BANDING SCREECH OWLS AND KESTRELS AT NEST BOXES
By Stuart D. Henderson and John B. Holt Jr.

Housing Development - Screech Owl-Kestrel Style

For the past three years, Screech Owls (Otus asio) and Kestrels (Falco sparverius) have had little trouble finding home sites in the Andover, Massachusetts region. This is due to the fact that scattered throughout the 70-square mile area are more than two hundred nesting boxes, put up specifically with these two raptores in mind - and the only "rent" required is that they and their families wear aluminum bands issued by the Fish and Wildlife Service.

Our nesting box project, initiated in the fall of 1958, was originally directed at Screech Owls until it was later found that Kestrels are even more inclined to utilize artificially constructed nesting sites than the owls.

We had always suspected that Screech Owls were fairly common in our region, and thought it would be interesting to add this species to the growing list of hawks and owls which we had studied, banded and photographed. But we soon discovered that finding a Screech Owl's nest in a natural cavity was something like finding a needle in a haystack. It entailed perilous climbing up dead or decaying trees and reaching down into dark hollows at the bottom of which could be anything from a mouse to a squirrel or black snake; and as far as the owls were concerned, the results were usually negative. This, obviously, was not the way to conduct a quantitative study.

We knew that Screech Owls sometimes appropriate backyard Flicker or Wood Duck boxes, and wondered what would happen if we constructed a number of such boxes and put them up in suitable woodland areas. It seemed like a good idea, but a project of the magnitude we desired would require more lumber than either of us could afford - until it was discovered that most of the necessary materials could be salvaged from nearby trash dumps, at which small quantities of usable odds and ends were periodically discarded. By frequenting these places we were able to realize a fairly constant supply of wood, and proceded to cover as much territory as possible with nesting boxes before winter set in. One hundred and ten were up and ready for the nesting season of 1959.

Early in May we began to check the boxes, but our enthusiasm was somewhat dampened when we learned that our project had been a great boon to the gray squirrel population - nearly 70% of the boxes had been usurped by these ubiquitous pests! Seventy-four of the 110 boxes contained nests of the gray squirrel. Of the remaining boxes, two were occupied by red squirrels, and one by a flying squirrel; Screech Owls had taken only eight, and Kestrels were nesting in six; Starlings had five, Flickers five, and

Wood Ducks four; two boxes contained families of Wood Mice, and two were filled to capacity with honey bee combs; one was destroyed, and one was empty. With such a great demand for our nesting boxes, we considered ourselves lucky to get as many Screech Owls and Kestrels as we did!

Though the results of the first season were hardly an inspiration insofar as the Screech Owl banding was concerned, we nevertheless took up the owl box project again in the fall of 1959, reasoning that the more boxes we put up, the more owls we would get. This time, a determined effort was made to discourage the squirrel population: we nailed tin collars, 18 to 24 inches wide, around the trunks of trees in which boxes were placed, and where possible these trees were "topped" and trimmed to prevent squirrels from jumping across from nearby branches. In most instances, of course, it was necessary to secure the landowner's consent to put up boxes in this manner, but most of them were quite willing to cooperate, and we usually picked small secondary hardwoods in congested areas which could well afford to be thinned out. Also, many boxes were attached to stubs which were already dead.

Over 200 boxes were out for the 1960 nesting season. We contemplated at least twice as many owl nests as before, but what a feeling of deflation when the boxes were checked and the nests tallied! We managed to discourage the squirrels, for the most part, but we actually ended up with fewer Screech Owl nests than the previous year had produced; only seven boxes were taken by owls, as opposed to eight in 1959, when half as many boxes were up. The new method of "squirrel guarding" had yielded a greater percentage of empty boxes, but still no owls. It was interesting to note, however, that many of the unoccupied boxes showed signs (pellets, prey remains, etc.) of having been used by roosting owls during the winter months; for no apparent reason, when spring arrived, they arbitrarily decided to nest elsewhere.

