

DISTRIBUTION AND POPULATION STATUS OF GRASSLAND BIRDS IN MASSACHUSETTS

by Andrea L. Jones and Peter D. Vickery

A walk along a farm road in the Connecticut River Valley in May reveals a variety of pleasing sounds. Male Bobolinks, as obvious as they are loud, fly above the hayfields. A flash of yellow appears as a meadowlark darts above the grasses singing its clear, melodic song. To the trained ear, the quiet buzzy song of a Savannah Sparrow may be heard from a clump of grasses. If it were the early 1900s, these sounds would most likely be accompanied by a variety of other grassland bird songs; the Upland Sandpiper's shrill "wolf whistle," the Vesper Sparrow's sweet, melodic song, or possibly the Grasshopper Sparrow's insect-like buzz. However, sadly, these sounds are now rarely heard in Massachusetts.

In 1993 the Center for Biological Conservation (CBC) at the Massachusetts Audubon Society (MAS) initiated a two-year project to inventory the distributions and populations of grassland birds in Massachusetts. The survey focused primarily on three species: Grasshopper Sparrow (*Ammodramus savannarum*), Upland Sandpiper (*Bartramia longicauda*), and Vesper Sparrow (*Poocetes gramineus*). Other species included in the survey were Savannah Sparrow (*Passerculus sandwichensis*), Bobolink (*Dolichonyx oryzivorus*), and Eastern Meadowlark (*Sturnella magna*). Researchers, naturalists, and birders throughout the state helped us identify promising grassland tracts; then, having compiled a long site list, we set out to determine the distribution and abundance of the six species of grassland birds. The data gathered in our study have provided important insights into the continuing story of the rise and fall of grassland bird populations in New England.

Native grasslands occurred sporadically in New England in pre-Colonial times. These grasslands were maintained by fires, either natural or, more frequently, set by Native Americans (Patterson and Sassaman 1988). These open areas provided habitat for grassland birds, including the endemic Heath Hen (*Tympanuchus cupido cupido*), extinct since the 1930s. Because fires are now suppressed, many native grasslands and heathlands are growing up with thick shrub cover that is unsuitable for ground-nesting birds.

There is little doubt that grassland bird populations in Massachusetts reached a zenith in the late eighteenth and nineteenth centuries as eastern forests were cut and converted to large farms. However, in the past century more than sixty percent of New England's farms have disappeared; the forests have reclaimed many of the fields that once supported species such as Vesper Sparrow and Upland Sandpiper. Degradation of remaining grassland is also affecting grassland birds. Some grasslands are no longer maintained, so trees

and shrubs are encroaching, further diminishing the area and quality of grassland habitat. Modern agricultural practices, such as early and more frequent summer mowing of hayfields, can destroy nests before young have fledged, and, because of frequent mowing at most airports, birds are sometimes unable to establish successful nests or are exposed to predators.

Additionally, many farms have been converted into suburban areas. Loss of habitat appears to be the primary reason for the decline of grassland birds in the Northeast (Askins 1993). These birds are now reduced to breeding primarily at airports, a few remaining large hayfields and pastures, and some meadows in conservation areas. The majority of grassland sites in Massachusetts are currently concentrated in the Connecticut River Valley and on offshore islands (e.g., Martha's Vineyard, Nantucket, and the Elizabeth Islands). However, development and fragmentation of many of these sites are continuing causes of concern for their future ability to support breeding populations of grassland birds.

Nearly all grassland birds have specific habitat requirements for types of vegetation and size of grassland area. Many fragmented grasslands are now too small to support grassland bird species. Upland Sandpipers, for example, need breeding areas of at least 100 acres and preferably greater than 400 acres. Vesper Sparrows need areas of roughly fifty acres, and Grasshopper Sparrows prefer areas of at least 200 acres (Vickery et al. 1994). Eastern Meadowlarks, Bobolinks, and Savannah Sparrows are less dependent on area and are therefore still breeding in many smaller fields throughout the state. It is suggested that a grassland of at least 500 acres is needed to maintain a diverse population of grassland bird species (Vickery et al. 1994). Although some large-scale monoculture farms still exist throughout New England, these are unsuitable for many grassland birds, such as the Upland Sandpiper, that require a mosaic of grassland habitats and grass lengths.

Landfills have recently become breeding habitats for some grassland birds. As landfills reach full capacity, they are capped with plastic shields that cover the fill material. These shields are topped with eighteen inches of soil and seeded with grass. These dry grasslands must be mowed every year to ensure that the roots of shrubs or trees will not penetrate the plastic cap. Ironically, over the past few years a number of these artificial grasslands have provided breeding habitat for Grasshopper Sparrows, Savannah Sparrows, Bobolinks, and Eastern Meadowlarks.

