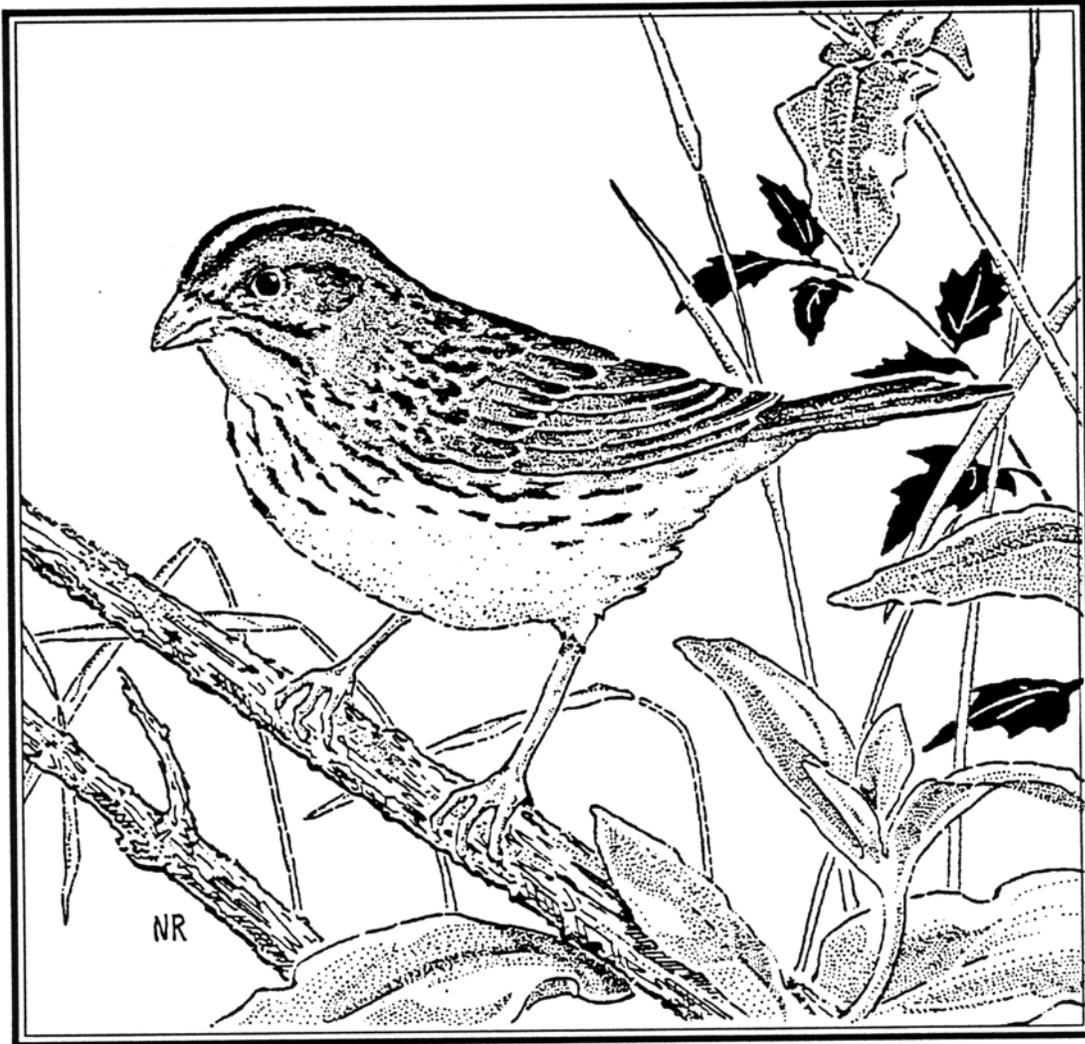


Henslow's Sparrow

Status Assessment

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ACRONYMS USED IN THE TEXT

American Ornithologist's Union	AOU
Breeding Bird Atlas	BBA
Christmas Bird Count	CBC
Committee on the Status of Endangered Wildlife in Canada ..	COSEWIC
Conservation Reserve Program	CRP
Department of Natural Resources	DNR
Migratory Bird Treaty Act of 1918	MBTA
National Biological Service	NBS
National Environmental Policy Act of 1969	NEPA
National Forest	NF
National Wildlife Refuge	NWR
North American Breeding Bird Survey	BBS
North American Ornithological Atlas Committee	NORAC
Texas Bird Records Committee	TBRC
The Nature Conservancy	TNC
U.S. Army Corps of Engineers	COE
U.S. Fish and Wildlife Service	FWS
Wisconsin Grassland Bird Study	WGBS