But if the bulk of the Screech Owl population continued to display indifference toward our efforts to attract them, not so the Kestrels. In fact, had it not been for the latter species, we probably would have given up the box project altogether. Almost all of the experimental pairs, for which two or more boxes had been put up, found them far superior to the hollows they had formerly been using, and 16 boxes were occupied by families of these handsome little hawks.

Since the Kestrels seemed to appreciate our handywork far more than the owls did, the fall and winter of 1960-1961 found us reclaiming many of the non-productive Screech Owl boxes, and putting them up in areas where the hawks were known to breed. In addition to this, boxes still located within Screech Owl ranges were checked periodically throughout the winter months, and many roosting adults were caught and banded in this way.

We are now happy to report that out "housing development" provided nesting sites for ten pairs of Screech Owls, and 30 pairs of Kestrels, in 1961. Presently, we are still maintaining a check of the owl boxes, re-encountering birds banded in the past, deriving a great deal of pleasure from watching their movements from year to year - and looking forward to the return of the Kestrels in the spring.

Methods of Locating Nesting Ranges

Screech Owl ranges almost invariably include: 1) A source of water, preferably running, such as a brook or small stream; 2) Stands of mixed hardwoods interspersed with conifers. These stands usually contain a large percentage of second growth, sapling-sized trees. A mature woods rarely contains Screech Owls. 3) Usually there are open areas such as fields, cleared areas under power transmission lines, orchards, or even a cemetery (seemingly a popular type of hunting area) in the immediate vicinity. This provides a good rodent hunting area.

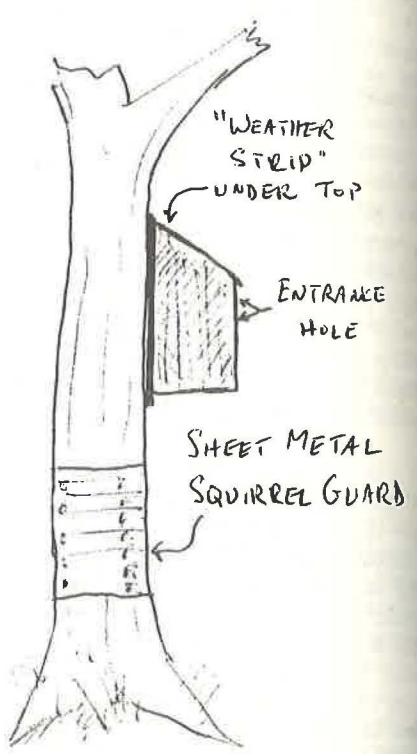
We generally locate Screech Owls by calling adults during late summer and throughout the fall. In late summer, the young, who are still more or less under parental care, are particularly talkative. Several visits to an area will definitely establish presence of a pair. Wandering birds tend to be confusing at times during late summer and fall, and it is best firmly to establish presence of one or more adults, before erecting boxes. With a much more extensive vocabulary and a different tonal quality, the young are considerably more vociferous than their parents. The presence of several young definitely indicates a nesting range. Screech Owl ranges seem rather limited; usually from $\frac{1}{4}$ to $\frac{1}{2}$ square mile. Boxes placed in the immediate area where a family is located usually produce the following season.

Finding Kestrel ranges is considerably easier, because of the Kestrel's diurnal habits. Kestrel ranges are usually slightly more extensive than those of Screech Owls, but in late March and early April the adults will usually be found within a few hundred yards of the prospective nest site, and seem to make themselves fairly obvious at this time. A Kestrel, alone or with another of either sex, seen during spring migration or in the early fall, does not necessarily indicate a home range. A pair should be seen in one area throughout the spring, or with young in mid-summer, before boxes are put up. Kestrels frequent old farms, fields, powerlines, and highways. Prospective nesters are sometimes located during Bal-chatri trapping operations in winter and early spring.

Construction of Nesting Boxes

Materials: Wood in sufficient lengths. White pine is best. We have used just about everything with reasonable success. Waterproof or marine plywood makes a very durable box. Nails of "hold-tite" type or

8d common type. (8d to attach top so that it can be removed with reasonable ease when checking box.) Regular grades of plywood do not make a satisfactory box. Stain finished box in some subdued natural tone of gray, brown, green, etc.



