Short-eared Owl winter roosting strategies

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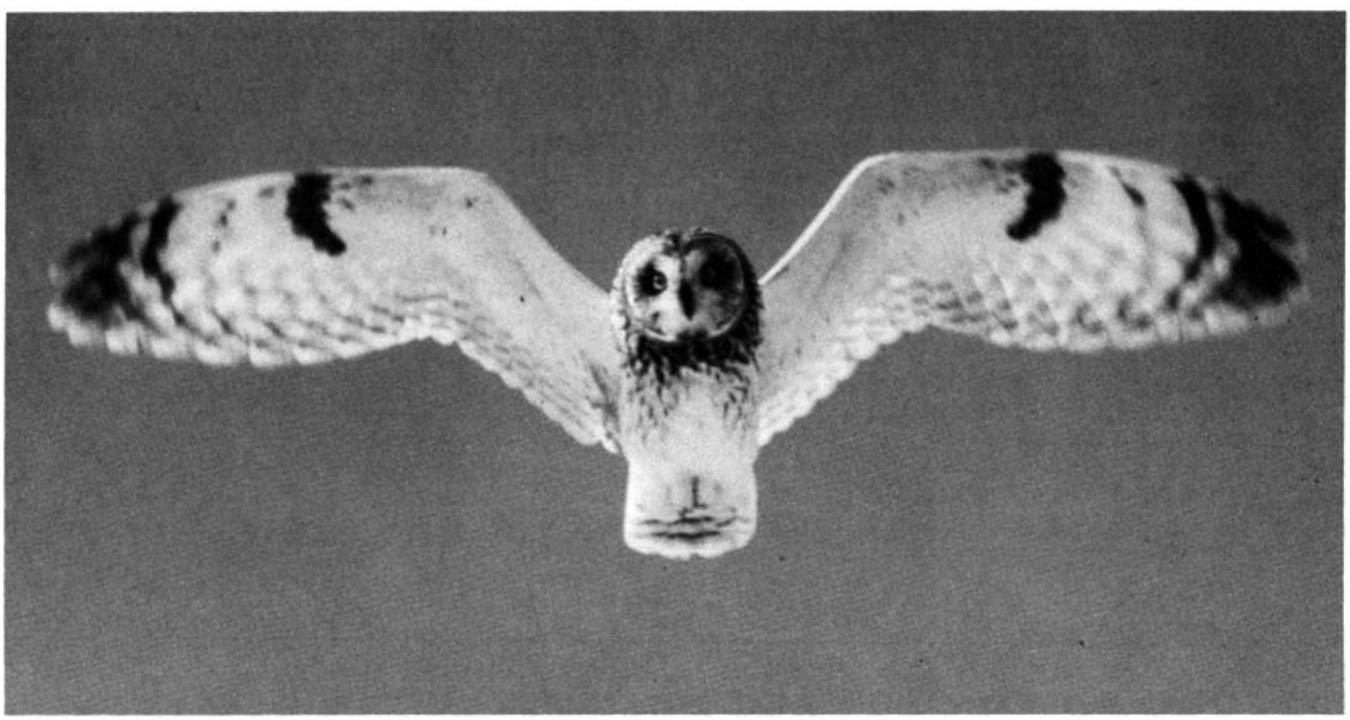

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THE SHORT-EARED OWL (*ASIO FLAMmeus*) is classically described as a ground-roosting and ground-nesting species (Urner 1925, Bent 1938, Chislett 1941, Weller *et al.* 1955, Craighead and Craighead 1956). Consequently, a recent observation of several Short-eared Owls roosting in conifers in the manner of their close relative, the Long-eared Owl (*Asio otus*), prompted an investigation. A thorough examination of the literature confirmed that this behavior was uncommon and had been noted by only a few investigators (Bent 1938, Banfield 1947, Hoyt 1962, Clark 1975, Ponshair 1976, Hanisek 1978, Kemp 1982). During three winters, systematic searches of conifer roosts were conducted to determine the frequency, duration and stimulus for this alternative roosting strategy.

Depending upon the weather, this typically ground-roosting species often roosts in conifers.

