not been caged or otherwise transported or subjected to handling by humans (my initial suspicion). It actively tried to flee when pursued, although with its injured wing it was easily captured by hand.

The circumstances surrounding this recovery strongly suggest that the wayward bluebird was somehow separated from its parents and the other members of its brood prematurely, that is, before it attained independence. Owing to its condition at the time of recovery, survival would have been very unlikely. This would have been suspected anyway because of its disappearance at such a young age, especially when its broodmates remained in the care of their parents for another 5 days.

Separation of a fledgling from its parents probably occurs more often than we realize, but there are few documented instances of the circumstances and outcome of such an event. Obviously young birds which have reached a point in their development where they are capable of strong, sustained flight but are still dependent on their parents for at least part of their nutritional needs are most vulnerable in this respect. In multi-brooded species the instinct of a parent to accompany an isolated juvenile may be offset by territorial attachment, as well as the stimulus of other young which remain behind.

There are many possible causes which may isolate a single fledgling in a case like this. I can think of the following: attack by predators, including birds of prey; sudden human activities in the area occupied by the family group (e.g., motorcycles, which were common in the area of this nest); excessively aggressive behavior by the parents, other members of the same species, or individuals of other species; violent weather conditions or storms; and almost any unusual disturbance at night which might cause the bird to leave its roosting site and fly aimlessly into the darkness.

Acknowledgements -- Not many of us are fortunate enough to have such "complete and thorough coverage" of a recovery as I did in this case. The bird was discovered and captured by Margaret Hillert and Lynn Allnutt; banders Ruth Erickson and Mary June Wolcott examined it and reported the recovery. This note would not have been possible without the diligence of all these persons.

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POPULATION ESTIMATE FOR THE AMERICAN KESTREL IN THE GREAT VALLEY SECTION OF PENNSYLVANIA

By G. Robert Ganis

Introduction

An American Kestrel (Falco sparverius) population was evaluated for a period of one year (September 1973 to September 1974) in a study area of the Great Valley. Seasonal population trends, nesting densities and spatial relationships were determined. The information gained from the study area was then extrapolated for the entire Great Valley of Pennsylvania.

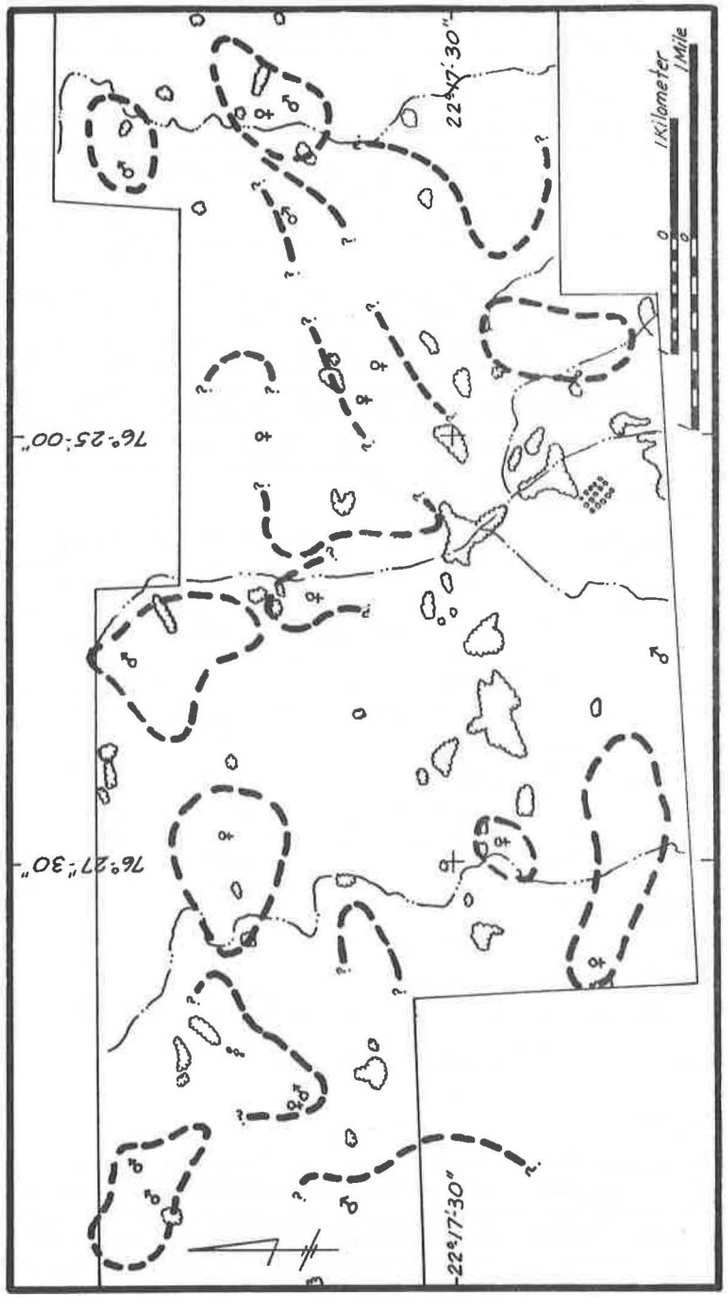

FIG. 1 "APPROXIMATE" WINTER KESTREL RANGES
SHOWING THE LOCATION OF BANDED INDIVIDUALS (by sex)
SEPTEMBER 1973 - MARCH 1974

