

1986

Barn Owl Investigations

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PERFORMANCE REPORT

STATE: Virginia PROJECT NO.: W-77-R-3
PROJECT TYPE: Research and/or survey STUDY NO.: X
PROJECT TITLE: NONGAME JOB NOS.: X-A, B, C
STUDY TITLE: Barn Owl Investigations
JOB TITLE: Evaluation of Barn Owl Habitat Use, Provision of Nest Boxes, and Survey of Breeding Population.

PERIOD COVERED: July 1, 1985 - June 30, 1986

JOB X-A
OBJECTIVE: To determine barn owl habitat requirements so that the selection of sites for nest boxes can be made efficiently and effectively.

JOB X-B
OBJECTIVE: To evaluate the status of the barn owl in Virginia, select suitable locations for nest boxes, construct and erect nest boxes in appropriate areas.

JOB X-C
OBJECTIVE: To monitor the use of nest boxes and other barn owl nest sites.

SUMMARY:

Radiotelemetry was used to study the movements and habitat use of six barn owls (Tyto alba pratincola). Mean home range size was 719 hectares; idle grass habitat was preferred, while corn, soybean, residential, and woods habitats were avoided.

The status of the barn owl in Virginia was evaluated after identifying 214 nest/roost sites and comparing their past and present abundance. Only 43 of 111 known nest sites (39 percent) were active in 1986 and many apparently suitable sites were unused. It is recommended that the barn owl be listed as a threatened species in Virginia.

Fifty-five barn owl nest boxes were erected prior to the 1986 breeding season. Thirteen (24 percent) were used. Another 45 nest boxes were erected after the breeding season.

Fifty-one active barn owl nests were located and these nests produced a total of 132 young at banding age (2.6 young per active nest, 2.9 young per productive nest).

BARN OWL HABITAT USE:

Radiotelemetry techniques were used to monitor barn owl movements in agricultural areas of Charles City, Henrico, and King William counties during the summer of 1984, the summer and fall of 1985, and the spring of 1986. Over 900 random samples of hunting location and hunting habitat from six barn owls were used to analyze home range size and habitat preferences.

Home range size, as described by a computer-generated 95 percent confidence ellipse, varied between 224 and 1670 hectares. Mean home range size was 719 hectares. Habitat preference and avoidance was determined by comparing the observed versus the expected proportion of time spent in a given habitat. The expected proportion is based upon the availability of that habitat within the owl's home range. Each barn owl spent a significantly greater proportion of time in the idle grass habitat than expected and a lower or significantly lower proportion of time in the corn, soybean, tame hay, heavily-grazed pasture, residential, and woods (except for one owl which frequently foraged in a densely-populated blackbird roost) habitats than expected (Table 1).

These findings indicate that intensive farming practices, which foster the replacement of idle grass habitats with row crops and increase the grazing pressure on pasture, impair barn owl populations. These results also indicate that a barn owl nest box program will be most effective if nest boxes are placed in areas that have an abundance of idle grassland such as fallow fields, wild hayfields, and lightly-grazed pasture.

Table 1. Barn owl habitat use near Richmond, Virginia, 1984 - 1986.

Owl #	Time Period	Habitat type						
		corn	soybeans	woods	pasture	tame hay	idle	residential
206	Jul-Aug 84	NS ³	avoided ²	avoided	-----	-----	preferred ¹	avoided
	Jul-Aug 85	avoided	avoided	preferred	-----	-----	preferred	avoided
	Sep-Oct 85	avoided	avoided	preferred	-----	-----	preferred	avoided
208	Jul-Aug 84	NS	NS	avoided	-----	-----	preferred	avoided
	Jul-Aug 85	avoided	NS	NS	-----	-----	preferred	avoided
215	Jul-Aug 85	avoided	NS	avoided	-----	-----	preferred	-----
	Sep-Oct 85	avoided	avoided	avoided	-----	-----	preferred	-----
217	Jul-Aug 85	avoided	avoided	avoided	NS	NS	preferred	-----
	Sep-Oct 85	NS	avoided	avoided	NS	NS	preferred	-----
224	Jul-Aug 85	avoided	avoided	avoided	-----	-----	preferred	-----
	Sep-Oct 85	avoided	NS	avoided	-----	-----	preferred	-----
226	May-Jun 86	avoided	avoided	avoided	-----	-----	preferred	-----

