

WINTER OF THE BUTCHER-BIRD: The Northern Shrike Invasion of 1995-1996

by Wayne R. Petersen and William E. Davis, Jr.

Little did Massachusetts birders realize that the appearance of a Northern Shrike (*Lanius excubitor*) in East Orleans on October 13, 1995, was the beginning of perhaps the most spectacular winter irruption of Northern Shrikes ever in the Northeast. Although the vanguard of Northern Shrike migration does not usually arrive in Massachusetts until late October (Veit and Petersen 1993), the appearance of one shrike on October 13 was hardly reason to suspect that anything out of the ordinary was about to take place.

To underscore the magnitude of the shrike invasion, consider the following:

Between October 13, 1995 and April 27, 1996, a total of 192 Northern Shrike reports appeared in the Bird Sightings column of *Bird Observer* (*Bird Observer* 24:57, 111, 170, 219, 227).

- In describing the winter season in New England, Blair Nikula (1996) noted that Northern Shrikes appeared in "record or near-record numbers everywhere—far too many to tally accurately, but dozens were found in every state and the Regionwide total easily exceeded 300 birds."

- Northern Shrike was one of only 17 species reported on every one of 24 eastern Massachusetts Christmas Bird Counts (CBCs) summarized in *Bird Observer* (24:117), and the 1995-1996 shrike count equaled or exceeded ten-year maxima in 27 of 29 CBC count areas (Table 1).

- CBC Counts for Northern Shrikes included 25 at Nantucket and 19 each at Concord, Greater Boston, and Newburyport.

- 561 Northern Shrikes were tallied on New England CBCs, with this species reported on all but five of 104 CBCs conducted throughout New England in 1995-1996; the average New England CBC total for Northern Shrike over the past 12 years is 62.9 birds (Petersen 1996).

The 1995-1996 incursion far exceeded the boundaries of Massachusetts and New England. In summarizing the 1995-1996 CBC season for North America, Geoff LeBaron (1996) noted that "The highlight of the Christmas Bird Count period, and for the winter in general over many areas of the continent, proved to be . . . [the] Northern Shrike." LeBaron goes on to remark that "Well over 3000 Northern Shrikes were tallied on 727 CBCs in 48 regions across the continent." An incursion of these proportions raises questions about the causes and the biological implications of the event.

What do we know about Northern Shrikes?

The Northern Shrike and the Loggerhead Shrike (*L. ludovicianus*) are the only predatory passerine species in North America. Called "butcher-birds"

Table 1. Numbers of Northern Shrikes reported on Massachusetts CBCs from 1986-1995.

Data from annual compilations by Robert H. Stymeist, and recently by Marjorie W. Rines and Robert H. Stymeist, published annually in *Bird Observer*.

Supplemental data were from published CBC data in *American Birds*. The raw data were not corrected by party-hours, since party-hours have remained fairly consistent during the last decade in most of these counts.

Year	86	87	88	89	90	91	92	93	94	95/96
Andover	-	-	-	-	0	0	0	1	1	1
Athol	1	1	0	0	3	1	0	0	0	3
Buzzards Bay	0	0	0	0	0	0	0	0	1	3
Cape Ann	1	2	1	0	3	1	0	0	2	4
Cape Cod	4	0	0	0	1	0	1	0	3	9
C. Berkshire	0	0	0	0	0	0	0	0	0	2
Concord	2	3	0	2	7	2	1	0	1	19
Boston	0	0	0	0	1	2	0	0	0	19
Greenfield	0	0	1	0	2	0	0	0	0	10
Marshfield	1	1	0	0	1	1	0	0	0	10
Martha's Vineyard	0	0	0	0	0	1	0	0	1	6
Mid Cape	2	0	0	0	0	1	0	0	0	5
Millis	2	1	0	1	3	3	-	0	0	2
Nantucket	2	4	0	0	3	0	0	0	1	25
New Bedford	0	0	0	0	0	3	0	0	0	1
Newburyport	4	3	2	2	4	6	0	0	4	19
Northampton	1	0	1	0	7	1	0	0	0	15
N. Berkshire	2	1	0	0	0	0	0	0	0	2
Plymouth	0	0	0	2	1	0	0	0	0	2
Quabbin	-	-	0	1	5	3	0	0	0	10
Quincy	0	1	0	0	1	1	0	0	0	9
Springfield	1	0	0	0	2	1	0	0	0	2
Stellwagen	-	0	0	0	1	0	0	0	2	2
Taunton-Middleb.	0	0	0	0	0	0	0	0	0	5
Tuckernuck	0	0	0	1	1	0	0	-	0	2
Uxbridge	2	0	0	0	0	0	0	0	0	8
Westminster	2	0	0	0	2	2	0	1	1	4
Westport	2	0	0	0	0	0	0	0	0	4
Worcester	2	1	0	1	2	0	0	0	0	8
Total	31	18	5	10	50	29	2	2	17	111
x/count/year	1.2	.7	.2	.4	1.7	1.0	.1	.1	.6	3.8