Dimensions: (When using 3/4 inch stock) - Bottom: 8 x 8 inches, with three or four small vent holes if possible. Sides: 8 x 16 inches at rear, and angling down to 14 3/4 inches at front. Back: 9½ x 22 inches - drill two or three holes top and bottom to facilitate nailing box to tree. Front: 9½ x 15½ inches - entrance hole 3½ inches in diameter. Top: 9 3/4 x 11½ inches - place 1½ x 8 inch "weather strip" below top at the back of box to cut out leaks at this seam.

Place about ½ inch of wood shavings at bottom of each box. The same box serves equally well for hawks or owls. Several models with slightly varying dimensions have been tried over the three years, and this box has proven best in most respects. Boxes can be made with removable tops or entrance holes of sufficient diameter to allow passage of a hand holding a Screech Owl. We prefer removable tops, as the other method often necessitates a rather rapid withdrawal of one's hand should the box be occupied by something other than an owl or hawk, especially honey bees. Also, an unnecessarily large hole tends to encourage entrance of predators.

After locating several prospective pairs of Screech Owls and Kestrels we commence with the housing project. First on the agenda is to obtain permission from landowners where the boxes are to be erected. I don't believe we have ever been turned down after explaining our plans and aims to a landowner, although several times I have, I believe, detected a touch of a "What are you anyway, some kind of a nut.." attitude on the part of the property owner. However, several have shown considerable interest, and have even offered us the use of ladders and their own services at times.

Always remember to ask the landowner the following: 1) Whether he objects to the topping of live trees; 2) He wishes some certain species of tree left untouched. This has often been the case with respect to White Pine (Pinus strobus), which we rarely use as a box base because of

its very disappointing habit of disappearing, with box attached, after a winter's logging operations; 3) he does not wish boxes erected in certain areas or on individual trees; or 4) he would prefer that all boxes were placed in either dead stubs or trees. This type of box leaves something to be desired, as it usually will find its way to the ground in a year or two; sometimes with the person attempting to climb it following closely! Boxes placed in large dead American Elms (Ulmus americana), which are now unfortunately very easy to find because of the Dutch Elm Beetle, have proven very successful for Kestrels. Such boxes are always attached to the main trunk of the tree which is usually still quite sturdy.

We have used two major methods of placing boxes. One is to merely pick the desired spot and height from the ground, and affix the box to this position with one or two small to medium spikes and a few 8d common nails. Use large spikes sparingly so that, if relocation ever becomes necessary or desirable the box can be reclaimed with a minimum of effort. This method usually achieves a greater number of boxes, at greater heights, in a shorter period of time, than does the second method described below. However, it also encourages a greater rate of occupancy by things other than raptores, and also does not particularly facilitate checking the boxes for winter roosting owls or for nests.

Nail this type of box where no irregularity or bulge in the trunk surface will exert pressure against the back of the box. Such pressure will tend to pull the back away from the rest of the box.

The second method consists of placing a box in a topped live tree or sapling, usually deciduous, and placing a metal guard on the trunk several feet from the ground. You may use either sheet metal or cafeteria-sized tin cans (two or more in series). Lack of access to the box from above, for lack of branches, and the difficulty of passing the metal guard below, seems to discourage squirrels and other pests from entering as readily. However, nothing seems completely to outwit the crafty gray squirrel, and some individuals, out of sheer perseverance or perhaps sheer stupidity, still decide to take up residence. There is a decided lack of escape routes from a box of this type and gray squirrels quite often, out of necessity, temporarily become "flying squirrels" when boxes are checked. Guarded boxes have considerably cut down residency by squirrels, but oddly have not appreciably raised residency by owls or hawks. Boxes of this type are generally lower than by the previous method, and are therefore easier to check.