SUMMARY

Prior to European settlement, Henslow's sparrow (*Ammodramus henslowii*) bred primarily in prairie habitat. With the loss of native prairie to agriculture, Henslow's sparrow adapted to breeding in secondary grassland habitats, particularly hayfields and pasture. The availability of these secondary habitats also allowed the species' range to expand to the north and the east as forests were cleared for agriculture. The species currently breeds locally across the Great Lakes region of the eastern U.S. and southern Ontario (Canada), to New York, south to Maryland, across northern Virginia, West Virginia and Kentucky, and west to eastern portions of Oklahoma and Kansas. The breeding range, particularly in the northwestern and eastern portion of the range, is contracting. The species winters in coastal areas from South Carolina, south to Florida, and west to Texas.

Grasslands which provide Henslow's sparrow breeding habitat are generally characterized by tall, dense grass with a well-developed litter layer and a relatively high coverage of standing dead vegetation. The grasslands frequently support sparse woody vegetation, but extensive woody invasion will eventually preclude use by Henslow's sparrow. Habitat area is considered a limiting factor for Henslow's sparrow; only large grasslands support persistent populations.

Winter habitats of Henslow's sparrow are similar to breeding habitats, in that they are dominated by dense groundcover. Either pine forests or open prairies are suitable winter habitat, provided that dense groundcover is present. The winter habitat requirements have not been rigorously studied until recently; 3 ongoing studies represent the first systematic research on wintering Henslow's sparrows.

The scientific community has expressed concern regarding Henslow's sparrow populations for decades, but it has been difficult to document population trends. North American Breeding Bird Survey (BBS) data clearly indicate a significant population decline for this species (since 1966) which is fairly consistent throughout its breeding range. Christmas Bird Count data indicate that the species' population is also declining on winter range. The distribution of Henslow's sparrow is scattered and localized throughout its current range. In 1987, the U.S. Fish and Wildlife Service identified Henslow's sparrow as one of 30 "migratory nongame birds of management concern in the United States" due to the species' widespread population decline and need for restricted/vulnerable habitats. Henslow's sparrow is listed as endangered, threatened, or a species of special concern in 16 states and was designated as endangered in Canada in 1993. This status assessment includes summaries of the status of Henslow's sparrow in 38 states and Canada, which make up the current and historic range of the species.

Loss and deteriorating quality of grassland habitats is an underlying cause for Henslow's sparrow population declines. The area of native prairie in North America, which historically provided prime Henslow's sparrow breeding habitat, has declined dramatically; some estimates are as high as 99.9%. The availability and quality of secondary agricultural habitats have also declined. Much agricultural land has been lost to development or reverted to forest. In addition, many hayfields and pastures have been converted to row crop production. Disturbances in remaining

hayfields have intensified with trends toward earlier and more frequent mowing. There have been large scale losses of grassland habitats in the winter range of the species, as well as the breeding range. Fire-dependent savannas and prairies of the southeast have been destroyed and continue to be threatened by: exclusion or reduction of frequency of fire; drainage; urbanization; and conversion to agriculture or pine plantation. Not only has the overall quantity of habitat declined, but also the average patch size of remaining grassland habitats has declined. The highly fragmented nature of the remaining grassland habitats has serious implications for area-sensitive species such as Henslow's sparrow.

The future of grassland habitats is uncertain. The grassland habitats required by Henslow's sparrow are transitory in nature and require cyclic disturbance (natural or man-made) to be maintained. Publicly-owned lands, lands owned by private conservation organizations, and possibly lands enrolled in the Conservation Reserve Program (CRP) offer the most potential for Henslow's sparrow management. There is a need to evaluate the potential for improving grassland management practices, particularly on publicly-owned lands which currently support most large, persistent populations of Henslow's sparrow. Opportunities to incorporate grassland bird management into agricultural programs, particularly the CRP, and innovative agricultural practices, such as rotational grazing, should also be evaluated.