because of their habit of impaling mice and small birds on thorns, or hanging them in the crotches of small shrubs, Northern Shrikes subsist largely on small birds and rodents in winter. They use their feet and their powerful bill to catch and subdue prey, which they pursue in a low, direct flight, sometimes actually following a hapless victim into the heart of a thicket or dense shrub (Cade 1967). Ordinarily solitary, Northern Shrikes defend winter territories, at least in certain geographical areas (Atkinson 1993, Rimmer and Darmstadt 1996). They also exhibit nonbreeding site fidelity from year to year, both in winter and possibly during migration (Rimmer and Darmstadt 1996).

During summer, Northern Shrikes are essentially birds of tundra edges and taiga forests. In North America, they breed from western and northern Alaska and southwestern Keewatin south to southern Alaska and northern Manitoba, and from northern Quebec south to central Quebec and southern Labrador. In winter, the species is partially migratory, occurring from central Alaska and the southern parts of the breeding range in Canada south to California, Utah, central New Mexico, central Missouri, central Ohio, Pennsylvania, and New Jersey, casually to areas beyond these boundaries (AOU 1983).

When Northern Shrikes appear in Massachusetts, they are most likely to be seen in coastal dune thickets or in fields, scrub areas, and open swampy situations where scattered trees and shrubs provide elevated perches. They also regularly appear around semirural bird feeders, where they are attracted by concentrations of songbirds (Davis 1997, Williams 1987). Most sightings occur from November through March, particularly along the coast and in inland river valleys (Veit and Petersen 1993).

Northern Shrike invasions: an historical perspective

Northern Shrike incursions in the Northeast have been documented since the nineteenth century (Stone 1937, Cruickshank 1942, Palmer 1949, Bull 1964, Griscom and Snyder 1955, Leck 1983, Zeranski and Baptist 1990, Veit and Petersen 1993). In Massachusetts and New England, the last major shrike invasion was during the winter of 1978-1979, when at least 100 birds were reported from eastern Massachusetts (Veit and Petersen 1993). During the same winter, 60 Northern Shrikes were tallied on 18 eastern Massachusetts CBCs, and a cumulative total of 201 was registered on a total of 85 New England CBCs—the highest regional tally ever recorded up to that time (Veit 1979).

Cade (1967) first pointed out that Northern Shrikes wintering in the northeastern United States probably emanate from the breeding population *L. e. borealis* east of Hudson Bay, not from the population *L. e. invictus* in Alaska, where much of the Snowy Owl and microtine rodent research has been conducted. This fact alone may explain the lack of congruence between the fluctuations of shrikes, owls, and rodents all across North America. In most winters, what happens to Northern Shrike numbers in the Pacific Northwest or

the northern Rocky Mountains probably has little to do with what is happening in the Great Lakes region or the Northeast. This amplifies the continentwide dimension of the shrike invasion in the winter of 1995-1996 because CBC records (*Field Notes* 50:352) show that unprecedented numbers of shrikes were recorded in the Pacific Northwest, the Middlewestern Prairies, the Great Lakes region, and New York, as well as in New England.