- ¹ preferred habitats are those in which the owl spent significantly more time than expected.
² avoided habitats are those in which the owl spent significantly less time than expected.
³ NS habitats are those which were not significantly preferred nor avoided.

STATUS EVALUATION:

The status of the barn owl in Virginia was evaluated by compiling information about their past and present abundance in the state. Roost and nest sites from around the state were identified, using techniques discussed in the following paragraph, and nearly every site was visited during the 1986 breeding season. A comparison was then made between the number of sites where barn owls were known to have bred in the recent past and the number of sites used in 1986.

Roost and nest sites were located by 1) searching over 900 barns, silos, tree cavities, church steeples, duck blinds, and other structures which barn owls have been known to use; 2) requesting reports from the public using over 60 ads in farmer's magazines, county newspapers, and agricultural or naturalist newsletters (figure 1); 3) contacting all of the Virginia Society of Ornithology chapters by mail and using a display at the 1986 annual meeting to request barn owl reports; 4) contacting all of the Virginia Commission of Game and Inland Fisheries wildlife biologists and game wardens; 5) talking to farmers, Cooperative Extension Service and ASCS employees; 6) posting over 100 "wanted posters" in feed stores, ASCS and Virginia Farm Bureau offices; and 7) searching Raven and American Birds for mention of barn owls.

A total of 214 sites which have definitely, or very probably, been used as barn owl nest sites or roost sites were identified (figure 2). Sixty-two (29 percent) of these were found by searching likely structures and 185 (71 percent) of were reported by farmers, naturalists, and Game Commission employees. Advertising was a very efficient means of locating barn owls around the state, and the bulk of the reports (78 percent) resulted in the identification of definite or very probable barn owl sites. The ads also served as a means of educating the public about the decline of the barn owl and of getting an indication of the public's interest in barn owls. Over 350 requests for barn owl nest box pamphlets were received indicating that there is considerable public interest in barn owls.

Of the 111 sites which are known to have been used for nesting by barn owls in the recent past (within the last ten years), only 43 (39 percent) were still active in 1986 (Table 2, figure 3). Loss of habitat, destruction of nest site, and loss of accessibility to nest site (many buildings have been sealed to prevent pigeon access) seem to explain why barn owls have disappeared from some areas; increased raccoon predation and competition with pigeons for nest sites appear to be limiting barn owl breeding in other areas.

Since the barn owl in Virginia has "exhibited a considerable decrease in numbers beyond the limits of normal fluctuation or documented range contraction" (Linzey 1979), we recommend that the barn owl be classified as a threatened species in Virginia.



The barn owl.

Information Sought On The Barn Owl

Pale silent forms that frequent an old abandoned barn need not be ghosts. Blood-curdling screams from a midnight barnyard need not be those of phantoms. An apparition haunting your barnyard may simply be a barn owl, a night bird which has many ghostlike qualities: light-colored feathers, silent and mothlike wingbeats, a preference for unoccupied buildings, and screechy screams and hisses which will raise the hair on anyone's back. There's no doubt that barn owls have inspired many haunted house stories.

Although barn owls may appear ominous, they are really very beneficial to man. This owl's diet is nearly 100 per cent rodents and they eat thousands a year without harming chickens or other livestock.

Simple proof of their value can be found in their roosts where pellets (regurgitated balls of fur and bones) accumulate. These pellets contain all of the undigestible matter from the owl's prey and dissecting them will reveal mouse skull after mouse skull. There is no better rodent killer, not even its close ally the barnyard cat.

