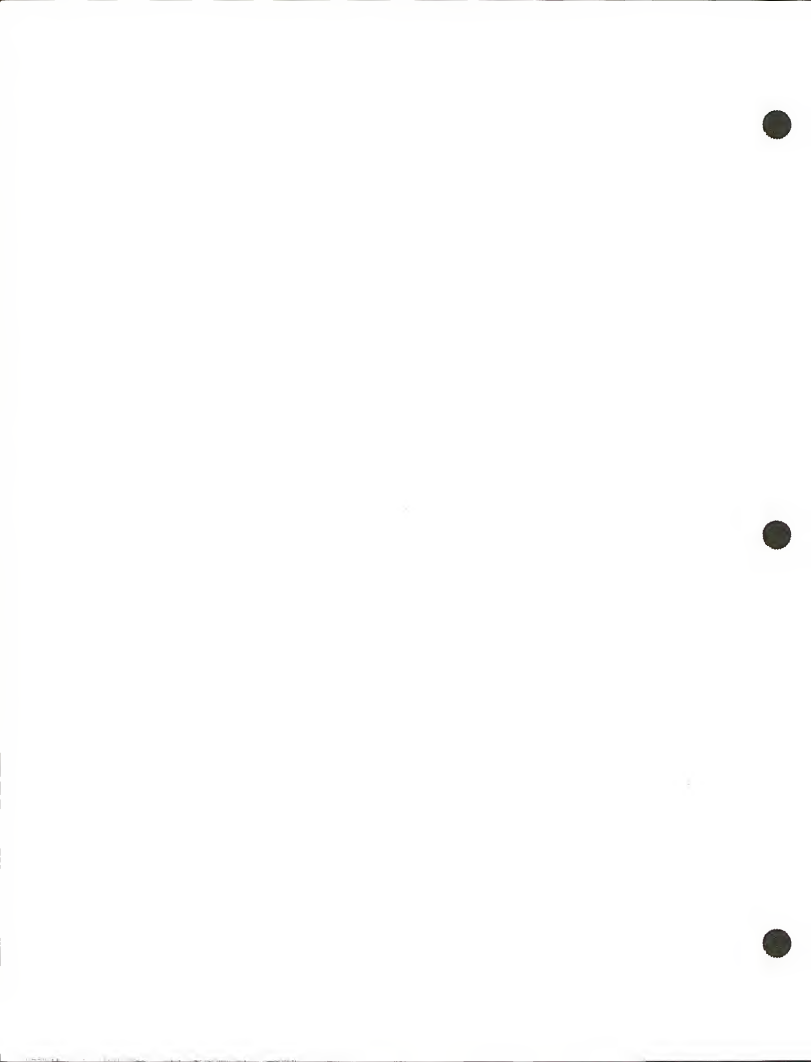
<u>Field Number</u>	<u>Field Content</u>	<u>Computer Field Name</u>	<u>Field Size</u>	<u>Codes</u>	<u>Printout Code</u>
18	Configuration of Distribution Line	DCONFIG	1	Pole and Crossarm Armless Single Pole Other Unknown	D
19	Conditions Possibly Contributing to the Collision	HABCOND	20	AGR = Agricultural 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 UNK = Unknown URB = Urban VEG = Vegetation WND = Wind Yes No Unknown	HABITAT CONDITIONS
20	Collision Biologically Fatal? (ever Released = Fatal)	FATAL	1		F

Field Number	Field Content	Computer Field Name	Field Size	Codes	Printout Code
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 PLJ = 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)



NORFOLK COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PAGE	SPEC. COLLECTED IN ST.	NEAR CITY	ANTH. ACB	UNIV. INST.	CONDITION
Endangered Species Unit	Wildlife Resources Com.		DeLaur, W 1205A	510-439-7635	FAWR 09/12/81	W H Coshenhill		UNH Y 03	1 UNK
Endangered Species Unit	Wildlife Resources Com.		DeLaur, W 1205A	510-439-7635	FAWR 05/02/77	W H Byron		UNH Y 03	1 UNK
Allen R. Russell	Idaho Power Company	1220 Idaho Street	Boise, ID 83705	200-383-2729	FAWR 05/01/81	W H Boise		UNH Y 03	1 P REV PWT
Wm. R. S. Hume	Idaho Power Company	Private Bag 50	Blainey, Malad	1	OTLEW 10/24/70	W H Blainey		UNH Y 04	1 UNK
Robert E. Engel	Cleveland Mus. Nat. Hist.	Male Oval Drive	Cleveland, OH 44166	216-231-4630	FAWR 11/77/65	W H U.		UNH Y 04	1 UNK
M. Soren	123 Brown Street	Nadelburg, Victoria	3024 Australia	1	FAWR 01/04/76	W H Fort Lorne		UNH Y 04	1 XER VER LIG
Carl L. Blackwelder	Bartholme Wildl. Dist.	Highway 70 West	Ninacoma, WI 53548	715-336-7400	FAWR 07/04/81	W H Woodford		UNH Y 04	1 XER VER LIG
Norval Macdonald	Hites. Sp. Natural Hist.	646 119th Lane, N.E.	Blaine, MN 55434	612-236-3334	FAWR 03/30/74	W H Rostved		UNH Y 04	1 P UNK
Edward P. Sullivan	U.S. Fish & Wildl. Serv.	Post Office Building	Sevanna, IL 61074	815-727-2732	FAWR 01/30/83	W H Sevana		UNH Y 04	1 XER VER LIG
Thomas O'Hall	Idaho Power Company	40 East Broadway	Battle, WI 53781	263-723-5421	FAWR 08/07/83	W H Judith Gap		UNH Y 04	1 UNK
E. Stuart Mitchell	Coast Road	Portland, CT 06460		263-342-2950	FAWR 04/77/84	CT Middleham		UNH Y 03	1 XER VER HES REV LIG
E. Stuart Mitchell	Coast Road	Portland, CT 06460		263-342-2950	FAWR 10/18/76	CT Colchester		UNH Y 03	1 PWT
Dr. Harry Anderson	Eden Vale Clinic	Rte 256	Eden, MS 38941	915-725-0235	FAWR 01/15/82	W H Kankakee		UNH Y 03	1 PWT
Carl B. North	Dept. of Zoology	Water State College	Eden, WI 84168	808-626-6176	FAWR 11/24/70	W H Corvino		UNH Y 03	1 UNK
R. Kent Carole	Dr. Ruse. Falcone's P.O.	P.O. Box 67	Blorlette, IN 47535	505-757-6576	FAWR 12/17/76	W H Russell		UNH Y 04	1 UNK
Lloyd Lloyd	U.S. Army Corps Engin.	Rte. 4, Box 182	Ballinas, ME 79503	505-715-4475	FAWR 11/77/81	W H Ballinas		UNH Y 03	1 PWT
Jay Buchanan	Return Dealer		Bonville, WI 97072	503-935-1221	FAWR 06/77/76	W H Bonville		UNH Y 03	1 UNK
Paul T. Schell			Bonville, WI 97072	716-413-2656	FAWR 06/12/82	W H Lockport		UNH Y 03	1 UNK
Constance E. Hughes		6763 Himsick Rd, Box 182	St. John, WI 53171	262-640-3621	FAWR 03/27/76	W H St. John		UNH Y 04	1 UNK
Charles R. Howell	Rumson Shelly Bk. Park		Hillingdon	901-476-2531	FAWR 11/77/83	W H Hillington		UNH Y 04	1 XER VER LIG
Jack Halvick	U.S. Fish & Wildl. Serv.	300 N.E. Mainland St.	Portland, ME 04109	503-231-2233	FAWR 01/17/75	W H Portland		UNH Y 04	1 PWT
Gary Harvey	Rumson Shelly Bk. Park	P.O. Box 15578	Portland, ME 04109	702-704-7689	FAWR 07/17/82	W H Fallow		UNH Y 03	1 XER VER LIG
John L. Layton	Ward's Radium Society	P.O. Box 2381	Casper, WY 82502	307-472-7689	FAWR 01/17/80	W H Sheridan		UNH Y 03	1 UNK
John L. Layton	Ward's Radium Society	P.O. Box 2381	Casper, WY 82502	307-472-7689	FAWR 01/15/81	W H Casper		UNH Y 03	1 UNK
John L. Layton	Ward's Radium Society	P.O. Box 2381	Casper, WY 82502	307-472-7689	FAWR 05/05/81	W H Biscailor		UNH Y 03	1 PWT
John L. Layton	Ward's Radium Society	1114 Thompsonville Rd. S	Tallahassee, FL 32303	904-222-3738	FAWR 07/05/73	W H Miami		UNH Y 03	1 PWT
Lois C. Clark	Idaho Power Company	1220 Idaho Street	Boise, ID 83707	200-383-2729	FAWR 02/15/79	W H Rona		UNH Y 03	1 PWT
Allen R. Russell	Idaho Power Company	1220 Idaho Street	Boise, ID 83707	200-383-2729	FAWR 12/15/78	W H Grandville		UNH Y 03	1 PWT
Allen R. Russell	Idaho Power Company	1220 Idaho Street	Boise, ID 83707	200-383-2729	FAWR 08/26/76	W H Jefferson County		UNH Y 03	1 PWT
Allen R. Russell	Idaho Power Company	1220 Idaho Street	Boise, ID 83707	200-383-2729	FAWR 03/13/84	W H Helena		UNH Y 03	1 PWT
Thomas O'Hall	Idaho Power Company	40 East Broadway	Battle, WI 53781	262-723-5421	FAWR 08/07/83	W H Helena		UNH Y 03	1 PWT
Michael M. Perkins	U.S. Bur. of Land Mgmt.	Star Rte. 3, Box 1	Ely, WI 89301	702-269-4655	FAWR 04/17/83	W H Eureka		UNH Y 03	1 PWT
Michael M. Perkins	U.S. Bur. of Land Mgmt.	Star Rte. 3, Box 1	Ely, WI 89301	702-269-4655	FAWR 04/17/83	W H Eureka		UNH Y 03	1 PWT
David B. Walker	Royal Soc. Prot. Birds	64 Burdocks, Hampton	Peworth CHB 25H, Cautin, UK		FAWR 05/17/82	W H Ches		UNH Y 06	1 XER VER LIG
David B. Walker	Royal Soc. Prot. Birds	64 Burdocks, Hampton	Peworth CHB 25H, Cautin, UK		FAWR 05/				