Summary of the Status of Three Grassland Bird Species Prior to Survey

Grasshopper Sparrow. During the late nineteenth and early twentieth centuries, Grasshopper Sparrows were considered abundant, particularly in central Massachusetts, the Connecticut River Valley, Cape Cod, and the islands.

Early literature cites "In our central valley, the Grasshopper Sparrow, though little known, has long been, locally, abundant . . . in the wide fields along the Amherst/Hadley line it is now far from rare" (Bagg and Eliot 1937). However, within a few decades, there was a decline: "Formerly an abundant summer resident (Cape Cod, Nantucket, Martha's Vineyard) occurring more locally north to Essex County and in the two inland river valleys. It has greatly decreased and is now becoming rare and local" (Griscom and Snyder 1955). In recent literature, this species is described as a "rare to uncommon breeder" (Veit and Petersen 1993) in Massachusetts. Grasshopper Sparrows, currently listed as a species of special concern in Massachusetts, are state-listed by six of the seven states in the New England-New York area (endangered in two states, threatened in one, special concern in three) (Vickery 1992), have declined in Massachusetts to a few remaining strongholds. These include Westover Air Reserve Base (ARB) and Nashawena Island (one of the Elizabeth Islands).

Upland Sandpiper. Upland Sandpipers were considered to be a common summer resident during the peak agricultural era in Massachusetts (Griscom and Snyder 1955). In the mid-nineteenth century, Upland Sandpipers were documented as a common species: "breeds, and towards autumn is often very common" (Allen [1864] in Bagg and Eliot 1937). By the turn of the century, this species was already declining, and it was soon noted that "this once well-represented tattler has come close to extinction in our region during the past thirty years" (Bagg and Eliot 1937). Most recently, they have been described as a "local and very uncommon breeder, greatly decreased since the 1800s" (Veit and Petersen 1993). They have declined rapidly to the point of becoming a state-listed species in all seven states within the New England-New York region (Vickery 1992). They are listed as endangered in two states (including Massachusetts), threatened in three, and special concern in two (Vickery 1992).

Vesper Sparrow. Vesper Sparrows have significantly declined throughout New England; they are listed as endangered in two states and special concern in three states in the New England-New York area (Vickery 1992). During the late nineteenth and early twentieth centuries, Vesper Sparrows were common, particularly along the Connecticut River Valley and on Cape Cod, inhabiting dry farmlands and sandy areas. Vesper Sparrows were noted as a "common summer resident" (Bagg and Eliot 1937) and "in 1864 . . . abundant breeding in open sandy fields and dry pastures" (Allen [1864] in Bagg and Eliot 1937). A decline in this species became evident by the mid-twentieth century, at which time they were noted as "formerly an abundant summer resident in open farming country throughout the state, now rapidly decreasing and becoming rare and local with the decline of agriculture" (Griscom and Snyder 1955). As this decline has continued, the species is noted most recently in *Birds of Massachusetts* as an "uncommon and local breeder" (Veit and Petersen 1993).

Survey Methods

Our primary survey efforts were concentrated on the three species that we considered to be in the greatest jeopardy: Grasshopper Sparrow, Upland Sandpiper, and Vesper Sparrow. For these species a complete statewide survey at 150 sites was conducted during the 1993 and 1994 field seasons. These sites included small hayfields, farm pastures, private and public airports, and large military air bases. Locations ranged from the Berkshires to Provincetown, and included the Elizabeth Islands, Martha's Vineyard, and Nantucket. Knowledgeable ornithologists and naturalists were contacted statewide to identify historical or current grassland bird sites. These 150 sites were also surveyed for Savannah Sparrow, Eastern Meadowlark, and Bobolink, but the numbers for these species were not complete statewide population estimates.

Surveys were conducted using a point census technique with a 100-meter radius. For five minutes, all birds seen or heard were recorded. A tape of Vesper Sparrow, Grasshopper Sparrow, Upland Sandpiper, Savannah Sparrow, Eastern Meadowlark, and Bobolink songs was then played. Each song was approximately thirty seconds long with a thirty-second interval between each song. Birds responding to the tape were counted. Birds seen or heard while walking between census points were also counted. Three to five point censuses were conducted at each site, depending on the size of the grassland. A second survey was conducted for some of the larger and more productive sites. At these sites, a complete walk-through of the grasslands, while periodically playing the tape, gave a more precise census of grassland birds numbers.