Method of Study

A study area of 16.6 square miles was delineated for detailed observation of Kestrel utilization. Road censusing, using binoculars, was carried out for a period of 14 months. An attempt to sex each falcon sighting was made. The cumulative mapping of Kestrel sightings showed distinctive spatial distributions that represents "approximate ranges". The complete bounds of each approximate range was not always possible to determine. Figure 1 shows the approximate ranges as nearly as could be determined. This is similar to the method used by Craighead and Craighead (1956) to delineate raptor ranges in Michigan. Because birds were not marked so as to be recognized as individuals, and since more than one bird was often seen in close proximity, the ranges mapped represented both singular and collective ranges. Extensive trapping was undertaken and, within each approximate range, most individuals were believed to have been caught. Kestrels were trapped using a bal-chatri trap with a vole as a lure animal, and each bird was marked with a U.S. Fish and Wildlife band. The estimated number of falcons occupying the approximate ranges equalled the cumulative number of trapped and banded birds within 14 percent. Because of a good correlation between estimated number of birds and the actual number of birds caught, it is believed that the estimate number is accurate.

Within the 16.6 square mile study area, a smaller tract of 14.0 square miles was chosen for a breeding census (see figure 2). In comparison with winter ranges, which were more difficult to determine for individuals, breeding territories were easily identified and a breeding census was not difficult to delineate. Nests were located by searching in the vicinity of birds that exhibited courtship behavior. Unmated birds were considered to be those which were never seen in the company of a bird of the opposite sex. In every instance where courting behavior was observed, a nest was located.

Description of Study Area

The study tract of 16.6 square miles, located just south of the city of Lebanon, Pennsylvania, is typical of the much larger area (2,247 sq. miles) of the Great Valley. The valley is a relatively flat contiguous agricultural area, roughly 11 miles wide on an average (in Pennsylvania; figure 3) that extends from New York to Alabama (MacLachlan, 1967). The Pennsylvania portion is remarkably consistent in terms of land use and habitat. The valley is very open and contains mostly small isolated woodlots. The area can be described as a network of farms broken by an occasional town and large city. The area contains a moderately dense network of roads.

Results

Winter Density

The estimated winter population density (September through March) for the 16.6 square mile study area averaged 21 Kestrels. These birds occupied 16 approximate ranges. Within the approximate ranges, 18