BOPUS COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1962

F C	CHECKED	INJURY	N	NECROPSY—NOTE	PHONE	L	LIVE	WIND	INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
V XX			XX			X			V BUD DIE	V Dr. Ed Bucher	518-456-0851	Dead night of recovery. Broken humerus.	
V XX			XX			X			V JAY RAN OUT DIE	V Dr. Ed Bucher	518-456-0851	Found under power line. Euthanized 08/17/77.	
V YU			XX			X			XX	XX	X	Very incomplete. Called Rich Howard. No better data.	
XX			XX			X			V BUD PLU BDN	V Mrs. B.B. Hamer		White-faced Bat.	
V XX			XX			X			V BUD	V Harvey Webster	U	Broke both wings. Was breeding in captivity.	
V XX			XX			X			V BUD BDN EYE	V C Poney Olson	652-283 359	Eyes inflamed. Now in captive breeding project. Banded	
XX			XX			X			V BUD BDN	V Mark L. Blackburn	715-256-7489	Returned to nest area. Flies away strongly. Banded 02/08/77.	
V XX			V Hail. M141. Health Lab?	X		X			XX	XX	X	Could have been hit by a car. No apparent injuries.	
V XX			XX			X			V BUD DIE	MDI	X	Dead after several hours. Compound wing fractures.	
V XX			XX			X			V BUD BDP	V Dr. Jordan	405-632-4139	Found below power line. Wing was amputated.	
V XX			XX			X			V BUD	V E. Stuart Mitchell	283-242-2938	Found near line. Wing healed in wild at weird angle.	
XX			XX			X			V E. Stuart Mitchell	V E. Stuart Mitchell	283-242-2938	Picked up under line soon after impact. Released 02/08/77.	
XX			XX			X			V BUD	V Dr. Harry Johnson	513-725-4035	Released in Nov., 1962. Found along road under lines	
V Y BDN			XX			X			XX	XX	X	Found dead below wire. No signs of injury. Banded 507-17528.	
XX			XX			X			V BTH	XX	X	No injury. Flown at quarry 24 hrs later.	
V Y BDN			XX			X			XX	XX	X	Wing torn, guy wires, 1-line all present. Almost severed.	
XX			XX			X			V BUD	V C Scriver Nature Center	503-503-1821	Picked up 1 mo after collision. Unable to fly after rehab.	
XX			XX			X			V BUD	V Paul T. Schmitt	716-433-8256	Eyes inflamed. Young bird. Replaced in nest after 24 hrs.	
V Y BDN PLU			XX			X			V BUD BDP DIE	XX	X	Wing amputated. Found along rd with wires. Maybe hit by car.	
V Y BDN BDN			XX			X			XX	XX	X	Line below horizon. Bright sun.	
XX			XX			X			XX	XX	X	Picked up near line near road. Maybe went to Polemont.	
V XX			XX			X			XX	XX	X	Defending terr. against Hairywood. Not injured.	
V XX			XX			X			V BUD	V C I	X	Wing broken at shoulder. Humeral shaft. Found near line.	
XX			XX			X			V BUD	V Lois L. Layton	307-472-7899	Wing tip and two fractures. Not an eyes inflamed accident.	
V XX			XX			X			V BUD	V Lois L. Layton	307-472-7899	Wing completely snapped off. Hit line diving on prey?	
XX			XX			X			XX	XX	X	Eyes inflamed. Stunned for 3 min. Flies off on its own.	
V Y BDN LES			XX			X			XX	XX	X	Also open wounds on breast.	
XX			XX			X			XX	XX	X	Called Russell and Howard. No better data.	
XX			XX			X			XX	XX	X	Called Russell and Howard. No better data.	
V Y BDN			XX			X			XX	XX	X	Not such information.	
V Y BDN BDN BDN			XX			X			XX	XX	X	Picked up under line after wind storm.	
V Y BDN BDN			XX			X			XX	XX	X	Picked up under line after wind storm.	
V Y BDN BDN			XX			X			XX	XX	X	Found under line. Windy.	
XX			XX			X			V BUD	V YU	U	Found under line. Returned to breeding area.	
V XX			XX			X			V BUD DIE	V David G. Walker	X	Found within 3 hours. Bird in captivity.	
V Y LES BDN			V Hail. M141. Health Lab.	680-252-5422	XX				XX	XX	X	Possible strike 1 then electrocution. BSL No. PB 02780.	
XX			XX			X			V BUD BDN DIE	V Lynn Oliphant	356-243-5765	Released after 7 mo. Retrapped as breeding adult.	
V Y BDN			XX			X			XX	XX	X	Bird recovered by radio-telemetry.	
XX			XX			X			V BDN	XX	X	Falconer's bird. Flies into wires below when flying to lawn.	
V Y BDN BDN			V Michael N. Hackett	280-334-9279	XX				XX	XX	X	Found 15 m out from the line.	
V Y BDN			V Michael N. Hackett	280-334-9279	XX				XX	XX	X	No signs of bone work.	
XX			XX			X			V BUD BDN	V Mrs. B.B. Hamer	X	Released July 8.	
V XX			XX			X			V BUD PLU WIP	V C H Davis	U	Wingtip removed. Was at Santa Cruz. Banded 507-5978.	
V XX			XX			X			V BUD DIE	V J. J. Bird	U	Wing almost severed. Bird seen night. Windy, rain.	
V XX			XX			X			V BUD	V C Poney Olson	X	Broke wing near shoulder.	
XX			XX			X			V BUD PLU EYE	V Anne Tappan	504-856-4418	Also abrasions on head.	
V Y BDN			V Connor Hennessey, MD			X			XX	XX	X	Blood hemorrhage around neck vertebrae.	
V Y BDN BDN			XX			X			XX	XX	X	Bird suspended from wire at sidspan.	
V XX			XX			X			V BUD	V C Stuart Mitchell	283-242-6572	Definite collision. River crossing. Compound wing fractures.	
V Y BDN			XX			X			XX	XX	X	Suspended from wire sidspan. Probably Long-eared Bat.	

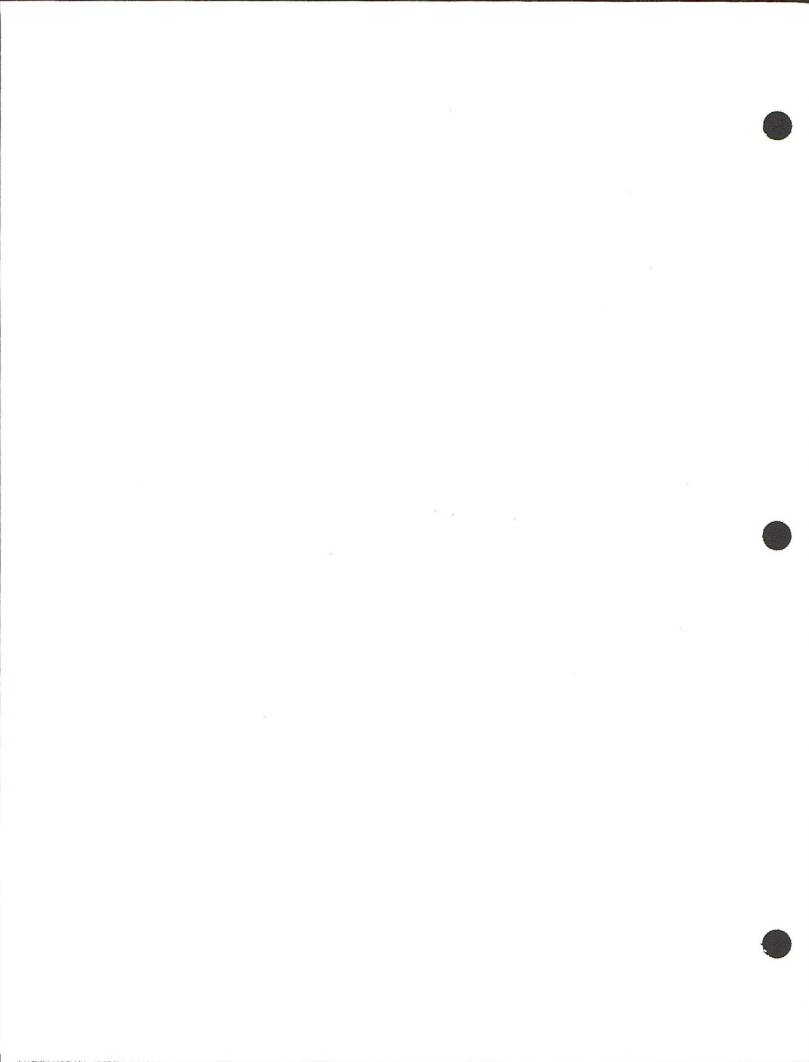
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLECTED IN	NEAR CITY	ANTH. NO.	NO. OF	HABITAT	CONDITIONS	
R. David Bishop	Trin. Wildlife Res.	1001 Hillside Ave.	060-332-6900	06/20/77	U	TH	Marlton	A	HHY 03	I P	GR
W. Bruce Bisset	Palmer Station Project	913-083-4654	06/08	10/26/04	U	SI	Clifton	A	HHY 07	05 H	IV PRY
Walter English	Woodland Park Area	205-425-4202	06/08	03/04/02	U	SI	Florida Harbor	A	HHY 08	04 I P	RD
Rich Kurlita	Biol. Natural Resources	506-705-2351	06/08	07/25/04	U	SI	Transey	A	HHY 09	03 I	NE3 VES
John Stehns	Biological Zoo	500-725-4787	06/08	11/07/02	U	SI	Temagou	A	HHY 04	I	NE3 RD
A.R. Hurnada	Ecology Department	406-505-3747	06/08	03/17/03	U	SI	Hingling	A	HHY 04	04 H	MS
A.R. Hurnada	Ecology Department	406-505-3747	06/08	03/17/03	U	SI	Hingling	A	HHY 04	04 H	MS
A.R. Hurnada	Ecology Department	406-505-3747	06/08	03/17/03	U	SI	Hingling	A	HHY 04	04 H	MS
Salvo Giovanni	Via Caperna 30	0322-910415	06/08	07/17/01	U	SI	Racaludo	A	HHY 03	I	PRY
Salvo Giovanni	Via Caperna 30	0322-910415	06/08	07/17/01	U	SI	Racaludo	A	HHY 03	I	PRY
N.P.D. Irwin	Tha Hoangpida, Editor	304-680-2510	06/08	12/28/04	U	SI	Dalony	A	HHY 07	01 U	PRY
C.R. Hagillo		304-680-2510	06/08	06/08/04	U	SI	Novilla	A	HHY 01	I	PRY
C.R. Hagillo		304-680-2510	06/08	06/08/04	U	SI	Novilla	A	HHY 01	I	PRY
L. Ann Hansen	SCSRA, Learer Quarry	408-429-2466	06/08	05/15/03	U	SI	Harro Bay	A	HHY 03	03 I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	Harro Bay	A	HHY 03	I	NE3 HSD PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	Cashly	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Luis Obispo	A	HHY 02	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	Fort Bragg	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Williams	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Poona	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Luciston	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Diego	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Calisto	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Barroville	A	HHY 01	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	07/17/02	U	SI	San Bishop	A	HHY 01	I	PRY
Kelly Ingram, DVM	Liberty M. Bishop, Fawn	602-598-3500	06/08	10/03/03	U	SI	San Bay	A	HHY 01	I	PRY
Richard E. Fitzner	Ecological Department	715-446-7179	06/08	10/18/74	U	SI	San Bishop	A	HHY 01	I	PRY
E. Fitzner	Ecological Department	715-446-7179	06/08	10/18/74	U	SI	San Bishop	A	HHY 01	I	PRY
Maya Piller	Publ. Serv. Co. M. Bishop	325-648-0411	06/08	06/17/04	U	SI	San Clovis	A	HHY 01	I	PRY
Maya Piller	Publ. Serv. Co. M. Bishop	325-648-0411	06/08	06/17/04	U	SI	San Clovis	A	HHY 01	I	PRY
Patrick L. McLaughlin	Calif. Pop. Fish & Game	707-443-1771	06/08	05/28/05	U	SI	San Agila Creek	A	HHY 01	I	PRY
Daniel Sanchez	Calif. Pop. Fish & Game	213-518-1702	06/08	07/23/05	U	SI	San Avalon	A	HHY 03	I	PRY
Brian J. Walton	Calif. Pop. Fish & Game	408-429-2466	06/08	06/02/05	U	SI	San Nueva Bay	A	HHY 03	I	PRY
Brian J. Walton	SCSRA, Learer Quarry	408-429-2466	06/08	06/02/05	U	SI	San Corte Madura	A	HHY 03	I	PRY
Daniel Sanchez	Catalina Community	213-518-1702	06/08	04/07/05	U	SI	San Avalon	A	HHY 03	I	PRY
Peter M. Stelach		1743 Cedar St.	Berkeley, CA 94703						HHY 01	I	NE3
Peter M. Stelach		1743 Cedar St.	Berkeley, CA 94703						HHY 01	I	NE3
Joseph B. Stencus	University of California	Dept. of Radiology	Berkeley, CA 94616						HHY 03	I	PRY