Even though barn owls are such efficient rodent killers, their populations have been declining throughout most of the Eastern United States. In fact, barn owls are listed as endangered by six and declining by 10 state wildlife agencies. An evaluation of their status in Virginia is presently being conducted. You can help by reporting any information you may have about barn owls. Include when the owl was seen, where (county, route number, property owner's name), and whether nesting occurred. All reports will be kept confidential. Please send information to:

Chuck Rosenberg
Department of Biology
College of William and Mary
Williamsburg, VA 23185

This information may also help to expand present barn owl populations because it will aid a nest box program which is being funded by the Virginia Commission of Game and Inland Fisheries. If you wish to build your own nest box and use it to attract barn owls to your property, instructions are available from the above address. Just send a self-addressed, stamped envelope.

There are three other owls that may be found in farm areas, but barn owls can be distinguished from these using four characteristics. Barn owls (which are often called monkey-faced owls) have white heart-shaped faces, light underparts and golden upper plumage, they do not "hoot", and they are frequently found in barns, silos, abandoned buildings, and hollow trees.

If you have never seen a barn owl sleeping the day away on a rafter or tirelessly carrying mouse after mouse to a hungry brood of young, you are not alone. Most people never see this uncommon nocturnal bird. But try looking for them (and the pellets they leave behind) in undisturbed barns, empty silos, abandoned buildings, unused water tanks, church steeples, and hollow trees. It may be that one of these secretive creatures haunts your neighborhood but has so far gone unnoticed.

Rosenburg is a master's degree student at William and Mary and is evaluating the owl's status in Virginia.

A Clipping From
Virginia Press Services
News Clipping Bureau

300 W. Franklin St.
Richmond, Va. 23220
Phone 804-648-8948

FARMVILLE HERALD

Farmville

Date DEC 6 1985

*Rosenburg, Chuck
Biology Dept.*

figure 1. An example of an ad used to request barn owl reports from the public.

Table 2. The total number of nest sites known to have been used by barn owls within the last ten years versus the number of those sites which were still active in 1986.

<u>SITE</u>	<u>NUMBER OF NESTS</u>	
	<u>TOTAL</u>	<u>1986</u> ¹
Silo	28	15
Tree cavity ²	19	3
Barn	15	6
Lookout tower	10	6
Other building ³	10	3
Duck blind	9	6
Water tank	8	3
Nest box	6	0
Trailer ⁴	3	-
Grain elevator	3	0
Chimney	1	0
Deer blind	1	0
Riverbank	1	1
Total	111	43

¹ nests in nest boxes erected in 1986 are included here only if the nest box is in a nest site which was used between 1976 and 1985.

² includes 8 silver maple (*Acer saccharum*), 6 white oak (*Quercus alba*), 2 northern red oak (*Quercus rubra*), 2 American sycamore (*Platanus occidentalis*), and 1 willow (*Salix* sp.).

³ includes 2 mills, a church, an abandoned house, the attic of an occupied house, a woodshed, a boathouse, a well building, a coal pier, and a NASA hangar.

⁴ the trailers were not inspected in 1986 and therefore are not included in the total number of nests.

- : roost sites
- * : nest sites
- ★ : areas with 4 or more nest sites in close proximity

