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David H. Ellis  
*Brigham Young University*

Dwight G. Smith  
*Brigham Young University*

Joseph R. Murphy  
*Brigham Young University*

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# STUDIES ON RAPTOR MORTALITY IN WESTERN UTAH<sup>1</sup>

David H. Ellis, Dwight G. Smith, and Joseph R. Murphy<sup>2</sup>

In past studies of predatory bird destruction, Hickey (1949) found that 102 of his banded juvenile marsh hawks were shot during their first year of life, while more recently Sprunt (1963) reported that 91 of the 118 Bald Eagles known to have been killed in 1962 had been shot. Although Spofford (1964) and others have called attention to the high raptor mortality caused by illegal predator control programs, and Imler and Kalmbach (1955) have reviewed Bald Eagle destruction in the years of the bounty laws, the extent of mortality caused by indiscriminate shooting is unknown.

In this study we attempted to locate all raptors killed during a two year period in Cedar Valley, Utah County, Utah. The study was centered on a 12.1 mile stretch of gravel road paralleled by single cross bar utility poles which were frequently utilized as perches by predatory birds in the valley. The study area was located within an intermontane valley comprising some 170 square miles, and averaging 4,900 feet in elevation; dominant plants were big sagebrush (*Artemisia tridentata*) and shadscale (*Atriplex confertifolia*). The land is used for dry farming and sheep range, and supports two small settlements. The valley is also a favorite rabbit hunting locality and receives large concentrations of hunters, particularly on winter weekends.

## PROCEDURE

The initial survey of the study road took place on 29 April 1967, and it was then subsequently surveyed at intervals of approximately one to three months, until the fall of 1968 when the pole line was dismantled. For sake of comparison, surveys were also made of the same pole line following its divergence from the study road. Many additional miles of roads and cliffs were also surveyed in an attempt to locate dead birds.

## RESULTS AND DISCUSSION

Thirty dead raptors were found on the initial road survey; this total included 14 Golden Eagles, 14 *Buteo* hawks, 1 Sparrow Hawk, and 1 Great Horned Owl. By the end of the study period, a total of 38 dead raptors had been found along this road and an additional ten in the remainder of Cedar Valley (see Table 1). Density of kills on the study road averaged 3.14 birds per mile, and included an extreme situation in which four dead Golden Eagles were found under two adjacent poles. Those birds suffering the heaviest mor-

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<sup>2</sup>Department of Zoology and Entomology, Brigham Young University.

Table 1  
DEAD RAPTORS FOUND DURING STUDY PERIOD  
CEDAR VALLEY, UTAH

Golden Eagle ( <i>Aquila chrysaetos</i> ) .....	26
Bald Eagle ( <i>Haliaeetus leucocephalus</i> ) .....	2
Rough-legged Hawk ( <i>Buteo lagopus</i> ) .....	8
Ferruginous Hawk ( <i>Buteo regalis</i> ) .....	1
Red-tailed Hawk ( <i>Buteo jamaicensis</i> ) .....	2
Swainson's Hawk ( <i>Buteo swainsoni</i> ) .....	1
<i>Buteo</i> * .....	5
Cooper's Hawk ( <i>Accipiter cooperii</i> ) .....	1
Sparrow Hawk ( <i>Falco sparverius</i> ) .....	1
Great Horned Owl ( <i>Bubo virginianus</i> ) .....	1
Total .....	48

\*Not identifiable to species owing to decomposition.

tality included the eagles (26 Golden Eagles and two Bald Eagles) and the *Buteos* (seventeen dead birds of four different species). During this same period only one dead raptor was found along the segment of the pole line not paralleled by the road.

The approximate times of death were estimated from the degree of decomposition at the time of discovery and the rate of decomposition observed in birds found shortly following death. Four time periods were assigned from the study road data. It was estimated that nineteen raptors, including ten *Buteos* and nine Golden Eagles, had been killed before the winter of 1966-67. During the winter and spring of 1966-67, fourteen raptors, including seven Golden Eagles and five *Buteos*, were killed. Two more Golden Eagles were killed during the summer of 1967, and an additional three during the winter of 1967-68. The heaviest mortality occurred in the fall and winter period, which also coincides with the periods of heaviest sport hunting. Two final road surveys were taken after the dismantling of the pole line in the fall of 1968, but no recently dead raptors were found.

Twenty-three of the dead eagles were suitable for age analysis. Fifteen were immature Golden Eagles, six were adult Golden Eagles, and two were adult Bald Eagles. Both Hickey (1949) and Craighead and Craighead (1956) similarly found that the highest raptor mortality occurs among the juveniles, and attribute this to the inexperience of these birds. We found that when driving along the study road we could approach to within fifteen meters of juvenile eagles perched on the pole, while the adult birds rarely displayed such tolerance of human presence.

At least two known hunting methods were used to destroy the birds. During the day some hunters were observed to drive back and forth along the road for the express purpose of obtaining suitable raptor targets, while at night spotlights were employed to locate roosting birds. Evidently the large numbers of raptors present on

certain winter days attract considerable attention from the sportsmen. For example, on the morning of 21 December 1967 we found eighteen Rough-legged Hawks, five Golden Eagles, two Ravens, three Marsh Hawks and one Prairie Falcon perched on poles along this twelve-mile segment of road.

An important aspect of this study concerns the probable causes of death of these predators. Of the 48 dead birds from the study area, only two were found sufficiently close to the road to indicate the possibility of their having been killed by vehicles. Poisoning was also considered as a possible cause of death, since several 1080 bait stations were located in Cedar Valley. Data furnished by U. S. Fish and Wildlife Service personnel would tend to indicate that high tolerance levels of predatory birds for this poison might eliminate it as a factor; we feel that such evidence is inconclusive, however, since no actual analyses of carcasses for 1080 or pesticide residues were made. Such analyses should definitely be a part of future studies of raptor mortality, in our area as well as elsewhere. In most cases, there were clear indications that the birds had been deliberately shot. For example, a Ferruginous Hawk nested immediately next to the study road and was photographed 8 April 1967 (Weston and Ellis, 1968). On 19 April 1967 it was found dead with holes in the head and body, and its legs and tail had been removed. Bodies of the raptors were almost always found intact and seldom scattered by scavengers. These remains often exhibited shot holes in the feathers and bones. The preponderance of the evidence available appears to support the hypothesis that shooting was the cause of death for a majority of the raptors found.

In our opinion, this brief study highlights a major problem relating to the future survival of raptorial birds; it also demonstrates gross disregard of present federal and state laws protecting raptors on the part of a segment of the public. Additionally, it emphasizes the present danger of indiscriminate shooting to high concentrations of raptors, and the possible extent of such mortality in relatively small areas.

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