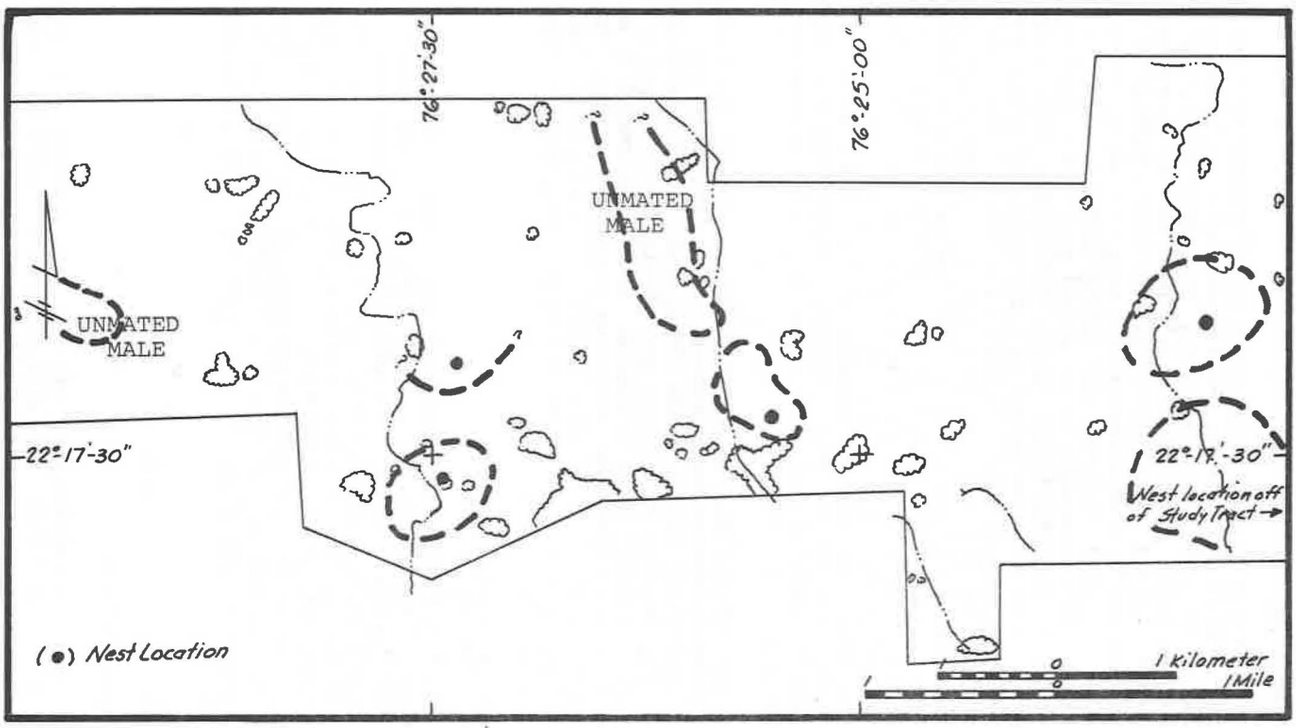

FIG. 2

KESTREL BREEDING TERRITORIES Mid-March-August, 1974

THE GREAT VALLEY REGION OF PENNSYLVANIA

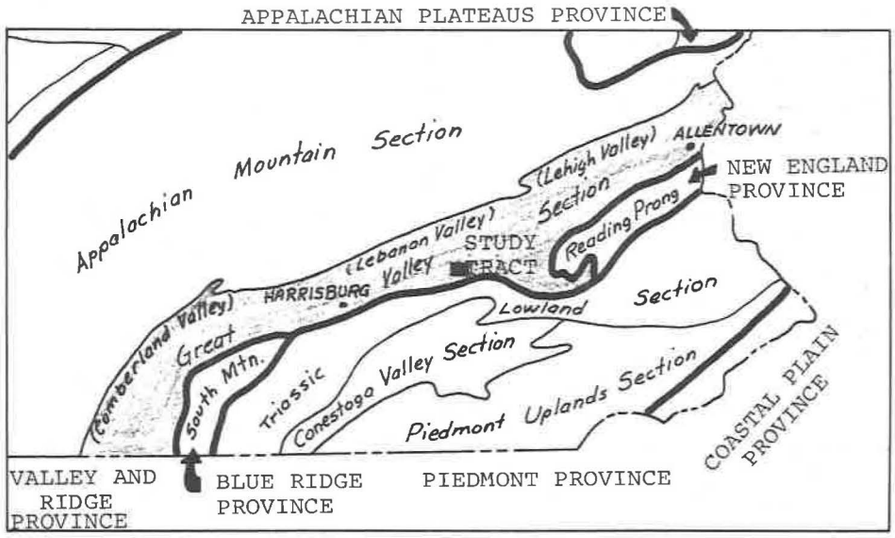

FIGURE 3

SOUTHEASTERN PENNSYLVANIA

Note: After Physiographic Provinces of Pennsylvania
Topographic and Geologic Survey
Commonwealth of Pennsylvania

Kestrels were trapped and banded, 9 males and 9 females. Figure 1 shows the distribution of the approximate ranges and the location of banded birds.

Summer Density

Four nesting pair of Kestrels and two unmated males occupied the nesting study tract of 14.0 square miles (figure 2). Two of these nests were in buildings, and two in natural cavities. No nesting boxes were provided. The density of 0.57 breeding birds per square mile or 0.28 nesting pair per square mile was determined. This compares very well with the breeding density determined in Illinois in 1959 of 0.58 breeding birds per square mile (Enderson, 1960). In Utah, a density of 4.50 pairs per square mile was noted in 1969, and 3.20 pairs per square mile in 1970 (Smith, Wilson and Frost, 1972). Craighead and Craighead (1956) noted Kestrel densities of .05, .10 and .13 nesting pair per square mile in 1942, 1948 and 1949 respectively in Michigan and .93 nesting pair per square mile in 1947 in Wyoming. Nagy (1963) reported a high nesting density of Kestrels in eastern Pennsylvania; however, this was influenced by a heavy concentration of nesting boxes provided over a relatively small area. Heintzelman, D.S., 1964, similarly, reported a very high nesting density of 3.25 nest per.5 square mile (which computes to 6.50 nest per square mile) in a study area in eastern Pennsylvania provided with nest boxes. Hamerstrom, Hamerstrom, and Hart (1973) were able to affect the nesting density of Kestrels dramatically in Wisconsin by providing nest boxes. The nesting density of Kestrels is variable nationwide and seems easily influenced by the availability of suitable nesting sites, especially if the nesting sites are nest boxes, which they seem partial to. By mid-July, all the young produced (a total of 8 females and 9 males; all 4 nest produced young, 3 nests of 4 and 1 nest of 5) were fledged, bringing the population density to 27 birds. It is not known how long the young remained within the study area; however, post juvenile dispersal was evident from sightings of birds in July and August in areas that were void of Kestrels since mid-March.

