Trapping, Marking and Radio-Monitoring Rough-Legged Hawks

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Introduction

The marking and radio-instrumentation of raptors have facilitated data collection on the ecology of many species. However, the use of these techniques for monitoring the activities of Rough-legged Hawks *(Buteo lagopus)* has not been reported. This paper describes the effective field methods employed to capture, and monitor the movements and activities of 22 Rough-legged Hawks during the winters of 1981-82 and 1982-83.

Research was conducted on the 2315 km² Idaho National Engineering Laboratory Site in southeastern Idaho. The study area is located at the foot of the Lemhi and Lost River Mountains in the Upper Snake River Plain. Habitat is characteristic of the northern desert shrub biome and vegetation is dominated by big sagebrush *(Artemisia tridentata)*. Low temperatures and low precipitation characterize the winter climate of this region. A more complete description of the study area is given by Reynolds and Trost (1981).

Methods

Rough-legged Hawks were trapped with carrion-baited noose carpets, similar to the trap Wegner (1981) employed for capturing American Kestrels *(Falco sparverius)*. Noose carpets constructed of 1-inch chicken wire were spray-painted brown and molded around Mountain Cottontail *(Sylvilagus nuttali)* or Blacktailed Jack Rabbit *(Lepus californicus)* carcasses that were skinned in the thoracic region. Sides of the noose carpet were wired together ventrally, leaving heads and legs of carcasses exposed. Nooses of 20 lb monofilament were tied on noose carpets at each wire junction to reduce slippage and keep the nooses upright. All nooses were replaced after about 5 trapping attempts. Total cost of materials for constructing noose carpets was less than $2.00 per trapped hawk.

Effective trapping weight of noose carpets and carrion was 1500 g. Traps at this weight restricted the mobility of hawks but allowed them enough freedom of movement to prevent noose breakage. Metal rebar was wired under noose carpets on cottontail carcasses while jack rabbits were eviscerated in order to attain this weight. Octagonal shaped bal-chatris (Berger and Mueller 1959), baited with Deer Mice *(Peromyscus maniculatus)* were also used in capture attempts. Bal-chatris and noose carpets were tossed from a moving vehicle near perched hawks. Baits and hawks were then observed from the vehicle at a distance of 0.4 km.

Hawks were fitted with radio-transmitters and/or wing markers. Orange vinyl markers of the dimensions described for Red-tailed Hawks *(Buteo jamaicensis)* by Kochert et al. (1983), were number coded with cattle identification marking paint (Fearing Mfg. Co., So. St. Paul, MN) and attached to each wing. AVM SB2 transmitters (AVM Instrument Co., Dublin, CA) in the 150.8 to 151.1 MHz frequency band were mounted proximo-ventrally on the rectrices of 9 hawks. Mounting procedures followed the suturing technique described by Harmata (1984). Size 0 veterinary suture was used for package attachment. Transmitters were equipped with 32 cm whip antennas that were tied to the rachis at 5 cm intervals and extended 20 cm beyond the tips of rectrices. Weight of transmitter packages, including a ⅔ amp lithium battery, was 29 to 31 g, and averaged less than 4% of a hawk's body weight. This was below the 5 to 6% mean package weight to body weight ratio recommended by Dunstan (1972) for mounting back package on this species. Hawks were held up to 1 hour while being weighed, measured, marked, radio-tagged and banded with USFWS locking leg bands prior to their release at capture sites. Radio locations were made with a programmable multiple channel receiver (Advanced Telemetry Systems, Inc., Bethel, MN) and 3-element yagi antenna. Hawks were located from a vehicle by triangulation, as well as from fixed-wing aircraft.

Results and Discussion

In 326 capture attempts, 79 hawks alighted on traps and 22 (28%) of these were trapped. All birds were trapped with carrion-baited noose carpets. The ineffectiveness of bal-chatris in capturing hawks likely resulted from the ability of hawks to hover above traps and their apprehensiveness to pounce on the bal-chatris when the mice were unable to flee. When hawks did pounce, they perched briefly on traps and were not ensnared. Hawks on noose carpets typically fed for several minutes and walked across the carcass, increasing the likelihood of capture. Success was highest where the hawks were perched on utility poles within 50 m of the road. A wide shoulder along the road was ideal for bait placement as it provided the hawks with an unobstructed view of the traps, prevented baits from being lost in deep snow and allowed hawks to remain out of the way of oncoming vehicles. Trapping was conducted along roads with little traffic since passing vehicles appeared to prevent many birds from flying to baits and flushed over 50% of the unsnared hawks that perched on traps.