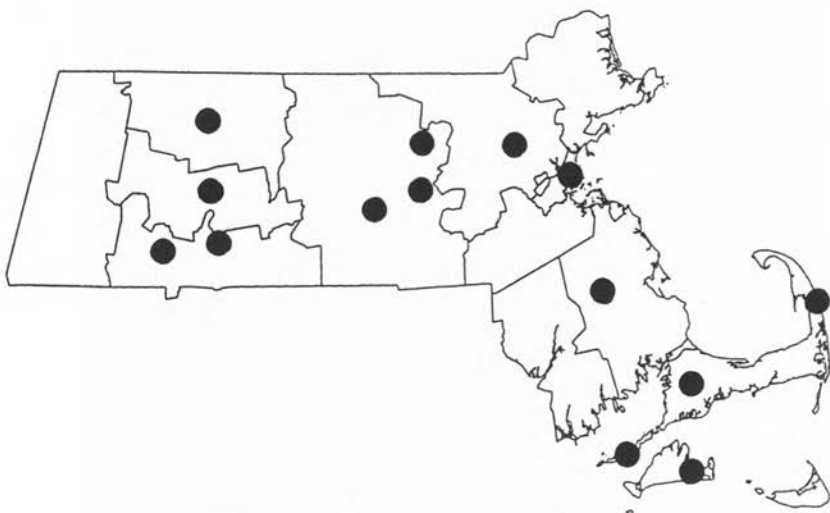


Figure 1. Major Grassland Sites in Massachusetts

Results

Figure 1 and Table 1 summarize the survey results. The most important grassland/heathland sites (based on number of pairs and diversity) censused were Logan Airport, Hanscom Field, Cumberland Farm, Fort Devens parachute landing, Clinton landfill, Worcester Municipal Airport, Westover ARB, Barnes Municipal Airport, Marconi Barrens, Katama Airfield, Turner's Falls Airport, South Maple Street (Hadley), Camp Edwards cantonment, Otis ANG Base Airfield, Burts Pit Road (Northampton), and the Elizabeth Islands. Of these sites, surveys at Fort Devens parachute landing, Westover ARB, Camp Edwards cantonment, and Otis ANG Base Airfield were also conducted by the Massachusetts Division of Fisheries and Wildlife staff. They surveyed these larger sites for several mornings, which provided a more accurate inventory (Melvin 1993).

Grasshopper Sparrow (state listed: special concern). Approximately 350 singing male Grasshopper Sparrows were counted at thirty-three sites. The following fourteen sites had more than four pairs: Hanscom Field; Worcester landfill; Fort Devens parachute drop zone; Worcester Municipal Airport; Clinton landfill; Westover ARB; Barnes Airport; Turner's Falls Airport; Katama

**Table 1. Numbers of Grassland Birds Counted
During 1993-1994 Field Seasons**

Species	Numbers	Number of Sites
Upland Sandpiper	85 ¹	10
Vesper Sparrow	96	28
Grasshopper Sparrow	350 ¹	33
Eastern Meadowlark	198	41
Bobolink	579	55
Savannah Sparrow	434	66

¹ Approximate numbers

Numbers are singing males for Vesper Sparrow, Grasshopper Sparrow, Eastern Meadowlark, Savannah Sparrow, and Bobolink. Numbers for Upland Sandpiper are estimated numbers of pairs based on number of adults counted.

Numbers for Eastern Meadowlark, Bobolink, and Savannah Sparrow do not represent complete statewide population numbers.

Airfield; Dukes County Airport (Martha's Vineyard); Naushon, Nonamesset, and Nashawena islands (Elizabeth Islands); and Burts Pit Road (Northampton). Greater than seventy percent of the state's Grasshopper Sparrow population occurs at only two sites: Nashawena Island and Westover ARB. Should either of these sites no longer support breeding Grasshopper Sparrows, the effect on the state population would be disastrous. The largest Grasshopper Sparrow breeding assemblage in Massachusetts, on the Elizabeth Islands, has declined by fifty-eight percent (to 140 pairs) from 1988 to 1994 (Hatch 1988), whereas the population at Westover ARB has increased from 55 to 168 pairs (Melvin 1994) during the same period. Because there is a major decline across the state, and because such a high proportion of the state's population is limited to just two sites (one of which is declining precipitously), the CBC has recommended that Grasshopper Sparrow be elevated to endangered species status by Commonwealth wildlife authorities.

