



Nest site selection, productivity, and food habits of ferruginous hawks in southeastern Montana
by John Thomas Ensign

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Fish and Wildlife Management

Montana State University

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Abstract:

Ferruginous hawks (*Buteo regalis*) were studied on 492 km of public land in southeastern Montana during the 1981 and 1982 nesting seasons. Nest sites were significantly removed from roads and areas of continual human activity. Ninety-one nests were located, 97% were situated on the ground in association with hills and ridges encompassing broad, flat valleys. Sixty-seven percent of all nests were located on the ends of side-ridges, knobs on ridgetops or lone knolls. Eighty-three percent of all nests were on slopes which were oriented in a 180° arc from southwest through north to northeast with 24% possessing a southwest orientation. Nests which were occupied in the 2 years possessed significantly more vantage from the nest than unoccupied nests. Bare ground and grass-forb cover within a 5 m radius of all nests differed significantly between the years while big sagebrush (*Artemisia tridentata*) cover averaged 15% in both years. Occupied nests in both years had similar levels of grass-forb cover (32.7 and 36.8%, respectively) adjacent to the nest, in spite of the significant differences noted at all nests. Increases in grass-forb cover measured at a nest were accompanied by decreases in sagebrush cover. Twelve and 11 nest territories were occupied during the 2 years of study, out of a potential of 25. Two-year average clutch size was 2.69, and 26% of all occupied nests were successful. Five juveniles were fledged each year, for an average of 1.67 juveniles per successful nest and 0.34 per nest attempt. Predation and sibling fratricide were the major causes of nestling mortality, accounting for 34 and 27%, respectively, of the total progeny loss. White-tailed jackrabbits (*Lepus townsendii*) represented the greatest frequency (24.4%) and biomass of prey items collected from nests. Other important prey items and their frequency of occurrence included western meadowlarks (*Sturnella neglecta*) 18.3%, thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*) 12.7%, and northern pocket gophers (*Thomomys talpoides*) 11.7%. Low prey densities and decreased prey vulnerability are implicated as major factors contributing to the dearth of nesting pairs and poor reproductive output. Notes are included concerning relative abundances of potential prey, the raptor community, and the behavior of adult and juvenile ferruginous hawks.

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A thesis submitted in partial fulfillment
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of

Master of Science

in

Fish and Wildlife Management

MONTANA STATE UNIVERSITY
Bozeman, Montana

June 1983

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of a thesis submitted by

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This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ACKNOWLEDGMENTS

I would like to express my appreciation to the following people: Dr. Robert L. Eng, Montana State University, for his advice, guidance and inspiration through all phases of study, field work and manuscript preparation; Dr. Richard J. Mackie and Dr. William R. Gould, Montana State University, and Robert K. Murphy, Wisconsin Rapids, Wisconsin, for critical review of the manuscript; Dr. Harold D. Picton, John E. Toepfer and Alan R. Harmata, Montana State University, for technical advice and assistance; Mr. Dan Bricco, Mr. William Matthews, BLM, Miles City, Montana, and Mr. B. J. Furber, BLM, Ekalaka, Montana, for help and support while I was conducting field work; and to my parents, William G. and Julia R. Ensign for their undaunting support, encouragement and interest in my endeavors.

Funding for this study was provided by the U.S. Bureau of Land Management and the Montana Agricultural Experiment Station.

TABLE OF CONTENTS

	Page
INTRODUCTION	1
STUDY AREA	3
Geology and Soils	5
Climate and Weather	6
Vegetation.	8
Mammals and Birds	9
Human Impacts	10
METHODS.	12
RESULTS AND DISCUSSION	17
Nest Site Locations and Characteristics	17
Reproduction.	29
Food Habits	38
Prey Populations.	43
The Raptor Community.	49
Ferruginous Hawk Behavior	53
CONCLUSIONS.	61
APPENDIX	74
LITERATURE CITED	81

LIST OF TABLES

	Page
1. Monthly precipitation totals in centimeters	7
2. Crude and ecological density for all nests, maximum possible nest territories and occupied nests on the study area, 1979, 1981, and 1982	20
3. Orientation of all nests located on the study area.	22
4. Physiographic location of nests located on the study area	23
5. A summary of nest site parameters for ferruginous hawk nests occupied during 1979, 1981, and 1982 in southeastern Montana	25
6. Productivity data for occupied territories and active nests and ferruginous hawks in southeastern Montana, 1981 and 1982	31
7. Productivity data for ferruginous hawks nesting in southeastern Montana, central Utah, and northeastern Colorado. (Similar average clutch sizes.)	34
8. Chronology of egg and nestling losses of ferruginous hawks nesting in southeastern Montana, 1981 and 1982.	35
9. Prey items collected at ferruginous hawk nests and perch sites in southeastern Montana, 1981 and 1982.	39
10. Raptors observed, their abundance based on average number of sightings per day of observation, and their status in southeastern Montana, 1981 and 1982	50
11. Locations and activity status of ferruginous hawk nests in southeastern Montana, 1979, 1981, and 1982	75
12. Dominant plant species found on the study area in southeastern Montana, 1981 and 1982	78
13. Mammalian species observed on the study area in southeastern Montana, 1981 and 1982	79

LIST OF TABLES--Continued

	Page
14. Avian species observed on the study area in southeastern Montana, 1981 and 1982, including their relative abundance and status on the area	80