STUDY AREA AND METHODS

The owl roosts under study were located in the Hackensack Meadowlands in northeastern New Jersey, where extensive tracts of estuarine marsh border the lower Hackensack River. Common Reed (*Phragmites communis*) is the dominant plant cover, tidal ditches and creeks are numerous, and sparse deciduous tree cover is found only in drier upland edges which are heavily urbanized. In many areas, highways, railroads, industrial parks, and active and inactive sanitary landfills have encroached into the marsh. Virtually all conifers present had been ornamentally planted at some of the industrial parks.

Conifer roosts of Short-eared Owls were studied at one industrial park that directly adjoined the marshes. Owl roosting was limited to only one 22-hectare block as determined through intensive searches for owls and/or pellets, whitewash, feathers, and prey remains, within a one-kilometer radius. Systematic searches of all conifers in the 22-hectare block were made each winter from 1981 to 1983. On most searches, flush counts (Craighead and Craighead 1956) were necessary as the owls were

usually hidden in the dense conifers. To help determine the length of time of roost site use, pellets were collected during flush counts in 1982 and 1983 when there was no snow cover. Most authorities agree that approximately one pellet/day/owl is ejected at the roost site (Chitty 1938, Craighead and Craighead 1956, Clark 1975), thus providing a measure of roost-site use in owl-days (Graber 1962).

During the second and third winters observations of the adjoining *Phragmites* marsh were made at dusk to observe Short-eared Owls emerging from ground-roosting sites. Although the conifer roosts were not consistently used, owls remained in the immediate vicinity throughout the winter. Observations began at least 0.5 hours before sunset. From a 3-meter dirt mound, the number, location, activity, flight direction, and time of Short-eared Owl emergence for initial evening flight, were recorded. Average snow depth was obtained from the National Weather Service at Newark International Airport, located only 13 kilometers south of the study area. The reading closest to sunrise was used as this would most closely match the conditions when the owls selected their daytime roosts.