BIRDS COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	CHICKEN INJURY	H	RECOVERY-NOTE	PHONE	L	LIVE BIRD INJURY	R R	RECOVERED/INJURY'S NAME	PHONE	COMMENTS
V X X			Y Univ. Tenn. Vet. School	615-546-6892	Y	HEB EYE DIE	Y B	Knoxville Zool. Park	X	Abandon ground left eye. Raptured liver & gall bladder.
V X X			X X	X	Y	DND	Y U	Mr. Moore Hays	513-283-4294	May still be released. Broken coracoid.
V X X			X X	X	Y	NDR	Y	Woodland Park Zoo	286-625-5482	Released 02/16/63. No scars. Probable myxomatosis.
V Y BGR			H X	X	X	X	X X X	X	X	Eye witness. Band 399-17870. Sent to H&L.
V X X			X X	X	Y	DND	Y C	Humphreys Zoo Rehab. Ctr.	501-725-4787	Unsuccessful release 10/63. Now in breeding chadon.
V X X			X X	X	Y	DND EUT DIE	H X X	X	X	Euthanized.
V X X			X X	X	Y	DND EUT	H X X	X	X	Euthanized. Eye witness.
V X X			H X	X	Y	DND EUT	H X X	X	X	Euthanized.
V Y BGR			H X	X	X	X	X X X	X	X	Found dead under line.
V Y BGR			H X	X	X	X	X X X	X	X	Found dead under line.
H X X			X X	X	Y	GRH	U X X	X	X	Bird entangled in wires. Fate unknown.
V X X			Y Dr. Susan Wells	504-665-4418	Y	DND EUT DIE	H X X	X	X	Died 12/04/64. Band 597-76381.
V X X			Y Dr. Susan Wells	504-665-4418	Y	DND BDM DIE	H X X	X	X	Died at New Orleans Wild Bird Rehab. Center. Not much info.
H X X			X X	X	X	X	X X X	X	X	Eye witness. Bird hit line, flinched & flattered, but flew on.
V X X			X X	X	Y	BGR PLU WTP	Y H	Alice. Lindsay Jr. Museum	8. Boyce	Power wing tip circ. Many wires in urban area.
V H BGR INT			H X	H	X	X	X X X	X	X	Found dying under line in river bottom. Band 327-53538.
V X X			X X	X	Y	DND	Y H	Gail Haylor	488-429-2466	Bones set, bird flown, now in breeding project.
V X X			X X	X	Y	BGR PLU INT HED DIE	Y H	Dr. James Rausch	X	Found below wire, near house. Band 591-55527
V X X			X X	X	Y	DND DIE INT	Y H	U.C. Davis.	X	Found below wire. Bird during wing repair operation.
V Y INT			H X	X	X	X	H X X	X	X	Band return. Band 597-63382.
V X X			X X	X	Y	DND WTP DIE	Y H	Brian J. Walton	488-429-2466	Infection. Bird in truck. Band 616-42518. Fence? Tar? 877
V X X			X X	X	Y	DND EUT	Y H	San Diego Zoo	X	Found in street below utility line.
V X X			X X	X	Y	DND BGR HED DIE	V H	X	X	Bird on way to vet. Found holes 1 line in chaparral.
V X X			H X	X	Y	DND	Y H	SCPHS	X	Still captive. Telephone or distribution line?
V Y BGR			H X	X	X	X	X X X	X	X	Pursued by trained Bpr. Bird at scene. Lt. some visibility?
U X X			X X	X	Y	DND	U U	Kathy Ingram, DSN	682-930-3338	Found below line along road. Last page missing.
V H BGR			H X	X	X	X	X X X	X	X	Hanging by neck at midspan.
V H BGR			H X	X	X	X	X X X	X	X	Hanging by neck at midspan.
H X X			X X	X	Y	GRH	Y V	Jornish Johnson	X	Hit 345k line adj. to 230k and dist. lines. Found midspan.
H X X			X X	X	X	X	X X X	X	X	Struck wire on 345k line, but not injured. Euthanized.
H X X			X X	X	Y	DND EUT	Y D	Remholdt M/L Care Center	X	Now phone line 46 m.l. Picked at wing. Euthanized.
H X X			X X	X	H	DND	X X X	X	X	Kicked bird. Hit wire upon landing. No injury.
V X X			X X	X	Y	DND RGP WTP	Y H	Brian Walton	488-429-2466	Band 597-77238. Chasing prey in mudflat. Found below wire.
V X X			X X	X	Y	BGR BGR HED DIE	Y H	Brian J. Walton	488-429-2466	Died at vet. Born Spring 1964. Found under line. Had 1/24.
Y Y PLU BGR INT			Y Natl. M/L Health Lab.	X	X	X	X X X	X	X	Euthanized strikes then electrocuted. Foggy. Band 629-69588.
Y H BGR INT			X X	X	X	X	X X X	X	X	Courtsip. Fatal grappling. Collapses then electrocution.
Y H BGR INT			H X	X	X	X	X X X	X	X	Courtsip. Fatal grappling. Collapses then electrocution.
Y Y BGR INT			H X	X	X	X	X X X	X	X	Euthanized. Bird blown into wires & electrocuted.

APPENDIX 6:

Raw Data--Peregrine Falcons (N = 24)



WFOUR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

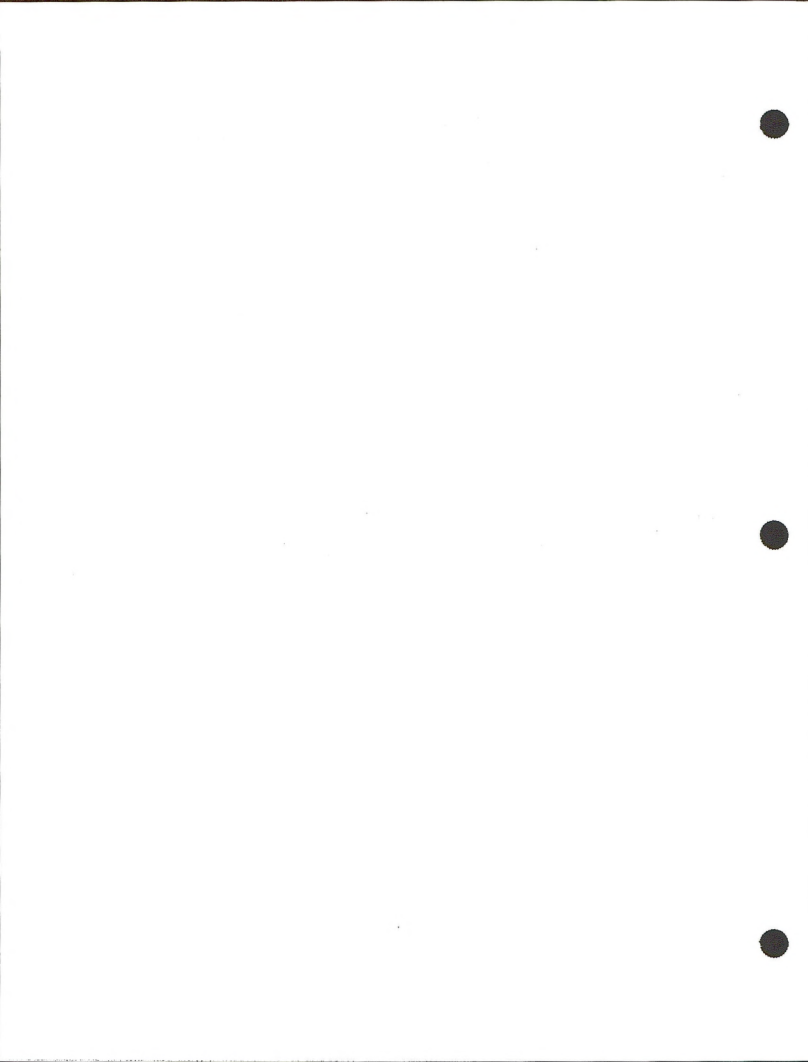
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLATE N BY	HEAR CITY	ANTHL BUCD ISOHRY CONDITIONS
Endangered Species Unit	Wildlife Resources Cont.		Beiner, NY 12854	510-439-7635	FAPER 05/02/77	U NY Byron	ANHYU X X X UK
M. Brown	123 Brown Street	Heidelberg, Victoria	3604 Australia		FAPER 01/04/76	M BU Lorne	ANHYU X X X TER VEB
S. Hunt Carnie	M. Anur. Falconers' Ass.	P.O. Box 67	3604 Australia	505-757-6572	FAPER 12/77/70	M BU Romanil	ANHYU 02 X X PVY
Jack Halvie	U.S. Fish & Wildl. Serv.	308 N.E. Maltmouth St.	Portland, OR 97209	503-231-2231	FAPER 11/77/75	M BU Willom	ANHYU 04 X X PVY AGD RGD
David B. Hahner	Royal Soc. Prot. Birds	64 Borehamda, Bampton	Pewith EN10 2HU, Ombria, UK		FAPER 05/30/01	M BU Shep	ANHYU 02 X X PVY
Steve Dorn	Calif. Regl Fish & Game	625 Pacific Ave.	Willom, CA 95928	516-534-2304	FAPER 07/01/04	M BU Orind	ANHYU 03 X X PVY
Anne Marie Tappan		1019 Oulardale	Baton Rouge, LA 70808	504-344-8235	FAPER 11/13/02	M LA Belar	ANHYU X X X RGD
C.A. Aguillo		4913 Greyfoss Ave.	Metairie, LA 70005	504-850-5510	FAPER 12/02/04	M LA Laville	ANHYU X X X RGD
C.A. Aguillo		4913 Greyfoss Ave.	Metairie, LA 70005	504-850-5510	FAPER 10/03/04	M U N	ANHYU X X X RGD
B. Lee Salmon	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA	408-429-2466	FAPER 06/15/63	M CA Harro Bay	ANHYU 03 X X TER PVY NED
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 77/77/77	M CA Harro Bay	ANHYU X X X RGD AGD UNO PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 59/77/70	M CA Dushy	ANHYU X X X PVY RIV
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 78/77/02	M CA San Luis Obispo	ANHYU 02 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 10/77/02	M CA Fort Bragg	ANHYU 01 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 78/77/02	M CA Willom	ANHYU 01 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 78/77/04	M CA Panama	ANHYU 01 X X RESIDENTIAL, AER
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 09/77/02	M CA Louisiana	ANHYU X X X RGD
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 77/77/02	M CA San Diego	ANHYU X X X RGD
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 78/77/01	M CA Calistoga	ANHYU 06 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 11/77/77	M CA Asheville	ANHYU X X X RGD
Patrick L. McLaughlin	Calif. Regl. Fish & Game	619 2nd Street	Arcata, CA 95521	707 443-4771	FAPER 05/08/65	M CA Maple Creek	ANHYU 02 X X PVY
David Barclon	Insk. for Wildl. Studies	P.O. Box 127	Arcata, CA 95521	213-510-1702	FAPER 07/29/65	M CA Arcion	ANHYU 03 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 06/02/65	M CA Harro Bay	ANHYU 03 X X PVY
Brian J. Walton	SOPHIS, Lower Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	FAPER 06/02/65	M CA Corto Madara	ANHYU 03 X X PVY