Explanations of Northern Shrike invasions

The Northern Shrike is a classic winter irruptive species that shares some characteristics with other irregularly migratory northern predators like Northern Goshawk, Rough-legged Hawk, Snowy Owl, and Boreal Owl, as well as many irruptive passerines such as Red-breasted Nuthatch, Bohemian Waxwing, and Pine Grosbeak (Forster 1990, 1994; Davis and Petersen 1995). There is evidence suggesting that irruptions (i.e., "invasions") may be caused by severe and widespread food shortages in traditional wintering areas (Bock and Lepthien 1976).

Various authors have tried to explain the winter emigrations of Northern Shrikes (e.g., Davis 1937, 1949, 1960, 1974; Cade 1967; Davis and Morrison 1988; Atkinson 1993; Temple 1995), and most have arrived at generally similar conclusions. Brewster (1906), Davis (1937), and Bent (1950) were among the first to highlight the variability in winter shrike numbers and to suggest that the winter emigrations of Northern Shrikes might be controlled by winter food availability, particularly small birds and mammals, in the north. Between 1900-1970, Davis (1937, 1949, 1960, 1974) investigated the cyclic nature of Northern Shrike and Snowy Owl irruptions in eastern North America and tried to establish a link between fluctuations in microtine rodent (i.e., vole) populations and those of shrikes and owls.

Using Christmas Bird Count and other data, Davis (1974) demonstrated that the appearance of shrikes in the United States during winter was cyclic and that variations in emigration years ranged from an average of 3.3 years prior to 1893 to 4.1 years from 1900 until about 1935. After 1935, the emigration cycle for Northern Shrikes fluctuated irregularly (Davis 1974, Root 1988). Davis' conclusion was that Northern Shrikes and Snowy Owls probably emigrate for slightly different reasons and at varying yearly intervals. Furthermore, he concluded that the use of CBC data to establish cyclic periodicity and correlations between events and species is probably not feasible because we lack information about where, exactly, invading birds come from (Davis and Morrison 1988).

Small mammal populations affect the survivorship of young shrikes most strongly after the onset of winter. Microtine rodent density apparently has little effect on either the breeding density of shrikes or the survivability of young shrikes on the breeding grounds immediately after fledging (Cade 1967). In

years of typical early winter weather, shrikes feed predominantly on microtines during fall and early winter. However, in seasons with heavy, early snowfall, small rodents are concealed beneath the snow and hence largely immune to predation by Northern Shrikes. Under such conditions, shrikes, particularly the inexperienced young of the year, are forced to hunt small songbirds, which are considerably more difficult to capture than microtine voles, and most of which have migrated south (Cade 1967).

During the late fall and early winter of 1995, exceptionally severe conditions prevailed across much of central and eastern boreal Canada—the traditional winter quarters of many Northern Shrikes (see *Field Notes* 50, No.2). These severe early winter conditions probably forced shrikes to compete for a songbird prey base diminished by the migration of most songbirds with the early onset of harsh winter weather. Voles, no matter how abundant, would have been unavailable to shrikes because of deep snow. This probably led to massive numbers of Northern Shrikes, many (most?) of them first-year birds, moving south of the Canadian border to avoid the intense competition farther north, where food may have been both scarce and inaccessible.

Biological implications

An inevitable question raised by winter shrike irruptions is what effect they have on the overall survival of Northern Shrike populations. Temple (1995) has proposed that "shrike populations are limited primarily by the carrying capacity of their nonbreeding habitat." This implies that poor food supplies or other conditions in the nonbreeding (i.e., wintering) habitat contribute to keeping the next year's breeding population below the carrying capacity of the breeding habitat. Cade (1967), working in Alaska, reached a similar conclusion: "There is little to suggest that the sparse breeding population in arctic Alaska is limited by any physical or biotic feature of this northern environment. The main limiting factor on numbers of shrikes is probably winter food shortage—or the relative unavailability of foods in winter."

Given the importance that winter conditions apparently have for shrike populations, invasions such as that of 1995-1996 raise significant biological questions: what is the survivorship of the many shrikes that emigrate southward in winter? How successful are they in avoiding the competition that may have forced them to flee boreal Canada in the first place? What is the foraging success of shrikes beyond the borders of their traditional wintering range during an invasion winter? To gain insight into these and other questions, we need to patiently sit back and wait for the next "winter of the 'butcher-bird'."

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