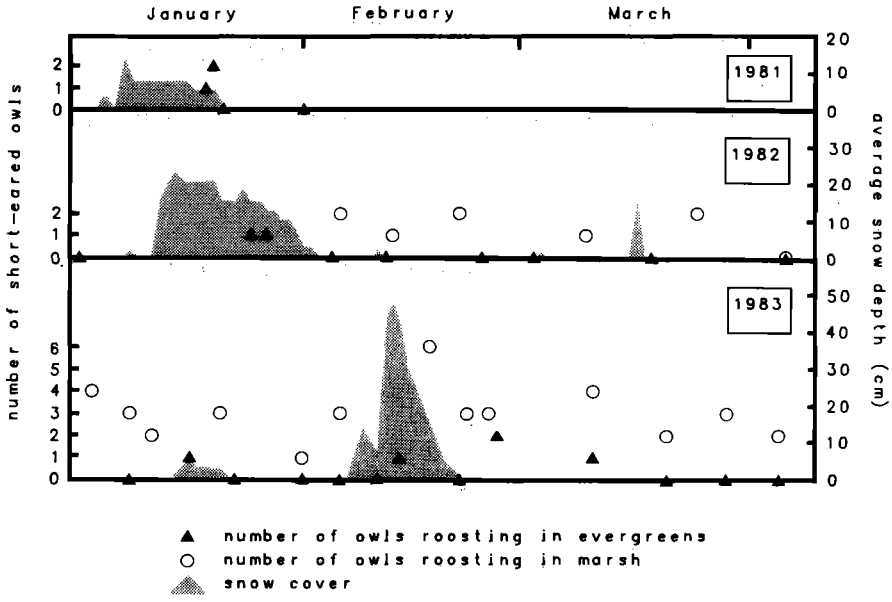
RESULTS

Conifer roost characteristics—In 1981, 1–2 Short-eared Owls roosted 2 meters above the ground in 4-meter Austrian Pines (*Pinus nigra*), that were planted on a 0.5 meter mound, bordered with small boulders. Two 1-meter ornamental yews (*Taxus* spp.), a 2-meter hemlock (*Tsuga canadensis*), a 1-meter ornamental juniper (*Juniperus communis*), and a 3-meter white birch (*Betula pendula*), were also present on the mound, but were assumed not used, owing to a lack of aforementioned owl indicators. During the following two winters, another roost-site mound was chosen containing three 2-meter Austrian Pines, two 1-meter junipers, and a 1-meter yew. In 1982, only junipers were used and owls roosted in the upper one-half of the shrubs, evidenced by patterns of whitewash found on low branches. In 1983, one juniper and two Austrian Pines were used. Owls and whitewash patterns were observed above ground at about 0.5 meters and 2 meters, respectively. The two roost areas were notably in areas with virtually no human traffic with the nearest driveway about 15 meters from both sites. In contrast, three other conifer groups were present, but were presumably not selected owing to their close proximity (2–3 meters) to regularly used parking lots.

Effect of snow cover on roost-site use—Figure 1 presents the results of systematic searches for conifer-roosting owls during the day and compares them to amount of snow cover. When average snow depth was at least 5 centimeters, six of seven observation days showed Short-eared Owls roosting in conifers, with an overall total of 26 pellets deposited. In contrast, there was a statistically smaller proportion of conifer-roosting during snow-free conditions (2 of 19 observation days). Only one of five significant snowfalls (≥5 centimeters) did not produce an observation of conifer-roosting, although this snowfall melted within two days (March 16, 1982). It should also be emphasized that the only conifer-roosting observed without snow cover was that of a roost initiated February 12, 1983, the day after a record snowfall (45.7 centimeters). The habitual use of this roost continued well after the deep snow had melted and one or two owls deposited a total of 22 pellets during the following snow-free period. In all other cases, conifer roosts were abandoned immediately following snow melt.

Evening emergence from ground roosts—Further substantiation that owls abandoned conifers and not the entire area after snowmelt is presented in Figure 1. Significant numbers of owls were present throughout the winters of 1982 and 1983. Furthermore, these owls were observed as they emerged from ground-roosts among the tall 2–3 meter *Phragmites* cover. Since this marsh is less than 200 meters from both conifer roosts, it appears fairly safe to assume that the individuals roosting in conifers were among those seen roosting in the marsh during snow-free periods.

Communal roosting: intraspecific and interspecific—No more than two Short-



Snow	Evergreen Roosts used	unused	total
>5 cm	6	1	7
none	2	17	19
total	8	18	26

Figure 1. *Results of systematic evergreen-roost searches during the day. Dusk observations from the adjacent marsh were included to show that owls remained in the vicinity even when evergreen roosts were not used. 2 × 2 contingency table indicates a highly significant over-utilization of evergreen roosts during periods of snow cover (Fisher Exact Test, $P < .001$).*

eared Owls roosting together in conifers and no more than three Short-eared Owls emerging together from ground-roosts in the marsh were observed. Of note, a Long-eared Owl was observed once roosting on the same branch with a Short-eared Owl about 0.7 meters apart. The Short-eared Owl was completely exposed near the end of the branch. In contrast, only the head of the Long-eared Owl was visible as it dozed alongside the tree trunk. The owls were left undisturbed, but the following day none was visible until my close approach flushed two Short-eared Owls and one Long-eared Owl from the same Austrian pine. This interspecific owl roost lasted for at least two days and probably had been in existence several days before discovery of it. This co-roosting was observed only in one season, although several Long-eared Owls continued to use this roost in subsequent years.

DISCUSSION

These observations strongly suggest that significant snowfall (≥5 centimeters) may be the primary stimulus for Short-eared Owls to seek roosting sites in dense conifer cover, as opposed to their typical ground-roosting sites. Of all the reports describing Short-eared Owl roost sites (Table 1), only Banfield (1947) and Hanisek (1978) suspected a relationship between snow cover and conifer-roosting. The numerous systematic searches conducted in this study extend and confirm their preliminary observations and speculations. Although the owl sample size studied here was small, the occurrence of conifer-roosting behavior is geographically widespread (Table 1) as not to suggest an aberrant behavior of a few individuals (or local tradition).