Screech Owl boxes erected in this way are often not more than 15 feet from the ground. This seems acceptable enough to owls, but Kestrel boxes should be at least 20 feet high to insure reasonable success. Our boxes for both species vary in height from about 12 to 45 feet. The average height for Kestrel boxes is usually nearly 30 feet. We often erect owl boxes with a 14 foot aluminum ladder, and sometimes check them

in this way. Kestrel and some owl boxes require a rope and a pair of climbing irons. A box is more easily nailed off from a ladder than from spurs.

We have found that Screech Owls will sometimes accept a box with a northerly exposure for roosting purposes, but never for nesting. All boxes intended for Screech Owls should face to the south or southwest. These birds are often noted at various times of the day sitting in the entrances of our boxes, apparently doing little more than surveying the world by daylight and enjoying the warmth of the sun. Perhaps this explains their preference for a southerly exposure! Kestrels, on the other hand, not using the boxes at any other time of the year except the nesting season, seem to have absolutely no preference as to exposure. Many of our boxes have consistently produced Kestrel brooks with a north or northeast exposure. Since owls may use boxes placed for Kestrels, however, it would seem wise to attempt to face as many boxes in a southerly direction as possible.

Owl boxes are put up at any time from late fall until early spring - late fall is possibly best. Owls sometimes begin roosting in boxes within a week or two, but if one wishes to band many adults, it is best to wait a few months before making the first check. If the objective is to be the highest possible number of nests, it is then best to wait until nesting time in April. The more checks, the more adults will be banded, if this is the main objective. Finding them "at home" seems largely a matter of luck. An adult owl captured and banded in a box usually will not use that particular box as a roosting or nesting place again for from 12 to 24 months. They will, however, immediately move into a box a few yards distant. Since we generally have at least four boxes in an area, this winter adult banding does not appreciably cut down on nests secured.

Nest Dates

Screech Owls: the earliest date on which a full clutch (4 eggs) has been deposited, in our experience, was April 1. Most nests will have eggs in advanced stages of incubation or very small nestlings by early May. Young are excellent banding size around May 29, excluding unusually severe spring weather when nesting may be slightly staggered.

The optimum time to band nesting adults is during that period of time from about the last week of incubation through the first week of brooding. The male owl is usually in the box with his mate during this period. The females seem to do virtually all the incubation and brooding, with the exception of this particular period. At all other times the male will be roosting nearby, sometimes in another box, but usually in foliage, where of course he cannot be found or caught.

Kestrel nesting season covers a longer period of time. Pairs seem

to have their nesting site chosen in April, and young have been banded from May 31 through July 10. Most nests are banded in mid-June, with the July nests generally being renestings from earlier failures. Screech Owls rarely renest after a failure, in our study area. Kestrel nests can sometimes be found in natural hollows by observing the actions of adults. We have never been successful in locating a Screech Owl nest in a natural hollow. Young Kestrels can be successfully sexed at two or three weeks of age: the feathers have grown to a sufficient length by this time to allow the bander to separate males and females. Juvenile plumage in Kestrels is nearly identical to the respective plumages in adult birds.

In June, 1960, John Campbell and I accidentally captured a female Kestrel incubating on a re-nesting attempt. Because of the time of year, we had expected large young and mistook the female for a large nestling. We did not discover our error until we had removed her from the box. We banded and released her, expecting this high strung falcon to immediately desert the nest. A few weeks later, however, we banded four nestlings from her clutch of four eggs.

During 1961 Jack Holt deliberately plugged the entrances of several of his Kestrel boxes prior to climbing to them, and banded 8 adult females during late stages of incubation and early brooding. All nests were subsequently successful, which indicates this may be a safe and acceptable method of banding nesting females.

Food Data

Screech Owls: When the young are about to hatch, and shortly thereafter, the male works diligently "stocking the cupboard", so to speak. On one occasion a box containing five newly-hatched young and the female, contained, in "cold storage" in various corners, three Meadow Voles (Microtus pennsylvanicus), two White-footed Mice (Peromyscus leucopus), and the remains of a Bluejay (Cyanocitta cristata) and of a Robin (Turdus migratorius). In a shallow pool of water under the box lay a decapitated Flying Squirrel (Glaucomys volans). I should add here that regardless of snow depth during the winter, the majority of our owls, judging from prey remains found in the boxes and in pellets, abide rigidly to a diet of small rodents. There are, however, a few "birders" who seem to have a decided preference for Bluejays, Chickadees, etc., but these individuals form a very small minority. Since Screech Owls roost in trees during the period of foliage, our food item studies apply only for fall, winter and the nesting season. A brief resume of food items and the relative utilization of each follows. Some items should raise a few eyebrows!