REPORT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	CHARGES	INJURY	R	RECOVERY--HOW	PHONE	L. LINE	BIRD	INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
Y X X			X X		X	Y	JUN BIR	ENT	Y H Dr. Ed Becker		518-456-6251	Found under power line. Euthanized 6/8/77.
Y X X			X X		X	Y	REX BIRD	EYE	Y C Penny Olson		862-383 393	Eyes closed. Now in captive breeding project. Banded
X X X			X X		X	Y	SUN		X X X		X	No injury. Flies at quarry 24 hrs later.
Y Y BIR BIR			X X		X	X X			X X X		X	Picked up near line near road. Maybe sent to Putnam.
Y X X			X X		X	Y	BIR	BIRD	Y D David G. Walker		X	Found within 3 hours. Bird in captivity.
Y X X			X X		X	Y	BIR PLJ	WING-TIP	Y C C Davis		U	Wingtip removed. Was at Santa Cruz. Band 507-55958.
X X X			X X		X	Y	BIR PLJ		Y Y Anna Tappan		504-866-4418	Also abrasions on head.
Y X X			X X		X	Y	BIR SHW	BIRD	N H X		X	Died 12/6/84. Band 507-78283.
Y X X			X X		X	Y	BIR SHW	BIRD	N H X		X	Died at San Bruno Wild Bird Rehab. Center. Not much info.
X X X			X X		X	X X			X X X		X	Eyes closed. Bird hit line, flinched & fluttered, but flew on
Y X X			X X		X	Y	BIR WING-TIP	PLJ	Y H Alex. Lindsay Jr. Mason		G. Hogan	Poor wing tip circ. May stress in urban area.
Y H BIR BLEED FR MOUTH			X X		X	X X			X X X		X	Found dying under line in river bottom. Band 507-58256.
Y X X			X X		X	Y	BIR WING		Y H Gail Kaylor		460-429-2466	Bones out, bird flown, was in breeding project.
Y X X			X X		X	Y	BIR PLJ	JUN HED BIRD	Y H Dr. James Rousch			Found below wire, near house. Band 507-55327
Y X X			X X		X	Y	BIR SEVERE	BIRD JUN	Y H L.C. Davis		X	Found below wire. Bird during wing repair operation.
Y Y BLEEDING FROM MOUTH			X X		X	N X			N H X		X	Band return. Band 507-65392.
Y X X			X X		X	Y	BIR WING-TIP	BIRD	Y H Brian J. Walton		460-429-2466	Infection. Bird in treatment. Band 816-49510. Fences? Yes??
Y X X			X X		X	Y	BIR BIRD		Y H San Diego Zoo		X	Found in street below utility line.
Y X X			X X		X	Y	BIR BIR	BIRD	Y H X		X	Bird on way to vet. Found below 1 line in chaparral.
Y X X			X X		X	Y	BIR		Y H SCORP			Bird captive. (telephone or distribution line?)
Y X X			X X		X	Y	BIR ENT		Y D Harold's W/L Care Center			Was phone line 16 on 1. Picked at wing. Euthanized.
X X X			X X		X	N	HOME		X X X		X	Kicked bird. Hit wire upon landing. No injury.
Y X X			X X		X	Y	BIR ASP		Y H Brian Walton		460-429-2466	Band 507-77220. Chasing prey in midair. Found below wire.
Y X X			X X		X	Y	BIR BIR	BIRD	Y H Brian J. Walton		460-429-2466	Bird at vet. Burn Spring 1954. Found under line. Buffalo.

APPENDIX 7:

Raw Data--Bald Eagles (N = 15)



ROTOR 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	AN TNL ON CD	WARRANT CONDITIONS
Allen R. Ansell	Idaho Power Company	1220 Idaho Street	Boise, ID 83705	288-383-2729	NHLEU 05/01/61 U 10 Boise		AN NY D 03 I P	REV PRT7
Robert R. Sigoli	Cleveland Res. Nat. Hist	Udco Oval Drive	Cleveland, OH 44106	216-231-4600	NHLEU 7/77/65 U IL D		SN NY D 03 I P	REV PRT7
Mark L. Blackburn	Northwoods Wildl. Cont.	Highway 70 West	Ninocqua, WI 54548	715-356-7460	NHLEU 07/01/64 U MI Washhold		SN NY D 02 I X	VEB RES ROD
Carroll Henderson	Winn. Dep. Natural Res.	640 119th Lane, N.E.	Blaine, MN 55434	612-296-3344	NHLEU 03/30/74 U MN Washhold		AN NY D 04 I P	REV PRT7
Edward P. DeVries	U.S. Fish & Wildl. Serv.	Post Office Building	Savanna, IL 61074	815-273-2732	NHLEU 01/30/63 U IL Salena		AN NY D 03 I X	VEB RES ROD
Thomas D'Neil	Montana Power Company	48 East Broadway	Butte, MT 59701	406-723-5421	NHLEU 04/07/63 U MT Judith Gap		AN NY D 03 I X	VEB RES ROD
Ken H. Harrington	U.S. Fish & Wildl. Serv.	P.O. Box 1910	Klamath Falls, OR 97601	503-883-6960	NHLEU 03/19/61 U OR Bairy		AN NY D 03 I P	REV PRT7
H.V. Harr	Washington Dep. of Game	Rte. 1, Box 65-8	Bremerton, WA 98012	360-469-2835	NHLEU 01/77/61 U WA Bremerton		AN NY D 03 I P	REV PRT7
H.V. Harr	Washington Dep. of Game	Rte. 1, Box 65-8	Bremerton, WA 98012	360-469-2835	NHLEU 03/17/64 U WA Carlton		AN NY D 03 I P	REV PRT7
Walter English	Woodland Park Zoo	3500 Phinney Ave. North	Seattle, WA 98103	206-625-5402	NHLEU 03/04/62 U WA Friday Harbor		AN NY D 03 I P	REV PRT7
Dick Arvilla	Dept. Natural Resources	P.O. Box 425	Essexville, NJ 45629	364-766-2351	NHLEU 07/25/64 U MI Treasury		AN NY D 03 I P	REV PRT7
John Stehns	Nashville Zoo	2809 Gallaway	Nashville, TN 38112	901-726-4787	NHLEU 11/07/62 U TN Madison		AN NY D 03 I X	VEB RES ROD
R.R. Harwata	Biology Department	Montana State University	Bozeman, MT 59717	406-585-3747	NHLEU 03/77/63 U MT Ringling		AN NY D 04 I X	VEB RES ROD
R.R. Harwata	Biology Department	Montana State University	Bozeman, MT 59717	406-585-3747	NHLEU 03/77/63 U MT Townsend		AN NY D 04 I X	VEB RES ROD
David Harcelton	Calafia Conservancy	Box 2739	Avon, CA 95704	213-510-1702	NHLEU 04/07/65 Y CA Avon		AN NY D 03 I P	REV PRT7

APTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1960

F C	CHARGES INJURY	N	RECOVERY-NAME	PHONE	L	LIVE BIRD INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
Y Y U		X X		X	X X		X X X		X	Very incomplete. Call Rich Howard.
Y X X		X X		X	Y B U		Y C Harvey Webster	U	X	Broke both wings. Now breeding in captivity.
N X X		X X		X	Y B U E X R		Y V Mark L. Blackbourn	715-336-7408	X	Returned to nest area. Flies very strongly. Band 629-14828.
Y X X		X	WHL Health Lab??	X	X X		X X X		X	Could have been hit by a car. No apparent injuries.
Y X X		X X		X	Y B U D I E N		H X X		X	Died after several hours. Compound wing fracture.
Y X X		X X		X	Y B U G P		Y N Dr. Jordan	465-228-4129	X	Found holes power line. Wing was amputated.
Y Y L E Y N E L E		Y	WHL. WHL Health Lab.	629-252-5422	X X		X X X		X	Possible strike & then electrocution. WHL No. PG 63768.
Y Y B U		Y	Conover Museum, MBI		X X		X X X		X	Blood hemorrhage around each vertebra.
Y N B U Y N O O D I E		N X		X	X X		X X X		X	Bird suspended from wire at midspan.
N X X		X X		X	Y M R E		Y V Woodland Park Zoo	285-625-5462	X	Released 02/15/63. No horns. Probable oculitis.
Y Y B U K		N X		X	X X		X X X		X	Eye witness. Band 599-17670. Back to WHL.
Y X X		X X		X	Y B U		Y C Nauphia Zoo Rehab. Ctr.	581-725-4787	X	Unsuccessful release 10/63. Was in breeding chamber.
Y X X		X X		X	Y B U		N X X		X	Euthanized. Eye witness.
Y X X		N X		X	Y B U		N X X		X	Euthanized.
Y Y P L U B U R		Y	WHL. WHL Health Lab.		X X		X X X		X	Extensive strike than electrocution. Foggy. Band 629-08956.