Upland Sandpiper (state listed: endangered). Approximately eighty-five pairs of Upland Sandpipers were counted at ten sites. The following five sites had more than four pairs: Logan Airport, Hanscom Field, Cumberland Farm (a large expanse of farmland in southeastern Massachusetts), Westover ARB, and Camp Edwards cantonment. The other five sites only support one or two breeding pairs of Upland Sandpipers. Westover ARB, the only site actively managing for this species, contains the majority of breeding pairs for the state (101 adults counted in 1994) (Melvin 1994). Should this site or the other airports and military sites close, breeding Upland Sandpipers in Massachusetts could rapidly disappear.

One major reason for the decline in Upland Sandpipers in the region is the amount of breeding habitat they require. At least 100 acres of optimal habitat, with surrounding open country is preferred (Vickery et al. 1994). Very few large expanses of grassland remain: farms have been fragmented by forest encroachment and development, and the expanse of open country no longer exists in most locations.

Vesper Sparrow. Only ninety-six singing male Vesper Sparrows were counted at twenty-eight sites. The following nine sites had more than four pairs: Plymouth Airport, Fort Devens parachute drop zone, Agawam Industrial Park, Orange Airport, Provincetown/Truro dunes, Provincetown Airport, Marconi Barrens, Potato Farm-Hawley, and Griffins Island-Wellfleet. The Provincetown/Truro dunes and Marconi Barrens, both on Cape Cod, hold the largest breeding populations of Vesper Sparrows, each with ten pairs. Both of these sites are protected by the Cape Cod National Seashore. However, the number of birds at Marconi Barrens appears to have decreased over the years, as shrubs continue to fill open spaces. Without active management, these sparrows are not secure at this site. The remaining Vesper Sparrows are scattered across the state in small populations at mostly transitory sites. Although Vesper

Sparrows are not currently listed for protective status in Massachusetts, the CBC is recommending to state wildlife authorities that this species be state-listed as endangered. We expect such action will help ensure its protection and will ultimately improve the dwindling numbers found throughout the state.

Thus, Vesper Sparrows are now primarily confined to some remaining large agricultural areas within the Connecticut River Valley and along the protected coastal moors of Cape Cod, and are scattered in small numbers throughout the state at small airports. Unlike Grasshopper Sparrows, there are no large concentrations of Vesper Sparrows anywhere in Massachusetts; their distribution is more widespread, but only a few pairs are found at each site. Most of these sites are unmanaged, and it is uncertain whether they will continue to provide suitable breeding habitat.

Savannah Sparrow, Eastern Meadowlark, Bobolink. Because these species do not have as large area requirements as the above-mentioned species for their breeding grounds and have adapted to a variety of agricultural situations, they are still scattered throughout the state, particularly in the Connecticut River Valley, where the majority of the state's farmland still exists. However, numbers of these species are considered declining throughout Massachusetts (Veit and Petersen 1993). For instance, Bobolinks, primarily nesting in hayfields, are threatened by early mowing practices. In Lincoln, Massachusetts, one researcher estimated about eighty percent or more mortality of Bobolink young in active hayfields mowed throughout the breeding season (Ells 1995). Survey efforts will continue throughout the Connecticut River Valley to document further breeding sites for these species.

Discussion

Interestingly, our inventory of 150 sites revealed that some of the best areas for grassland birds are military airfields. The large grasslands surrounding these runways provide prime breeding and feeding habitat for many grassland birds. Westover ARB in Chicopee, with 1500 acres of grassland habitat, is the most important site for grassland birds in Massachusetts (Melvin 1994). The Natural Heritage and Endangered Species Program has worked closely with environmental engineers on the base to ensure protection of grassland birds and to develop management practices to increase numbers of breeding pairs. The grassland habitat that has been created actually discourages larger flocking birds, such as gulls and waterfowl, which pose a threat to aircraft.

Better habitat management of existing grassland sites provides the best opportunity to protect and enhance grassland bird populations. If mowing can be delayed until the end of the breeding season (approximately July 31), reproductive success will improve. Prescribed burning, which has been a major initiative by MAS on Nantucket and throughout Massachusetts, has been demonstrated to improve habitat for most grassland birds. However, thus far

only a few grassland sites have been burned to provide high-quality bird habitat. The CBC is currently beginning work on a comprehensive grassland management manual to provide management options for all grassland flora and fauna that will be distributed to landowners throughout New England. By using these management tools and educating private, municipal, and military land managers about these practices, we may be able to reverse the decline of these rare birds.

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