In fall, other than the staple of mice and other small rodents, which form the major part of the diet at all times, Flickers (Colaptes auratus) and Bluejays seem fairly popular.

During winter we have found remains of Bluejays (numerous); Flying Squirrels (2 or 3); an unidentified species of black mole (2); and Saw-whet Owls (several instances!).

Things really get varied when the young arrive in the spring, as the adults are then under considerable pressure to find sufficient food for them. At this time we have found the following:

Mice and voles (not quite so numerous as at other times of the year)
Insects and frogs (quite commonly)
Black-capped Chickadees (Parus atricapillus)
Migrant warblers (several species)
Sparrows and other small birds (fairly regular food items in the nest, but also readily available at this season because of the spring migration)
Bluejays (not many)
Robins (2)
Towhee (Pipilo erythrophthalmus) (1)
Red-winged Blackbird (Agelaius phoeniceus) (2)
Mourning Dove (Zenaidura macroura) (1)
Woodcock (Philohela minor) (1)
Flying Squirrels (2)

And most surprising of all, in a box with six half-grown young owls and a female, a decapitated but otherwise intact, better than half-grown, Cottontail Rabbit (Sylvilagus floridanus)! How these birds ever managed to carry an animal of this size into the box is completely beyond us, but rabbits don't climb trees!

Kestrel food items: food items are difficult to locate in the "guano-bed" that forms in the bottom of an active Kestrel nest, but we have found remains of mice and voles, sparrow feathers (very rarely), and many insect wings, legs, and body casings.

Incidental Observations

Most roosting Screech Owls will not leave a box during daylight hours even if you were to take it off the tree and lower it to the ground, as Jack Holt once did when reclaiming the box. The owl in question was just attempting his escape when Jack reached the ground to pick up the box. During the winter of 1961, however, John Campbell and I had three out of 12 roosting birds flush from the boxes at the first indications of climbing. Whether these birds had been "educated" by previous experience we do not know, but at least two of them had not been previously banded. We now stuff the entrance hole with a hat on a pole before climbing. I might add that a Screech Owl can fly with amazing speed and agility through dense woods under conditions of bright, snow-reflected sunlight.

By the time the young reach banding size, the box is exceedingly filthy and foul-smelling, and banding young Screech Owls is anything but pleasant work.

Often by this time neither of the adults is in the box, although they can usually be found roosting within sight of the box at heights of from 3 to 10 feet. If approached, they will flush immediately.

Nests have been as close as 1/8 of a mile in the same year, as in the case of our Zink's Swamp and Bannister Road pairs. In 1961 the female incubating at Zink's Swamp was the female banded at the 1959 Bannister Road nest. Both adults at Bannister Road in 1961 were new, unbanded birds. Both adults had been banded there in 1959. The old pair of birds from Zink's Swamp, both banded in 1960, had disappeared, and the 1959 Bannister Road female was mated with a new unbanded male. We have recaptured a few birds banded two to three years before who were still resident on their old home range, but the majority of evidence points to either a high turnover in mated pairs, or considerable moving from old areas within our study area to new areas out of the study area. Several of our banded nestlings have been found replacing lost mates of established pairs in years subsequent to their banding.

Banding Totals

The following chart shows the combined banding totals of the three years of this study. All birds listed were banded as a direct result of our nesting box project.

	1959	1960	1961	Total
Screech Owls				
Adults	16	23	21	60
Nestlings	18	23	36	77
Total	34	46	57	137
Kestrels				
Adults	-	-	8	8
Nestlings	24	41	82	147
Total	24	41	90	155

Note: Ohio's famous "hawk man", Laurel Van Camp, has banded over 5,000 Screech Owls by means of boxes over a period of years. The original impetus for our own project came from an article by Mr. Van Camp.