Banfield (1947) speculated that the white background of snow provided "poor cover" for the owls. This loss of cryptically colored surroundings may be an important motivation for abandoning ground roosting areas given that Short-eared Owls almost always remain well hidden until flushed. Similarly, the Craigheads (1956) noted that Short-eared Owls almost always select fields with light-colored grasses that closely resembled their plumage. By roosting in dense conifers, relatively dry and protected branches may offer thermal advantage in terms of body heat conservation. Hayes and Gessaman (1980), have shown that in small raptors the maintenance of thermal balance can only be improved by the use of physical shelter or sunbathing. In areas where conifers or evergreens were not available, Short-eared Owls have used a variety of substrates as roosts (Table 1).

In both conifer roosts and on the ground, the establishment of small communal roosts was frequently observed. Although as many as six Short-eared Owls were seen hunting in the same area at dusk, the largest communal roost encountered had three owls. Much larger roosts have been reported, however (Weller *et al.* 1955, Clark 1975, Bildstein 1979). The unusual observation of two Short-eared Owls roosting with a Long-eared Owl represents only the second published record of an interspecific owl roost (both species using the same tree). Kemp (1982) first reported a communal roost of one Short-eared Owl and three Long-eared Owls in a hawthorn bush (*Crataegus* spp.) in England. Apparently, the gregarious nature of wintering *Asio* owls provides adequate levels of socialization necessary to establish a cooperative interspecific roost. This mutual tolerance suggests that the benefits of communal roosting outweigh the costs of interspecific competition. Newton (1979) suggests that it is more efficient for individuals to clump together when food is unpredictably concentrated at various places and times (*e.g.*, vole plagues), than when food is uniformly distributed. Additionally, communal roosts often serve as "information cen-

Table 1. Review of Short-eared Owl winter roosting sites

Source and Location	*Original Description of Roosting Sites*
Hendrickson & Swan (1938) Iowa State College	2 acre deciduous thicket, perched on logs, bases of brushpiles in colder weather, never over 8 ft from the ground.
Jenkins (1944) England	perched 20–30 ft in "deciduous" trees.
Banfield (1947) Toronto, Canada	fields, clumps of ornamental conifers (15–20 ft) when snow on ground, used only douglas firs (*Pseudotsuga taxifolia*).
Weller *et al.* (1955) Columbia, Missouri	In a form in a tuft of grass, fields with a dense cover of grass less than 1 ft high (*Panicum dichotomilflorum, Aristida* spp.).
Craighead & Craighead (1956) Superior Twsp., Michigan	fields of light-colored grass (*Phleum pratense, Bromus* spp., *Phragmites* spp.), grass-sedge kettles, marsh areas.
Hoyt (1962) central New York	residential "cedar" grove
Short & Drew (1962) Williamston, Michigan	vine-covered "deciduous" trees, pile of lumber and discarded branches, large rock pile.
Clark (1975) central and western New York	abandoned limestone quarry filled with stumps, auto junkyard, pile of scrap metal, scotch pine grove (*Pinus sylvestris*), juniper grove (*Juniperus communis*)—same roost as reported by Hoyt (1962).
Ponshair (1976) Blendon Twsp., Michigan	young scotch pine plantation—perched under conifers, only 1 observation of owl in tree.
Hanisek (1978) Lopatcong, New Jersey	thicker "yews" [*Taxus* spp.], roosted 6–8 ft above ground.
Kemp (1982) Norfolk, England	raised tussocks, "broken" birches (*Betula pendula*), and tree stumps in open "boggy area", hawthorn bush, roosted under or 1–2 m up in "conifers".
This study Lyndhurst, New Jersey	2–3 m Austrian pines or 1 m common junipers—roosted 1–2 m above ground, or in *Phragmites communis* marsh (reeds 2–3 m).

ters" from which some birds follow others to profitable hunting grounds (Ward and Zahavi 1973). Further study is required to isolate the precise mechanisms of communal roost formation in *Asio* owls, as well as conifer roosting behaviors in Short-eared Owls.

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Pine Grosbeak (Pinicola enucleator). *Illustration/James Coe.*