

OBSERVATIONS ON THE BEHAVIOR OF WINTERING BALD EAGLES

by

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Abstract

The behavior of four Bald Eagle (*Haliaeetus leucocephalus*) was studied in western Connecticut during the winter of 1976-77. The eagles congregated below a hydroelectric dam which killed and injured large numbers of fish. The Bald Eagles ate these fish almost exclusively when in the vicinity of the dam and were never observed to hunt the waterfowl which also congregated in the area. Crows were observed to mob or harass the eagles on ten occasions. The eagles exhibited soaring behavior on seventeen occasions. Soaring has been considered an aspect of play and courtship; evidence is presented which suggests that soaring may also be involved in agonistic interactions.

Introduction

The behavior of the Bald Eagle (*Haliaeetus leucocephalus*) has been studied many times. Most of these investigations have concentrated on reproductive and nesting behavior. Comparatively few studies have dealt with migratory Bald Eagles on their wintering grounds (Southern 1963, 1964; Hancock 1964; Ingram 1965; Lish 1973; Platt 1976), and fewer still have concentrated on the behavior of wintering eagles.

This paper is a report of one winter of observations on the behavior of Bald Eagles in western Connecticut. The eagles congregated below the Shepaug Hydroelectric Dam on the Housatonic River; the dam's generators kept the otherwise frozen river open and killed or injured large numbers of fish.

The National Audubon Society Continental Bald Eagle Project has reports of Bald Eagles wintering in the Shepaug Dam area as early as December 1963, with the possible existence of an active nest in the area until 1966. Local residents have reported observing wintering Bald Eagles in the area as early as 1953; there are also reports of Bald Eagles wintering along the Connecticut River near Essex.

Study Area and Methods

The Bald Eagles were observed in the vicinity of the Shepaug Hydroelectric Dam on the Housatonic River, approximately 4.6 km north of Newtown, Connecticut. Most observations were made on the property of the Connecticut Light and Power Company, located on the north shore of the river and extending for 0.8 km east (downstream) of the dam; additional observations were made on a public road which follows the north side of the river for an additional 3.4 km. Above the dam is a lake surrounded by undeveloped woodland.

The subjects were observed with field binoculars (7×35) and a telescope (80-160X); observations were dictated into a tape recorder. This report covers more than 50 hr of observation.

Results and Discussion

Four Bald Eagles (one adult, three immatures) were observed. According to the plumage classifications of Bent (1937) and Southern (1964), the immature eagles were approximately 2–3 (A), 3–4 (B), and 4 years old (C). The first observation of each eagle was between 14 December 1976 and 3 January 1977. The eagles were observed for the last time between 23 February 1977 and 11 March 1977.

The river was frozen from 29 December 1976 to 24 February 1977, except for an area immediately below the dam when the dam's generators were operating. The lake above the dam was frozen from before the eagles' arrival until after they left. The departure of the eagles coincided with a period of consistently above-freezing temperatures which opened the river.

The eagles normally arrived at the dam from the direction of the woodland above the dam and flew in the direction of the woodland upon leaving the feeding area. Presumably their roosting site(s) were located in this area. Several attempts to locate these sites were, however, unsuccessful.

Feeding. With one exception, fish were the only observed prey of the eagles. Fish are the preferred food of Bald Eagles (Broley 1947, Southern 1966, Mc'Clelland 1973, Dunstan and Harper 1975, Ofelt 1975), and wintering eagles have been reported to congregate near dams in many parts of the country (Sprunt 1961, Southern 1963, Ingram 1965, Spencer 1976).

The eagles were observed to make swooping dives to the river to catch fish on 69 occasions, 33 of which were successful (47.8%). However, the two older birds (the adult and immature C) were successful 62.5% (20/32) of the time, while the two younger birds were successful only 35.1% (13/37) of the time ($p < 0.025$, Chi-Square Test). The species of fish they were catching was not determined; dead fish washed onto shore included White Perch (*Roccus americana*), Trout (*Salvelinus spp.*), and Bass (*Micropterus spp.*).

Interspecific Interactions. The large number of fish killed or injured by the dam's generators attracted many other birds to the area. Hundreds of Common Crow (*Corvus brachyrhynchos*) were present on all observation days as was a mixed-species flock of 50–200 Herring, Great Black-backed, and Ring-billed Gull (*Larus argentatus*, *L. marinus*, *L. delawarensis*). In addition, small numbers of the Canada Goose (*Branta canadensis*), the Mallard (*Anas platyrhynchos*), the Common Merganser (*Mergus merganser*), and the Great Blue Heron (*Ardea herodias*) were often present. The eagles were never observed hunting the waterfowl, and an eagle was observed scavenging on waterfowl (a gull) on only one occasion. The apparent lack of interest of the eagles in the waterfowl is surprising because, next to fish, waterfowl are the preferred food of Bald Eagles and are often their primary food during the winter (Oberholser 1906, Brooks 1922, Bent 1937, Murrie 1940, Retfalvi 1970). However, Spencer (1976) has reported that Bald Eagles ignore waterfowl when fish are available, and Munro (1938) and Southern (1964) have reported cases of waterfowl ignoring Bald Eagles which were feeding nearby.