Recoveries

There have been, to date, seven recoveries of banded Screech Owls (4 adults, 3 nestlings) from 7 days to two years later, and at distances of from a few hundred yards to approximately 15 miles from original place of banding. We do not think these are of sufficient interest to include here in detail. They do, however, seem strongly to indicate that our population of Screech Owls is quite sedentary.

Our Kestrel recoveries are described below:

633-16903: nestling female banded at North Andover on June 23, 1959, was "found dead" at Savannah, Georgia, reported by letter dated September 20, 1959.

633-16907: nestling male banded at West Boxford on June 24, 1959, was "brought home by cat - released" at Old Lyme, Connecticut, on Oct. 7, 1959.

633-16917: nestling male banded at Andover on June 28, 1959 and was caught and released at Lowell, Mass. (about 10 miles distant) Aug. 17, 1959.

643-09899: nestling male banded at Bradford on May 31, 1961, was "found dead" at Wollaston Beach, Quincy, Mass., on July 20, 1961. This is only 50 days later, when this bird should still have been under parental care. Quincy is about 30 miles from Bradford, and we are inclined to theorize that this male travelled there via the Merrimack River in an already deceased condition. The particular box this nestling was banded in is close to the river, and we experienced fairly heavy rains during the period between banding and recovery.

633-16953: nestling male banded at North Andover, June 17, 1960, was "captured by father - released bird with band attached", in "first part of September 1960" at Lebanon, Windham County, Connecticut.

693-09251: nestling female banded at West Newbury on July 2, 1961, was "killed (probably by aircraft) on active runway at Pease Air Force Base", New Hampshire, on August 11, 1961.

Banding Objectives

1. To determine mortality causes and rates of these two species of raptores. An objective greatly sought after by both of the authors, and I am afraid completely defeated by the new IBM card recovery reporting system which the Banding Office plans to put into use. To the best of our knowledge no provision is made for reporting either the exact circumstances of recovery, or the name and address of the person who found the bird. If this information were provided, follow-up correspondence might

help to some extent. Unless the new form is in some way modified to provide at least as much information given on the old pink sheets, one of the most important goals of our project will be completely unattainable.

2. To study the sedentary Screech Owl population, and to determine how much, if any, significant movement takes place in this population. The new method of giving only the 10-minute grid (using coordinates on the recovery report) with no mention of town or local area will limit the possibilities of this section of the study also. In our area, several towns can easily be included in one 10 square mile area, which on the new form will be the only information as to specific area which will be provided. In studying the relatively short-distance movements made by a population of a largely sedentary species such as the Screech Owl, this system will will absolutely impossible, and the information provided useless to this type of study. In our study, a movement of 5 or 6 miles by an individual can be significant; with the coordinates system we will not know if the bird in question was recovered by our next door neighbot, or in a town several miles distant.

3. To determine average and long-term life spans of the two species in this study.

4. To collect data on success and failure rates, clutch and brood sizes, food habits, nesting dates, etc.

5. To determine migration routes and wintering grounds of Kestrels from our area, and to determine, if possible, what proportion of our Kestrel population is migratory, winter resident, and permanent resident.

33 Tewksbury St., Ballardvale, Mass. ★★★

EUROPEAN GOLDFINCH WITH STRANGE BAND

On April 22, 1962, your Editor trapped a European Goldfinch (Carduelis carduelis), an immature, and found that it was already banded: the band was an unbroken ring of aluminum, about the size of a 1B band but of somewhat thinner metal. Since it was an unbroken ring, it must have been put on the bird's leg while the bird was still quite young - the sort of band which breeders use. There is a possibility, however, that this kind of band could have been used to band nestlings. The band had the following inscription:

60
NB 19535

We banded the bird's left leg (the strange band was on the right) with a regular Fish & Wildlife Service band, no. 103-32497. Anyone with information as to where this strange band may have come from is urged to contact the Editor.

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