LIST OF FIGURES

	Page
1. Study area showing land ownership and major drainages	4
2. Study area in southeastern Montana showing locations and activity status of ferruginous hawk nests, 1979, 1981, and 1982	18
3. Distribution of ferruginous hawk nests in relation to slope of terrain, 1979, 1981, and 1982.	19
4. White-tailed jackrabbits observed per kilometer of headlight survey in southeastern Montana, 1981 and 1982	44
5. Number and species of small mammals trapped per 100 trapnights in southeastern Montana, 1981 and 1982	46
6. Relative abundance of five most common passerines encountered along survey routes in southeastern Montana, 1982	48

ABSTRACT

Ferruginous hawks (*Buteo regalis*) were studied on 492 km² of public land in southeastern Montana during the 1981 and 1982 nesting seasons. Nest sites were significantly removed from roads and areas of continual human activity. Ninety-one nests were located, 97% were situated on the ground in association with hills and ridges encompassing broad, flat valleys. Sixty-seven percent of all nests were located on the ends of side-ridges, knobs on ridgetops or lone knolls. Eighty-three percent of all nests were on slopes which were oriented in a 180° arc from southwest through north to northeast with 24% possessing a southwest orientation. Nests which were occupied in the 2 years possessed significantly more vantage from the nest than unoccupied nests. Bare ground and grass-forb cover within a 5 m radius of all nests differed significantly between the years while big sagebrush (*Artemisia tridentata*) cover averaged 15% in both years. Occupied nests in both years had similar levels of grass-forb cover (32.7 and 36.8%, respectively) adjacent to the nest, in spite of the significant differences noted at all nests. Increases in grass-forb cover measured at a nest were accompanied by decreases in sagebrush cover. Twelve and 11 nest territories were occupied during the 2 years of study, out of a potential of 25. Two-year average clutch size was 2.69, and 26% of all occupied nests were successful. Five juveniles were fledged each year, for an average of 1.67 juveniles per successful nest and 0.34 per nest attempt. Predation and sibling fratricide were the major causes of nestling mortality, accounting for 34 and 27%, respectively, of the total progeny loss. White-tailed jackrabbits (*Lepus townsendii*) represented the greatest frequency (24.4%) and biomass of prey items collected from nests. Other important prey items and their frequency of occurrence included western meadowlarks (*Sturnella neglecta*) 18.3%, thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*) 12.7%, and northern pocket gophers (*Thomomys talpoides*) 11.7%. Low prey densities and decreased prey vulnerability are implicated as major factors contributing to the dearth of nesting pairs and poor reproductive output. Notes are included concerning relative abundances of potential prey, the raptor community, and the behavior of adult and juvenile ferruginous hawks.

INTRODUCTION

Throughout its breeding range populations of ferruginous hawks (*Buteo regalis*) are stable or declining slowly, with habitat loss posing a serious threat to any stability (Evans 1982). In 1973 the U.S. Fish and Wildlife Service (USFWS) classified the ferruginous hawk as "status undetermined" (USFWS 1973). This bird has been listed on Audubon's Blue List as a species that displays noncyclical population declines or range contractions either locally or on a more widespread level (Tate 1981).

The present status of breeding populations of ferruginous hawks in Montana is uncertain. Nesting concentrations occur in the extreme southwest in Beaverhead County and in the extreme southeast in Carter County (D. Flath pers. comm.). In addition, scattered nesting has been reported along the northern tier of counties east of the town of Havre.

My study was established in 1981 on a large, nearly contiguous block of public lands in the Carter County area. Preliminary reconnaissance of this area in 1977 and 1979 by personnel of the U.S. Bureau of Land Management indicated a substantial nesting population of ferruginous hawks. My study objectives were to investigate the distribution and habitat use of all raptors, with special consideration given to characteristics of nest sites, food habits, productivity and behavior of ferruginous hawks. The field season in 1981 began in

early April and terminated in mid-September and extended from mid-April to mid-August in 1982.

STUDY AREA

The study area was located in the southeastern corner of Montana beginning approximately 21 km (13 mi) south of Ekalaka and continuing in a southerly direction for 24 km (15 mi) (Figure 1). At its greatest east-west width the area spanned 34 km (21 mi), extending roughly from Box Elder Creek on the east to the Chalk Buttes Road on the west. Land ownership of the 492 km² (190 mi²) study area was 84% federal (BLM), 5% state, and 11% private. The private land was largely located along Cabin Creek which traversed the study area from northwest to southeast. Studies were concentrated north of Cabin Creek in an area encompassing the Buffalo, Lone Tree, Dead Boy, and Chito Creek drainages. This segment was approximately 240 km², or roughly half of the entire study area.

The study area is located at the north end of a broad relatively flat horseshoe shaped basin. Virtually treeless, this sagebrush-grassland basin is confined on three sides by sandstone buttes and hills that rise approximately 200 m (650 ft) above the surrounding landscape. The basin includes broad gentle drainages which gradually slope up towards narrow, bare shale ridges that finally rise abruptly 15-30 m (50-100 ft) from the surrounding landscape. Although all drainages are ephemeral, occasionally heavy runoff from spring thaws or local thunderstorms has cut and furrowed the steep ridgetops and valley bottoms.