OUTLINE MAP OF VIRGINIA

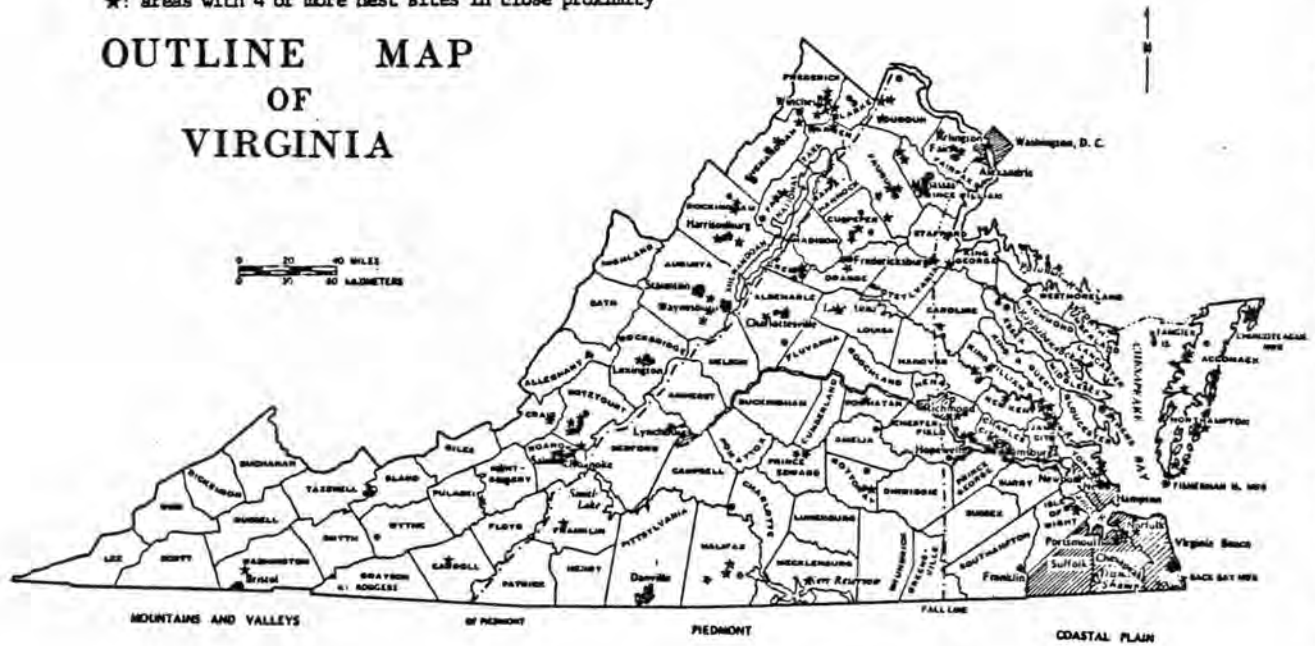


Figure 2. Location of 214 barn owl roost and nest sites, most of which have been active within the last 10 years.

- : roost sites
- * : nest sites
- ★ : areas with 4 or more nest sites in close proximity

OUTLINE MAP OF VIRGINIA



Figure 3. Location of 51 nest and 16 roost sites which were active during the 1986 breeding season.

- : nest boxes erected after the breeding season
- ★ : nest boxes erected prior to the breeding season
- ☆ : Nokesville area which has 8 Game Commission boxes and 20 boxes erected by Ken Bass and Mark Causey

OUTLINE MAP OF VIRGINIA



Figure 4. Location of 65 nest boxes erected before and after the 1986 breeding season (as of 15 July).

NEST BOXES:

Three barn owl nest box designs were used for this project: 1) A simple wooden tray was erected in roofed barns or silos. 2) A rectangular enclosed box was used in barns with heavy raccoon use. A 6"x6" entrance hole was cut in one wall and the box was nailed against the inside wall, flush with the hole. This provides access from the outside of the barn so that owls, but not raccoons, can get into the box. 3) A square enclosed box was attached to poles or to the outside of barns and silos which have no entrance for barn owls. Fifty-eight nest boxes were erected prior to the 1986 breeding season. One box was lost with the demolition of its silo, a second box was removed from a silo prior to its demolition, and a third box was removed due to pigeon use. Thus, 55 nest boxes were available for use during the 1986 breeding season; the remaining 45 were erected after the breeding season (Table 3, figure 4).

In addition to the Virginia Game Commission nest boxes, 35 nest boxes built by other people were known to be available for use in 1986: 20 erected by Ken Bass and Mark Causey in Prince William county, 5 on Fort A.P. Hill property in Caroline county, 4 on Fisherman Island National Wildlife Refuge in Northampton county, and 6 erected by individuals in various parts of the state.