APPENDIX 8:

Raw Data--Golden Eagles (N = 9)



WUPR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

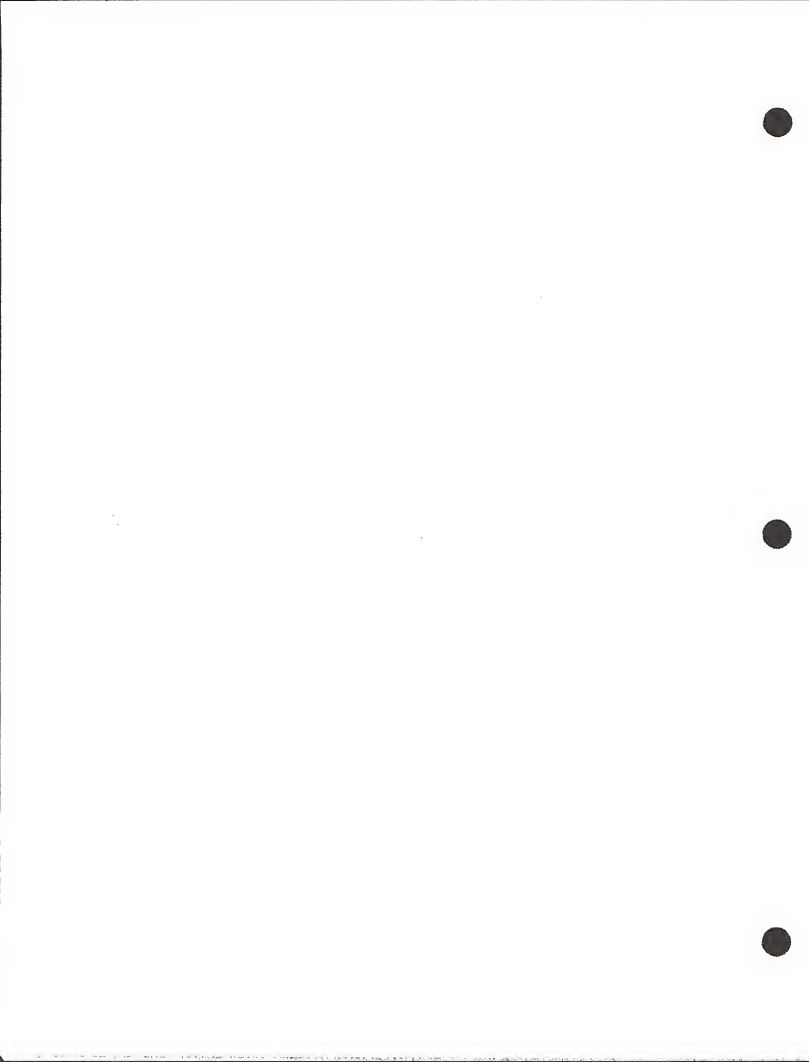
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLDATE	W ST	NEAR CITY	A	T	H	L	O	C	D	W	U	L	T	CONDITION
Jay Bowman	Nature Center		Duriver, OR 97702	503-293-1281	ACCN	06/77/76	U	02	Survivor										A H N Y D 02 I P SV RES
Lois L. Layton	Marie Robison Society	P.O. Box 2851	Casper, WY 82502	307-472-7669	ACCN	11/07/68	U	WY	Survivor										U H N U I I I I
Allen R. Annell	Idaho Power Company	1220 Idaho Street	Boise, ID 83707	200-363-2729	ACCN	12/26/72	U	ID	Jafferson County										A H N Y D 02 I P DOK
Michael M. Perkins	U.S. Bur. of Land Mgmt.	Sher Rte. 5, Box 1	Ely, NV 89301	702-209-1865	ACCN	04/17/83	Y	NV	Fordha										0 H N Y T 02 N I PWT
Michael M. Rechart	U.S. Bur. Land Mgmt.	3548 Development Ave.	Boise, ID 83705	200-334-9279	ACCN	03/05/71	U	ID	Arco										0 H N Y D U I U DOK
Michael M. Rechart	U.S. Bur. Land Mgmt.	3548 Development Ave.	Boise, ID 83705	200-334-9279	ACCN	04/02/71	U	ID	Brandsview										0 H N Y D 02 I P PWT
Mr. Kewen Weigel	Private Raptor Project	Rte. 1, Box 199	Tussock, MS 67454	913-283-4091	ACCN	10/26/84	N	KS	Clifton										0 H N Y T 02 N I SV PWT
R. R. Hornata	Biology Department	Montana State University	Bozeman, MT 59717	406-286-3747	ACCN	03/77/83	U	MT	Ringling										0 H N Y T 04 N I RES
Brian J. Walton	SDP&D, Leawr Quarry	University of California	Santa Cruz, CA 95064	408-429-2466	ACCN	02/77/80	Y	CA	Bishop										A H N Y T 05 N I SQUAD

DUFOUR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	DUPONT'S IDENTITY	N	REMARKS--NONE	PHONE	L	LIVE BIRD MAJOR	R R	RECORD/INQUIRY'S NAME	PHONE	COMMENTS
Y X X		X X		X	Y BUD			Y C Durrive Nature Center	503-593-1021	Picked up 1 m after collision. Unable to fly after rehab.
Y X X		X X		X	Y BUD			Y C X	X	Wing broken at shoulder. Banded at 11. Found near line.
U X X		X X		X	X X			X X X	X	Called Rasmil and Howard. No further data.
Y Y BUD OLD MAN		X X		X	X X			X X X	X	Picked up under line after wind storm.
Y Y BUD DUT		Y Michael H. Neckert		208-334-9279	X X			X X X	X	Found 15 m out from the line.
Y Y BUD		Y Michael H. Neckert		208-334-9279	X X			X X X	X	No signs of burn marks.
Y X X		X X		X	Y BUD (EXHIBITION)			Y U Mr. Nure Waigel	913-283-4894	Key still to released. Broken caracoid.
Y X X		X X		X	Y BUD (EXHIBITION)			X X X	X	Exhausted.
Y Y BUD-SEVERE?		X X		X	X X			X X X	X	Perched by trained fly. Bird at same. Lt. mass visibility?

APPENDIX 9:

Raw Data--Ospreys (N = 7)



OPTION COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1963

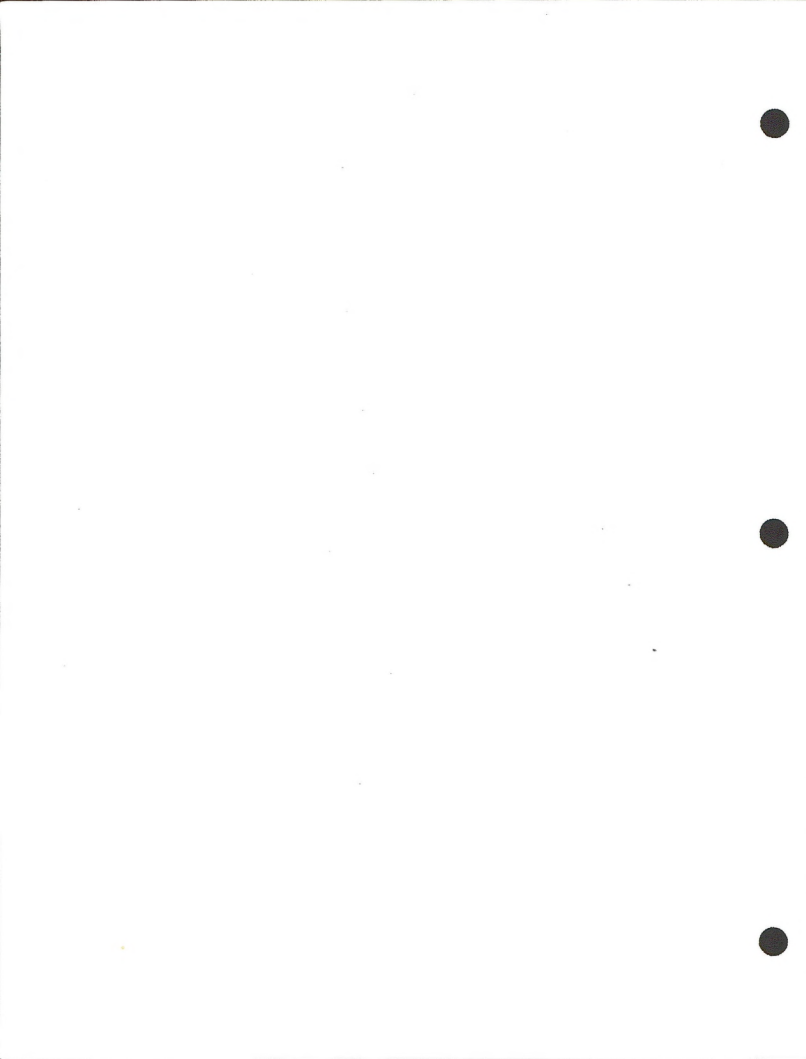
CONTRIBUTOR'S NAME	CONTRIBUTOR'S DIST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC.	COLLDATE	W ST	NEAR CITY	A N T N L O N C D	HABITAT	CONDITIONS
Endangered Species Unit	Wildlife Resources Dist.		Belmar, NY 12854	518-439-7635	POBL	09/12/61	U NY	Celadonhill	U N N Y U I I I U N		
Lloyd Isley	U.S. Army Corps Engin.	Rte. 4, Box 182	Salliams, OH 74935	518-775-4475	POBL	77/77/81	U OH	Salliams	U N N Y T O A N I U N		
Louis E. Clark		1114 Homosville Rd.	S O Tallahassee, FL 32383	904-222-2738	POBL	07/05/73	N FL	Miami	U N N Y T 63 N I P A Y T O D L I O		
Michael R. Perkins	U.S. Dep. of Land Mgmt.	Star Rte. 5, Box 1	Ely, NY 63381	702-269-4625	POBL	04/17/63	Y NY	Eureka	U N N Y T 65 N I P A Y T		
Shurt Mitchell	The House	Con Road	Portland, CT 61488	203-342-2998	POBL	10/05/64	N CT	East Haddam	U N N Y T 65 N I V E D R I V U N D R O D		
R. David Bishop	form. Wildlife Res.			800-332-9588	POBL	09/30/77	U TN	Harristown	U N N Y D 63 I P O V E R W A T E R		
Kathy Ingram, BGI	Liberty M. Babak. Found.	11825 N. 76th Street	Scottsdale, AZ 85254	602-958-2559	POBL	10/03/83	N AZ	Duchayo	U N N Y D 66 I P A D		