Trapping success increased 33% after enlarging the noose diameter from 2.5 to 3.5 cm. Dyeing nooses dark brown did not improve capture success. Hawks were most attracted to baits in mid-morning and late afternoon particularly after 10 to 15 cm of fresh snowfall. Most birds flew to baits within 15 minutes of bait placement but some perched as long as 2 hours before responding. Periods of snowmelt which exposed open ground, and winds in excess of 25 KPH reduced the number of birds foraging along roads and hindered trapping efforts.

Since hawks observing baits dropped from a vehicle would not respond to traps, baits were tossed on the side of the vehicle which best concealed their placement. If a particular hawk was selected for trapping, other raptors perched nearby were flushed before bait placement. In the presence of Golden Eagles *(Aquila chrysaetos)*, Rough-legged Hawks would usually not fly to traps and were occasionally displaced by eagles after perching on baits.

Marking and radio-tagging were effective in monitoring Rough-legged Hawk activities. Markers faded little after 1 year and number codes remained readable (Tom Campbell, pers. comm.). Marker loss was not observed although markers on 2 hawks rotated around the wing, rendering them unreadable. Long-term behavioral or physical impairment resulting from marking or radio-tagging was not apparent. However, 2 birds bit through and splintered the rachis above the point of radio attachment and dropped the transmitters after 1 month. Both hawks were also wing-marked which allowed them to be monitored after radio loss. Rough-legged Hawks preened wing-markers and radio packages excessively for 1 or 2 days following release. McCrary (1981) also noted a brief adjustment period of Red-shouldered Hawks *(Buteo lineatus)* to backpack mounted radios.

Individual wing-marked and radioed hawks were observed in the study area as long as 143 and 162 days, respectively. Battery life of transmitters exceeded the duration of winter range occupation for all birds and was, therefore, adequate for monitoring hawks throughout winter. Maximum recorded range of transmitters was 73 km from the air and 20 km from ground locations. Broadcast range exceeded that reported for other Buteos equipped with transmitters having a battery life of 1 to 4 months. Red-shouldered Hawks in riparian habitat, and Swainson's Hawks *(Buteo swainsoni)* and Ferruginous Hawks *(Buteo regalis)* in steppe areas were located from 2 to 5 km from ground locations during intensive monitoring (Fitzner and Fitzner 1977, McCrary 1981, Woffinden and Murphy 1983). Greater signal reception in the present study was probably a result of differences in telemetry equipment and the open, flat terrain of the study area.

The tendency of Rough-legged Hawks to forage along highways from power poles should allow these field techniques to be useful in other areas. The effectiveness of rabbit carcasses as bait may have related to the abundance and overall high consumption of rabbit carrion by the wintering hawk population (Watson 1984). However, due to the opportunistic feeding behavior of this raptor, noose carpets baited with other carrion sources would likely be equally effective for trapping. Noose carpets should also be useful for capturing other carrion feeding raptors such as Golden Eagles and Northern Harriers *(Circus cyaneus)* which were trapped during this study. The habit of Rough-legged Hawks to frequent power poles near highways also make them highly visible to observers and thus a favorable subject for short and long-term marking studies.

Acknowledgements

This research was funded by the Office of Health and Environmental Research of the United States Department of Energy, as a contribution of the INEL Radioecology and Ecology Program and in cooperation with the Fish and Wildlife Program, Department of Biology, Montana State University. Published as Journal Series No. 1573, Montana Agricultural Experiment Station. Special thanks are extended to A. R. Harmata for technical advice and suggesting the use of noose carpets, and to R. L. Eng, O. D. Markham, C. T. Collins and L. R. Mewaldt for reviewing this paper.

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