Population Projections for the Great Valley

Although the seasonal population densities were made on a portion of the Great Valley, they are probably representative of the entire Great Valley of Pennsylvania. I based this argument on qualitative observations. I have traveled extensively throughout the Great Valley and have found the general nature of Kestrel sightings very similar to the specific study area on which I made my quantitative determinations.

The estimate for the Kestrel population for the Great Valley of Pennsylvania was determined by establishing the population density per unit area on the study tract and multiplying this factor by the total area of the Great Valley. The area of the Great Valley was determined using a polar planimeter over the area outlined on U.S. Geologic Survey topographic maps (1:250,000).

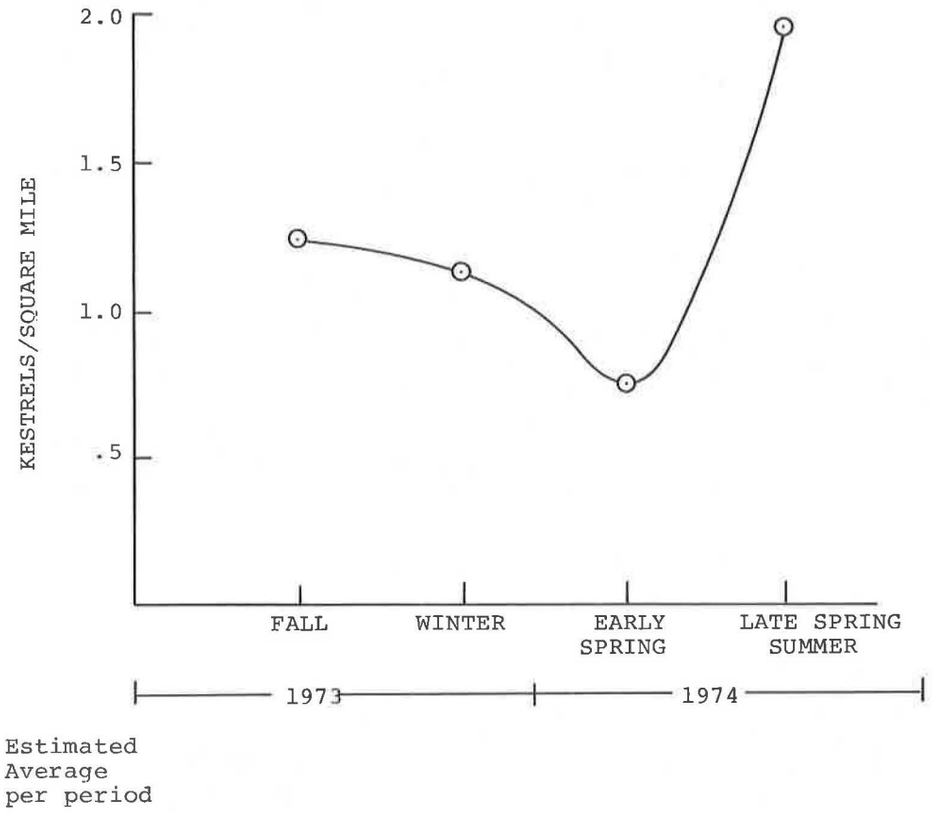

Figure 4 Kestrel Seasonal Density
Great Valley of Pennsylvania

Three population densities were computed for the Great Valley in Pennsylvania; Winter, Early Spring, and Summer:

Winter population = 1.32 (density/per square mile in the study tract) X 2,247 (area in square miles of Great Valley in Pennsylvania) = 2,966 falcons

Early Spring = 1.20 X 2,247 = 2,696 falcons

Summer = 1.9 X 2,247 = 4,269 falcons

Approximately 63 percent of the summer population are young produced that year (2,646 falcons).

Acknowledgements

I would like to extend my appreciation to Dr. Richard Clark for his many useful suggestions during this study and for reviewing this paper. I am also indebted to Mr. Mark Zehring for educating me on the methods of trapping raptors. John W. Purvis drafted the figures for the paper.

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CORRIGENDUM - There is an error in the Adams/Miller "Absecon Bay Heron Colony" paper (EBBA NEWS, 38:103-108) which should be corrected forthwith. On page 107 (last line), the recovery information for GLOSSY IBIS #726-82628 should be deleted. This recovery is in error. We apologize for the mistake. Editor