Table 3. Virginia Game Commission nest box availability, use, and productivity for 1986.

TYPE	NUMBER AVAILABLE	NUMBER USED	PERCENT USED	TOTAL NUMBER OF YOUNG	NUMBER/ ACTIVE NEST	NUMBER/ PROD. NEST
Tray	38	11	28.9	31	2.8	3.4
Rectangular box	9	1	11.1	6	6.0	6.0
Square box	8	1	12.5	2	2.0	2.0
Total	55	13	23.6	39	3.0	3.5

1986 BREEDING RESULTS:

All nest boxes and other possible nest sites were visited between 15 May and 15 July 1986. Young were banded if they were accessible and if there was no danger of causing premature fledging. The total number of young at banding age (4-8 weeks) was recorded for each site. The number of young that fledged was not identified for most sites. The number of young at banding age is used below to compare the productivity of different nest site types and to give an approximate idea of the total productivity of all nest sites combined. Paradichlorobenzene crystals were spread on the ground near any nests that were accessible to raccoons and black rat snakes in hopes of deterring predation following nest inspection.

A total of 51 active barn owl nests were found, of which five were not productive (Table 4). Thirteen of the active nests were in Virginia Game Commission nest boxes; two of these nests were not productive (Table 3). Therefore, 24 percent of the available nest boxes were used and these nests accounted for 25 percent of the known Virginia nests. Pigeon nests were found in five nest boxes. All pigeon nests were removed.

A total of 132 young (2.6 young per active nest, 2.9 young per productive nest) at banding age were found. Virginia Game Commission nest boxes produced 39 young (3.0 young per active nest, 3.5 young per productive nest). The higher productivity per nest observed for nest boxes is probably due to the greater space and security that nest boxes offer (Colvin 1984).

Barn owls have nested in a diversity of sites in Virginia (Table 2). It should be noted that the representation of sites is biased towards man-made structures. People reporting barn owl nests are more likely to know of barn owls using their buildings than of barn owls using tree cavities. Also, man-made structures were searched much more frequently than trees because they are easily identified as potential barn owl sites and they are better suited for nest boxes.

Mean egg-laying, hatching, and fledging dates were extrapolated from the estimated ages of young in all nests. The mean egg-laying date was 6 April (extreme dates were 20 February and 13 June); the mean hatching date was 6 May (extreme dates were 20 March and 13 July); the mean fledging date was 8 July (extreme dates were 22 May and 15 September). It is important to avoid disturbing nests during incubation; it is also important to band young well before they can fly so that premature fledging is avoided. The variability in the breeding dates makes it impossible to totally avoid these problems, but they can be minimized by inspecting nests between 1 June and 1 July.

Table 4. Barn owl productivity in Virginia in 1986.

	NUMBER OF NESTS	NUMBER OF YOUNG	PRODUCTIVITY ²	
			NUMBER/ ACTIVE NEST	NUMBER/ PROD. NEST
Nest Box ¹	16	48	3.0	3.4
Non Nest box	35	84	2.4	2.8
Total	51	132	2.6	2.9

¹ includes three nests in nest boxes erected by Ken Bass and Mark Causey.

² six nests which still had eggs in early July and two nests from which young had fledged before inspection are not included in these calculations.

LITERATURE CITED:

- Colvin, B.A. 1984. Barn owl foraging behavior and secondary poisoning hazard from rodenticide use on farms. PhD dissertation. Bowling Green State University, Bowling Green, Ohio.
- Linzey, D.W. Editor. 1979. Proceedings of the symposium on endangered and threatened plants and animals of Virginia. Blacksburg, Virginia.

TARGET DATE FOR COMPLETION: Continuing

STATUS OF PROGRESS: On schedule

SIGNIFICANT DEVIATION IN PROGRESS: None

RECOMMENDATIONS: Continue mangagement aspects across the state

COST THIS SEGMENT: Federal \$9,456 : State \$3,152 : Total \$12,608

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DATE: August 1, 1986