ROPER COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1963

F C	ORIGINS	UNARY	N	NEUROLOGY--NOVE	PHASE	L	LIVE BIRD	UNARY	R R	REHABILITATION'S NOVE	PHASE	COMMENTS
Y X X			X X		X	Y	RED BIRD		Y	B Dr. Ed Becker	518-455-6851	Bird sight of recovery. Broken humerus.
Y Y B D			X X		X	X			X	X X	1	Blue town, grey wire, Y-line all present. Almost recovered.
X X X			X X		X	X	RED		X	X X	1	Examination. Blended for 3 min. Flies off on its own.
Y Y B D B D			X X		X	X			X	X X	1	Picked up under line after wind storm.
Y X X			X X		X	Y	RED		Y	C Stuart Mitchell	283-342-2572	Infinite calluses. River crossing. Compound wing fractures.
Y X X			Y Univ. Tenn. Vet. School	613-545-6692	Y	WY	RED BIRD		Y	B Knoxville Zool. Park	1	Stricken around left eye. Raptured liver & gall bladder.
U X X			X X		X	Y	RED (XING/CHILD)		U	U Holly Ingram, BWH	602-928-3550	Found twice line along road. Last page missing.

APPENDIX 10:

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



AVION COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

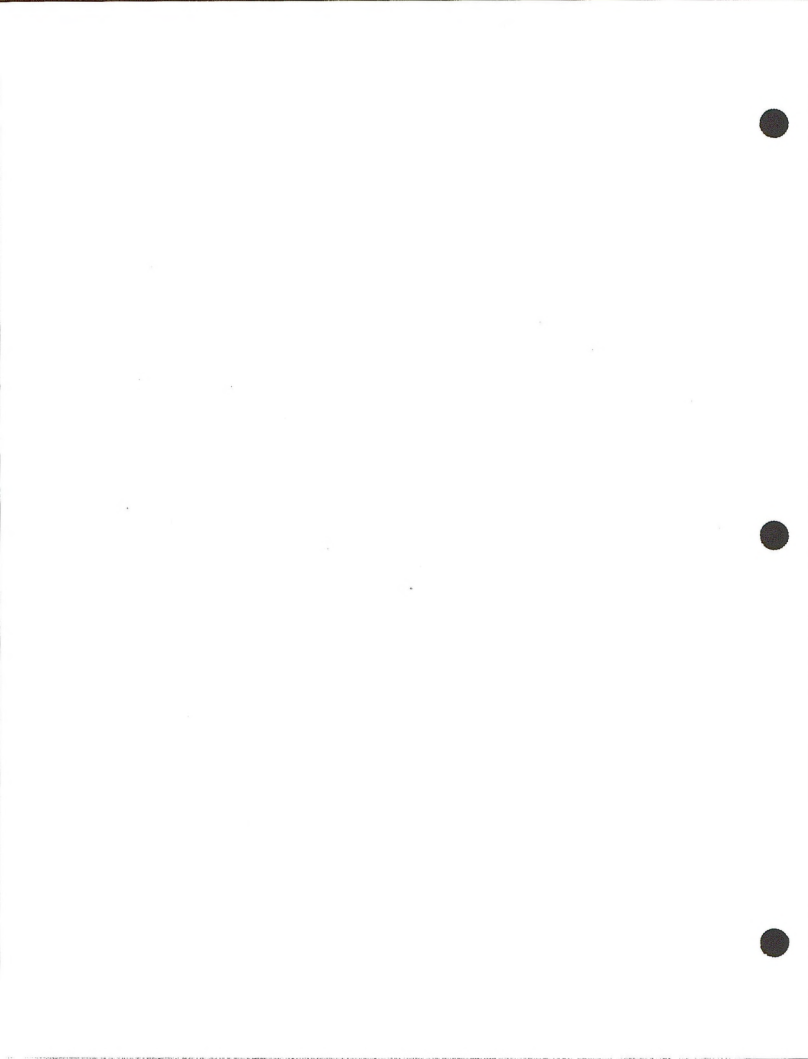
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INDIC.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLDATE W BY	NEAR CITY	ANAL ON CD INSTANT CONDITIONS
E. Stuart Mitchell		Coat Road	Portland, CT 06480	203-342-8550	01/01/76	U CT Colchester	ANN Y 03 N H PYT
Dr. Harry Johnson		Box 286	Eston, KS 66541	913-723-4825	01/01/76	U KS Haskala	ANN Y P 05 X I PAY RD
Paul T. Schnell		6763 Rinsick Rd, Box 102	Lockport, NY 14094	716-433-2696	01/01/76	U NY Lockport	SD N Y T 04 N H S 000Y-LINES
Charles A. Norvell			Willington	901-676-5201	01/01/76	U NH Willington	ANN Y P 04 X I VES? SIA
Peter H. Blatch		1743 Cedar St.	Barkley, CA 94703	415-642-8829	01/01/76	U CA Barkley	ANN Y T U N H NES?
Peter H. Blatch		1743 Cedar St.	Barkley, CA 94703	415-642-6629	01/01/76	U CA Barkley	ANN Y T U N H NES?
Joseph P. Sharpe		University of California Dept. of Radiology	Berke, CA 95616	916-752-4745	01/01/76	Y CA Davis	SD N Y D 03 I P R

REPORT COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	CHUCKER INJURY	H	NECROPSY--NONE	PHASE	L	LIVE BIRD INJURY	H R	REGULATOR'S NAME	PHASE	COMMENTS
H X 1		X X		X	Y 800		Y V E. Stuart Mitchell	283-342-2728	Picked up under line soon after impact. Released 01/08/77.	
H X 1		X X		X	Y 800		Y V Dr. Harry Johnson	913-725-4635	Released in Nov., 1962. Found along road under lines	
H X 1		X X		X	Y 800		Y V Paul T. Schnell	716-433-2536	Eysmitron. Young bird. Replaced in nest after 24 hrs.	
Y V 804 FLB		X X		X	X X		X X X	X	Line taken horizon. Bright sun.	
Y V 827		X X		X	X X		X X X	X	Courship. Taken grappling. Collision then electrocution.	
Y V 840		X X		X	X X		X X X	X	Courship. Taken grappling. Collision then electrocution.	
Y V 840 NO TAGGER		X X		X	X X		X X X	X	Eysmitron. Bird blown into wires & electrocuted.	

APPENDIX 11:

Raw Data--All Falcons (N = 32)



RAPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

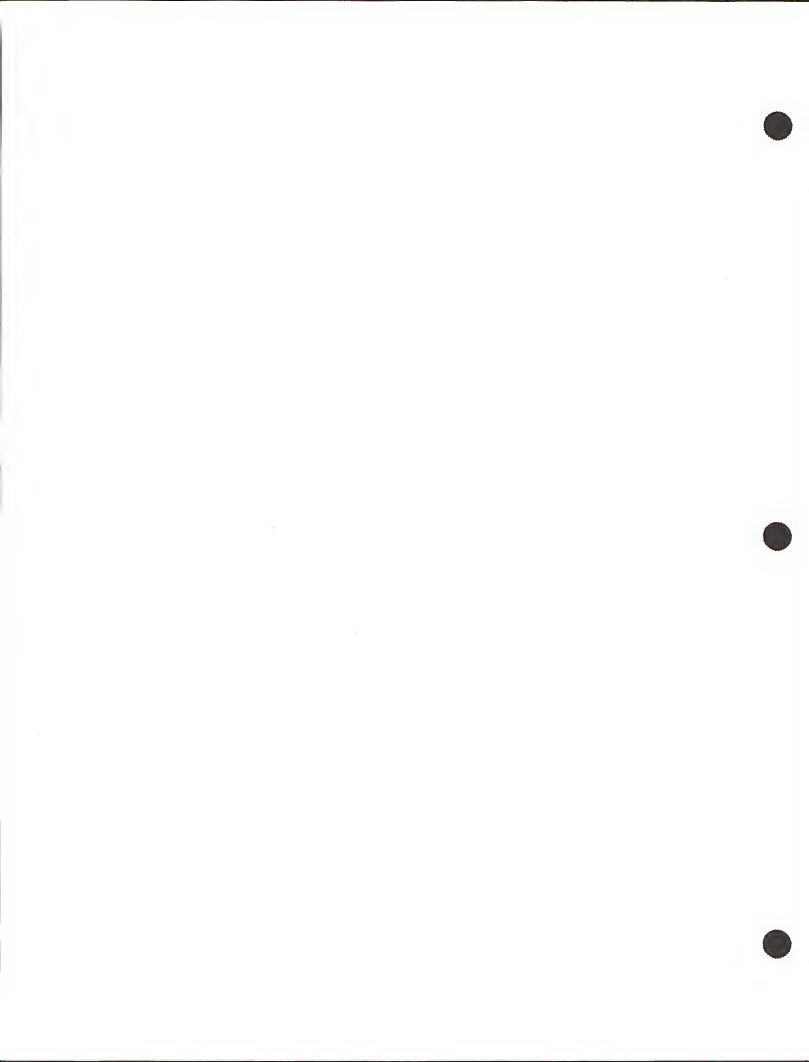
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLABOR. U ST	NEAR CITY	ANTHL ON CD	WINDY CONDITIONS
Endangered Species Unit	Wildlife Resources Cent.	Wildelberg, Victoria	Belmar, NY 12854	510-439-7635	FAPER 05/02/77	W NY Byron	A N H Y U 1	X I WAD
H. Bren	123 Brown Street		3804 Australia		FAPER 01/04/76	U AU Lerne	S N H Y U 1	X I TER NEB
S. Kent Carnie	M. Amer. Falconers' Ass.	P.O. Box 67	Glacieta, NM 87535	505-757-6672	FAPER 12/17/70	U NM Russell	A N H Y U 02	X I A PY
Jack Helvie	U.S. Fish & Wildl. Serv.	500 N.E. Mallonah St.	Portland, OR 97209	503-231-2213	FAPER 01/17/75	U OR Cannon	U N H Y U 04	X I P PY NEB RD
Lois L. Layton	Marie Robison Society	P.O. Box 2051	Casper, WY 82402	307-472-7009	FACEL 01/19/01	U WY Casper	U N H Y U 1	X I LAK
Lois L. Layton	Marie Robison Society	P.O. Box 2051	Casper, WY 82402	307-472-7009	FACEL 05/05/01	U WY Sinclair	U N H Y U 1	X I P PY
David B. Walker	Royal Soc. Prot. Birds	64 Burdett, Bampton	Powrth CM10 254, Cumbria, UK		FAPER 06/20/01	U UK Shop	S N H Y U 02	X I P HES
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 02/17/75	U SK Saskatoon	S N H Y U 1	X I LUD
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 11/17/01	U SK Saskatoon	D R Y Y U 1	X I MOK
Lynn Oliphant	Univ. of Saskatchewan		Saskatoon, Sask. S7N 0W0	306-343-5705	FACEL 00/17/72	U SK Saskatoon	S Y Y P 10	X I LAK
Steve Dunn	Calif. Rept. Fish & Game	625 Pacific Ave.	Willson, CA 95508	916-234-2304	FAPER 07/01/04	U CA Orland	S N H Y U 03	X I P RD
Rosemary McCall	Australasian Raptor Ass.	18 Hassett St., U. Corner,	Canberra, Act 2601, Australia		FACEL 01/23/79	U AU Canberra	A N H Y P 05	X I X NEB GEN PWT
Rose Marie Tappan		1019 Ockerdale	Baton Rouge, LA 70803	504-344-0235	FAPER 11/13/02	U LA Buler	D N H Y U 1	X I LUD
Salvo Giovanni	Via Capura 50	95030 Roccaluto	Ugriponol Sicily	0932-941045	FACEL 00/17/01	U SI Roccaluto	A N H Y D 03	X I D PWT
Salvo Giovanni	Via Capura 50	95030 Roccaluto	Ugriponol Sicily	0932-941045	FACEL 03/17/74	U SI Roccaluto	D N H Y D 03	X I D PWT
C.A. Scullion		4313 Brydfous Ave.	Metairie, LA 70006	504-888-5510	FAPER 12/02/04	U LA Louisville	A N H Y U 1	X I I
C.A. Scullion		4313 Brydfous Ave.	Metairie, LA 70006	504-888-5510	FAPER 10/03/04	U W U	D R H Y U 1	X I I
D. Lee Nelson	SEPM, Lessor Quarry	University of California Santa Cruz, CA		408-429-2466	FAPER 06/15/03	U CA Marro Bay	A N H Y D 03	X I P TER PWT NEB
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 7/17/77	U CA Marro Bay	A N H Y U 1	X I NEB RD LUD PWT
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 09/17/70	U CA Cuddey	S Y Y T H 1	X I PWT RIV
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 10/17/02	U CA San Luis Obispo	S N H Y D 02	X I P LAK
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 10/17/02	U CA Fort Bragg	S Y N Y D 01	X I P LAK
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 10/17/02	U CA Williams	S N H Y D 01	X I P LAK
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 10/17/04	U CA Panama	S Y Y T H 01	X I NEB CENTRAL AREA
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 03/17/02	U CA Los Angeles	A Y H Y U 01	X I RD
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 7/17/02	U CA San Diego	A N H Y U 1	X I LUD RD
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 11/17/01	U CA Calicut	A N H Y T 06	X I RD
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 10/17/01	U CA Berkeley	A N H Y U 01	X I LUD
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 03/08/05	U CA Maple Creek	A N H Y P 02	X I NEB
Patrick L. McLaughlin	Calif. Rept. Fish & Game	619 2nd Street	Eureka, CA 95501	213-810-1702	FAPER 07/29/05	U CA Eureka	S N H Y D 03	X I P LAK
David Barcelona	Inst. for Wildl. Studies	P.O. Box 127	Arcata, CA 95521	408-429-2466	FAPER 00/02/05	U CA Marro Bay	S N H Y D 03	X I P PY
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 00/02/05	U CA Marro Bay	S N H Y D 03	X I P PY
Brian J. Walton	SEPM, Lessor Quarry	University of California Santa Cruz, CA 95064		408-429-2466	FAPER 00/02/05	U CA Marro Bay	S N H Y D 03	X I P PY

WAPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1965

F C	CROSS INJURY	N	NECKPOY-HAVE	PHONE	L	LIVE BIRD INJURY	R R	REHABILITATOR'S NAME	PHONE	COMMENTS
Y X X		X X		X	Y JIM DIM EAT	Y H Dr. Ed Bucher		518-456-6851	Found under power line. Euthanized 08/17/77.	
Y X X		X X		X	Y BEN BAD EYE	Y C Penny Olson		652-383 390	Eysmithson. Now in captive breeding project. Banded	
N X X		X X		X	Y STUN	N X X		X	No injury. Flown at quarry 24 hrs later.	
Y Y BAK BAD		N X		X	X X	X X X		X	Picked up near line near road. Maybe sent to Potomac.	
N X X		X X		X	Y BAK	Y Y Lois L. Layton		387-472-7689	Wing tip and toe fractures. Not an eyemite account.	
Y X X		X X		X	Y BAK	Y C Lois L. Layton		387-472-7689	Wing completely snapped off. Hit line diving on prey?	
Y X X		X X		X	Y BAK DIED	Y D David G. Walker		X	Found within 3 hours. Died in captivity.	
N X X		X X		X	Y BAK BAK	Y Y Lynn Oliphant		385-343-5785	Released after 7 mo. Outspread an breeding adult.	
Y Y BAK		N X		X	X X	X X X		X	Bird recovered by radio-telemetry.	
N X X		X X		X	Y HONE	X X X		X	Falconer's bird. Flies into wires twice when flying to barn.	
Y X X		X X		X	Y BAK PLW WING-TIP	Y C UC Davis		U	Wingtip removed. Now at Santa Cruz. Band 587-55528.	
Y X X		X X		X	Y BAK	Y C Barry Olson		X	Brown wing near shoulder.	
N X X		X X		X	Y BAK PLW	Y Y Anna Tappan		584-655-4418	Also abrasions on head.	
Y Y BAK		N X		X	X X	X X X		X	Found dead under line.	
Y Y BAK		N X		X	X X	X X X		X	Found dead under line.	
Y X X	Y Dr. Susan Wells	X X		584-656-4418	Y BAK JNT DIED	N X X		X	Died 12/04/84. Band 587-76283.	
Y X X	Y Dr. Susan Wells	X X		584-656-4418	Y BAK BAK DIED	N X X		X	Died at New Orleans Wild Bird Rehab. Center. Not such info.	
N X X		X X		X	X X	X X X		X	Eysmithson. Bird hit line, flunked & flattened, but flew on	
Y X X		X X		X	Y BAK WING-TIP PLW	Y H Alex. Lindsay Jr. Houston G. Rojas		X	Four wing tip circ. Many wires in urban area.	
Y B BAK BLEED FN MOUTH		N X		N	X X	X X X		X	Found dying under line in river bottom. Band 587-55528.	
Y X X		X X		X	Y BAK HAZARD?	Y H Gail Taylor		428-429-2465	Bones out, bird flown, now in breeding project.	
Y X X		X X		X	Y BAK PLW JNT HED DIED	Y H Dr. James Ruesch		X	Found below wire, near house. Band 587-55527	
Y X X		X X		X	Y BAK SEVERE! DIED JNT	Y H U.C. Davis.		X	Found below wire. Died during wing repair operation.	
Y Y BLEEDING FROM MOUTH		X X		X	N X	N X X		X	Band return. Band 587-55522.	
Y X X		X X		X	Y BAK WING-TIP DIED	Y H Brian J. Walton		488-429-2466	Infection. Died in treatment. Band 816-45510. Fences? Tor877	
Y X X		X X		X	Y BAK DIED	Y H San Diego Zoo		X	Found in street below utility line.	
Y X X		X X		X	Y BAK BAK SHU DIED	Y H X		X	Died on way to vet. Found below T line in chaparral.	
Y X X		X X		X	Y BAK	Y H BOPARD		X	Still captive. Telephone or distribution line?	
Y X X		X X		X	Y BAK EAT	Y D Humboldt M/L Care Center		X	Now phone line (6 ex.1. Picked at wing. Euthanized.	
N X X		X X		X	N HONE	X X X		X	Hatched bird. Hit wire upon landing. No injury.	
Y X X		X X		X	Y BAK BOP	Y H Brian Walton		488-429-2465	Band 587-77228. Chasing prey in mallard. Found below wire.	
Y X X		X X		X	Y BAK BAK SHU DIED	Y H Brian J. Walton		488-429-2465	Band at vet. Burn Spring 1964. Found under line. Wellfals.	

APPENDIX 12:

Raw Data--All Eagles (N = 24)