Crows were observed harassing Bald Eagles on eight occasions and mobbing an eagle on two occasions. Harassment and mobbing were differentiated on the basis of length of the interaction and the number of crows involved. The eight interactions classified as harassments involved one to six crows ($\bar{X} = 3.0 \pm 1.6s$) and lasted 1–5 min ($\bar{X} = 2.6 \pm 1.4s$ min). Five harassments involved a perched eagle, and three occurred when an eagle was in the air; in two cases the eagle had a fish which the crows were apparently trying to

take. All harassments were directed against the immature eagles. Crows were never observed harassing or mobbing the adult eagle.

Several studies have reported crows nesting or feeding near Bald Eagles (Baily 1927, Howell 1937, Southern 1964, Ingram 1965, Erskine 1968, Spencer 1976), and several others have reported crows harassing Bald Eagles or attempting to get their food (Herrick 1932, Hausman 1948, Musselman 1949, Retfalvi 1970, Weekes 1975).

Both instances of mobbing involved one immature eagle (C). The first case occurred on the first day the bird was observed and quite possibly the first time it had entered the study area. It took place while the bird was perched in a tree, lasted 10 min, and involved 100–110 crows. The other observed mobbing occurred two days later while the eagle was circling the study area; it lasted 13 min and involved 26 crows.

Intraspecific Interactions. Only one unequivocal agonistic interaction was observed during more than 50 hr of observation. On that occasion an immature eagle (B) was perched on a branch eating a fish when a second immature eagle (C) landed on the same branch and made a pecking movement toward the first bird without making contact. The first bird immediately left the branch, and the second eagle grabbed the fish with its talons and began eating it.

The only other observed intraspecific interactions involved soaring. During soaring two or more eagles swoop down upon each other, often perform rolls in the air in unison, turn over in the air and extend their talons up at the diving eagle, and sometimes try to take sticks from each other in midflight (Bent 1937, Platt 1976). Soaring has been observed as part of play behavior in immature eagles (Bent 1937, Platt 1976), during courtship and early nesting (Herrick 1924, Ingram 1965, Grewe 1966, Brown and Amadon 1968), to signal the presence of a local food source (Sherrod et al. 1976), and during territorial defense (Mattsson 1974, Ogden 1975).

Seventeen separate instances of soaring behavior were observed. Fifteen soaring bouts involved two eagles, and two involved all three immature eagles; the adult eagle was involved in only three of the seventeen bouts. The fourteen soaring bouts involving immature eagles could almost certainly be classified as play. In all cases the eagles took turns chasing each other, and both eagles remained in the feeding area after the bout; five of the fourteen bouts included transferring sticks in midair. However, it is possible that the three soaring bouts involving the adult were agonistic interactions. In all three cases the adult was alone when an immature eagle entered the dam area, and the adult flew up to meet it. In all three cases the adult chased the immature eagle, but the immature eagle never chased or swooped down upon the adult. All three bouts ended with the immature eagle leaving the area. The adult and immature eagles coexisted in the feeding area on many other occasions.

Acknowledgments

I thank the Connecticut Light and Power Company for allowing me access to their property. I also thank Alexander Sprunt IV for providing the National Audubon Society Connecticut Bald Eagle File and John and M. Stoessel Wahl for the use of their Questar telescope. The following people provided me with personal information concerning the present and past history of Bald Eagles in Connecticut: Mrs. Polly Brody, Mr. Donald Hopkins, Mr. Fred King, and Mrs. John Stratton.

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USE OF HUNTING METHODS BY FERRUGINOUS HAWKS IN RELATION TO VEGETATION DENSITY

by

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Abstract

To test the hypothesis that hawks increase their foraging efficiency by selecting the most appropriate hunting technique for a particular habitat type, I studied the relative use of 4 hunting methods by 2 Ferruginous Hawks in relation to the density of vegetative cover. No trends in relative use of hunting methods with increasing vegetation density could be detected, indicating either that efficiency of hunting methods did not change with increasing cover density or that factors other than cover density were more important in the hawks' choice of hunting methods for a particular site.

Introduction

There is increasing interest in foraging behavior of hawks, especially in factors affecting the selection of habitats for hunting and efficiency of food gathering in various vegetation types. Besides answering important behavioral questions, such information has potential management importance in areas of changing land use.

That hawks use more than one hunting technique, which may differ in energy expenditure and in rate of return, complicates such studies. An individual bird's choice of hunting methods may depend upon its relative efficiency in terms of prey captured per unit of energy expended (Wakeley 1978b). Furthermore, the hunting method which is most efficient in one vegetation type within a bird's home range may be inferior to another method in a different vegetation type. Thus a hawk might increase its overall foraging efficiency by selecting the most appropriate technique for a particular habitat.

This study examines trends in the relative use of 4 hunting methods by 2 Ferruginous Hawk (*Buteo regalis*) in relation to increasing density of vegetative cover, and evaluates the effect of such trends, if any, on foraging efficiency. Wakeley (1978a) determined that cover density was the most important factor influencing the use of