NOTICE: COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1985

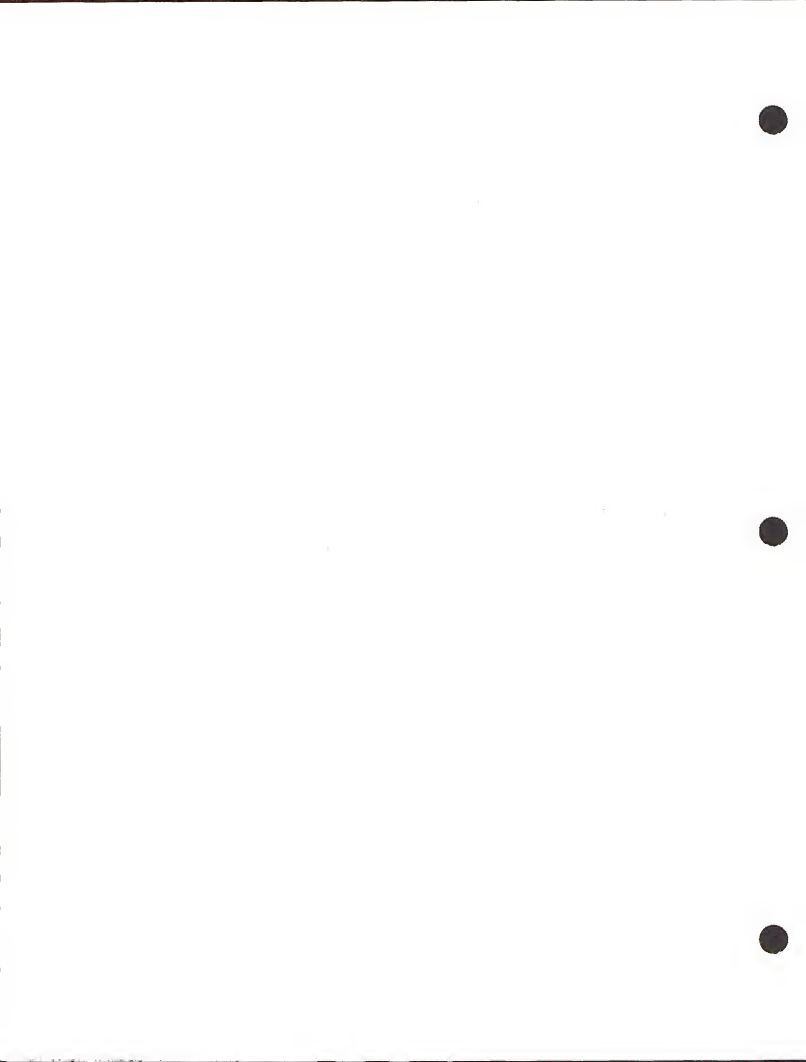
CONTRIBUTOR'S NAME	CONTRIBUTOR'S INST.	CONTRIBUTOR'S STREET	CONTRIBUTOR'S ADDRESS	PHONE	SPEC. COLLATE W RT	NEAR CITY	ANTNL CD CDD	NOTIFY CONDITIONS
Allen R. Russell	Idaho Power Company	1208 Idaho Street	Boise, ID 83705	200-383-2729	NHLEU 05/01/80	U ID Boise	ANHYD 03	IPR PRT
Robert R. Stogdill	Cleveland Bus. Hist. Mst.	Kade Oval Drive	Cleveland, OH 44106	216-231-4680	NHLEU 7/7/76	U IL U	DUHUT 0	UX IAR
Mark L. Blackburn	Northwoods Util. Comd.	Highway 70 West	Hawco, WI 53040	715-355-7400	NHLEU 07/04/84	U WI Milwaukee	DDHNP 02	IXED NEB EDO
Carol Henderson	Nim. Rep. Natural Res.	640 191st Lane, N.E.	Minneapolis, MN 55434	612-296-3394	NHLEU 03/30/74	U MN Minneapolis	ANHYD 04	IPR RSD
Edward P. Sullivan	U.S. Fish & Wildl. Surv.	Post Office Building	Birmingham, AL 35204	615-273-2732	NHLEU 01/20/83	U AL Gadsden	ANHYT 0	UX IAR
Thomas O'Hell	Montana Power Company	40 East Broadway	Butte, MT 59701	406-723-5421	NHLEU 04/07/83	U MT Judith Gap	ANHYT 0	UX IAR
Jay Peterson	Nature Center		Dearborn, MI 48122	503-593-1221	NHLEU 05/17/76	U MI Dearborn	ANHYD 03	IPR RSD
Lola L. Layton	Marine Biological Society	P.O. Box 2051	Casper, WY 82402	307-472-7609	NHLEU 11/07/80	U WY Sheridan	UHHUUT 1	XX I
Rita R. Russell	Idaho Power Company	1208 Idaho Street	Boise, ID 83707	200-383-2729	NHLEU 12/25/72	U ID Jefferson County	ANHYD 03	IPR RSD
Michael H. Perkins	U.S. Bur. of Land Mgt.	Star Ave. 5, Box 1	City, NY 05081	702-203-4625	NHLEU 04/17/83	U NY Esopus	ANHYT 05	IPR PRT
Ron H. Harrington	U.S. Fish & Wildl. Surv.	P.O. Box 1910	Klamath Falls, OR 97601	503-883-4500	NHLEU 03/19/84	U OR Seely	ANHYD 03	IPR RSD
Michael R. Kuchert	U.S. Bur. Land Mgt.	3940 Development Ave.	Boise, ID 83705	200-334-9279	NHLEU 03/05/71	U ID Elko	ANHYD 0	UX IAR
Richard R. Kuchert	U.S. Bur. Land Mgt.	3940 Development Ave.	Boise, ID 83705	200-334-9279	NHLEU 04/02/71	U ID Green River	ANHYD 03	IPR PRT
H.V. Hare	Washington Dep. of Game	Sta. 1, Box 65-0	Brainerd, MN 56412	507-649-2835	NHLEU 01/17/81	U MN Brainerd	ANHYD 03	IPR PRT
H.V. Hare	Washington Dep. of Game	Sta. 1, Box 65-0	Brainerd, MN 56412	507-649-2835	NHLEU 03/17/84	U MN Carlton	ANHYD 03	IPR RSD
Mr. Kiara Meigel	Prairie Dog Project	Sta. 1, Box 159	Tenocott, KS 67404	913-203-4094	NHLEU 08/25/84	U KS Clifton	ANHYT 05	IPR PRT
Melvin English	Woodland Park Zoo	2050 Pennyway Ave. North	Seattle, WA 98103	206-425-5482	NHLEU 03/04/82	U WA Friday Harbor	ANHYD 04	IPR RSD
Dick Gault	Dept. Natural Resources	P.O. Box 495	Escondido, CA 92029	956-706-2351	NHLEU 07/25/84	U CA Escondido	ANHYD 03	IPR RSD
John Gault	Roughie Zoo	2000 Gallows	Memphis, TN 38112	901-726-4787	NHLEU 11/07/82	U TN Memphis	ANHYT 04	IPR RSD
A.R. Harvath	Biology Department	Montana State University	Bozeman, MT 59717	406-556-3747	NHLEU 03/17/83	U MT Ringling	ANHYT 04	IPR RSD
A.R. Harvath	Biology Department	Montana State University	Bozeman, MT 59717	406-556-3747	NHLEU 03/17/83	U MT Ringling	ANHYT 04	IPR RSD
A.R. Harvath	Biology Department	Montana State University	Bozeman, MT 59717	406-556-3747	NHLEU 03/17/83	U MT Ringling	ANHYT 04	IPR RSD
Brian J. Walton	SDPDS, Lower Quarry	University of California	San Diego, CA 92161	602-423-2456	NHLEU 02/17/82	U CA Bishop	ANHYT 05	IPR RSD
David Barntson	Catalina Conservancy	Box 2739	Aspen, CO 80501	213-510-1762	NHLEU 04/07/83	U CO Aspen	ANHYD 03	IPR RSD

ROTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1945

F C	CARRIER NUMBER	N	RECEIVED—NAME	PHONE	L	LIVE BIRD INJURY	N R	REHABILITATOR'S NAME	PHONE	COMMENTS
V V U		X X		X	X X		X X X		X	Very incomplete. Called Rich Howard. No better data.
V X X		X X		X	V BUD		V C Harvey Gubster		U	Broke both wings. Was breeding in captivity.
H X X				X	V BUD BUD		V Y Mark L. Blackburn	715-235-7400		Returned to nest area. Flies away strongly. Band 659-14928.
V V 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 BUD		H X X		X	Blind after several hours. Compound wing fracture.
V X X		X X		X	V BUD BUD		V N Dr. Jordan	465-258-4129		Found broken power line. Wing was amputated.
V X X		X X		X	V BUD		V C Survivor Makers Center	503-593-1023		Picked up 1 hr after collision. Unable to fly after rehab.
V X X		X X		X	V BUD		V C X		X	Wing broken at shoulder. Handed off. Found near line.
U X X		X X		X	X X		X X X		X	Called Howell and Howard. No better data.
V Y BUD BUD BUD		X X		X	X X		X X X		X	Picked up under line after used storm.
V Y LEO TELLE		V Natl. WFL Health Lab.	650-232-0462	X X	X X X		X X X		X	Possible strike & then electrocution. HSR. No. PD 63708.
V Y BUD HW		V Michael H. Hachert	650-334-2879	X X	X X X		X X X		X	Found 15 a cat from the line.
V Y BUD		V Michael H. Hachert	650-334-2879	X X	X X X		X X X		X	No signs of bare wires.
V Y BUD		V Connor Hansen, WFL		X X	X X X		X X X		X	Blind hemorrhage around each vertebrae.
V N BUD BUD BUD		H X		X	X X X		X X X		X	Bird compensated from wire at midspan.
V X X		X X		X	V BUD BUD BUD		V N Mr. Rona Uigol	913-553-4094		Wing still to be released. Broken covered.
H X X		X X		X	V BUD		V Y Woodland Park Zoo	616-625-5462		Released 6/14/43. No scars. Probable amputation.
V Y BUD		H X		X	X X		X X X		X	Eyes edematous. Band 525-17070. Sent to WFL.
V X X		X X		X	V BUD BUD BUD		V C Memphis Zoo Babak. Ctr.	501-726-4767		Unsuccessful release 10/43. Was in breeding chamber.
V X X		X X		X	V BUD BUD BUD		H X X		X	Edematous.
V X X		X X		X	V BUD		H X X		X	Edematous. Eye edematous.
V X X		X X		X	V BUD		H X X		X	Edematous.
V Y BUD-BUD-BUD?		H X		X	X X		X X X		X	Paralyzed by trained Gyr. Blind at exam. L.L. some visibility?
V Y BUD BUD		V Natl. WFL Health Lab.		X X	X X X		X X X		X	Eyes edematous strike then electrocution. Foggy. Band 659-63988.

APPENDIX 13:

Raw Data--All Buteos (N = 11)



RAPTOR COLLISION DATA RECEIVED THROUGH SEPTEMBER 15, 1985

F C	DAMAGE INJURY	N	NECROPSY-HOME	PHONE	L	LIVE BIRD INJURY	R R	REHABILITATOR'S NAME	PAGE	COMMENTS
N X X			X X	X	Y BUD			Y V E. Stuart Mitchell	803-342-2990	Picked up under line soon after impact. Released 61/68/77.
N X X			X X	X	Y BUD			Y V Dr. Harry Johnson	913-723-4825	Released in Nov., 1982. Found along road under line
N X X			X X	X	Y SAM			Y V Paul T. Schnell	716-433-2536	Eymitoma. Young bird. Released in nest after 24 hrs.
Y V GUN PLJ			N X	X	X X			X X X	X	Line below horizon. Bright sun.
N X X			X X	X	N X			X X X	X	Refueling tower, against barrier. Not injured.
U X X			X X	X	X X			X X X	X	Called Schnell and Howard. No better data.
N X X			X X	X	Y SPY			Y V Jeremiah Johnson		Hit 345k line adj. to 220k and dist. lines. Found midspan.
N X X			X X	X	N X			X X X	X	Struck wire on 345k line, but not injured. Eymitoma.
Y V BIR			X X	X	X X			X X X	X	Courship. Taken grappling. Collision then electrocution.
Y V GUN			N X	X	X X			X X X	X	Courship. Taken grappling. Collision then electrocution.
Y V GUN NO TUBING			N X	X	X X			X X X	X	Eymitoma. Bird blown into wires & electrocuted.

USDI - BLM

LOANED

BORROWER

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Olendorf, Richard
Raptor collisions
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Wayne Piliz	Publ. Serv. Co. N. Mex.	Alvarado Square	Albuquerque, NM 87150	505-948-2011	BLJNH 03/77/84	N NM Clovis	A N N Y T 06 N X R D N O W - W E E D P R Y ?
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