Cyclic disturbances are necessary to maintain grasslands, and consequently grassland bird populations. Prescribed burning, mowing (haymaking), and grazing are 3 management tools which have been successfully applied to maintain Henslow's sparrow breeding habitat. On winter range, protection and maintenance, through fire, of natural pinelands is imperative. Mowing and/or grazing may be effective management tools for potential secondary wintering habitats, such as broomsedge fields and powerline corridors. However, the ability of these habitats to support viable wintering populations of Henslow's sparrow has yet to be determined. The timing, extent and frequency of disturbance are important considerations in managing both breeding and wintering habitat. Management plans must also address the size of the management area.

Any effort to manage for Henslow's sparrow should not be viewed in isolation, but rather should be seen as an opportunity to benefit a wide-range of species associated with grassland habitats. The grassland ecosystems on which Henslow's sparrow depends are considered among the most endangered ecosystems in North America. Integrated management for grassland-dependent species is a sound ecological approach, and also makes most efficient use of economic and logistic resources. Recent initiatives demonstrate that conservation and management of grassland birds are receiving increased attention; these initiatives need to be encouraged and expanded.

Henslow's sparrow research priorities include: 1) monitoring the status of the largest, persistent breeding populations, 2) documenting additional breeding populations, 3) systematically surveying suitable habitat on the winter range to identify key wintering areas, and 4) evaluating habitat requirements and ecology of the species on winter range.

TAXONOMY

Henslow's sparrow (*Ammodramus henslowii*) belongs to the Order Passeriformes, Family Emberizidae. Audubon collected the first Henslow's sparrow known to science in Kentucky in 1820. Thus, the species is frequently referred to as *Ammodramus henslowii* Audubon. The species is sometimes treated in the genus *Passerherbulus* (AOU 1957). Zink and Avise (1990 cited in Nature Conservancy 1995) evaluated relationships within the genus *Ammodramus* based on mtDNA and allozymes; evidence suggests that the genus *Ammodramus* is possibly not monophyletic. Other common names cited in the literature include Henslow's bunting (Hyde 1939) and stink bird (Mirarchi 1986). Lowery (1974) explained that the name "stink bird" was originated by quail hunters because bird dogs often point or are distracted by Henslow's sparrows.

Two subspecies of Henslow's sparrow are recognized by the American Ornithologists' Union (AOU 1957). (Bull 1974 noted a lack of differentiation and regarded the species as monotypic). The western subspecies (*Ammodramus henslowii henslowii*) breeds over most of the species range. The eastern subspecies (*Ammodramus henslowii susurrans*) occurs along the Atlantic coast. Some authors suggest that this subspecies is now extinct (Vickery 1995) or virtually extinct (Rosenberg and Wells 1995). However, the subspecies status of the relatively recent breeding population in North Carolina has not been determined (D. McNair, pers. commun.). Arnold (1983) proposed a third subspecies (*Ammodramus henslowii houstonensis*), but subspecies designation has since been rejected and the only known colonies of the proposed subspecies are extirpated (Keith Arnold, Texas A&M University, pers. commun.).

PHYSICAL DESCRIPTION, SONG, AND GENERAL BEHAVIOR

Smith (1992) described Henslow's sparrow as follows: "The Henslow's sparrow is characterized by its large flat head, large gray bill, and short tail. The head, nape, and most of the central crown stripe are olive-colored, with the wings extensively dark chestnut. The breast is finely streaked. The striped, olive-colored head and reddish wings together are diagnostic. When flushed, the bird flies low and jerkily, with a twisting motion of the tail... Among adult Henslow's sparrows the sexes are alike. Body lengths range from 12.1-13.3 cm and the average weight is 13.0 g." Hyde (1939) provided a detailed description of differences in plumage based on season, sex, age, and geographic region. Roberts (1949) and Graber (1968) also provided detailed physical descriptions. Graber (1968) and Smith (1968) compared the physical characteristics of the eastern and western subspecies. Oberholser (1974) provided a detailed description of plumage for the western subspecies.

The shy, secretive nature of Henslow's sparrow is frequently noted by ornithologists. On the breeding range, the species is much more frequently identified by song than by sight. Hyde (1939) described the song of Henslow's sparrow as an "insignificant two-syllable 'tze-sick'." Peterson (1980) described the vocalization as "a poor vocal effort; a hiccupping tsi-lick." To an untrained ear, the vocalizations may sound more like an insect than a bird. Researchers frequently describe the vocalizations of Henslow's sparrow as inconspicuous, but distinctive. Henslow's sparrow is considered to have a propensity for singing at night (Graber 1968; William Busby, Kansas

Biological Survey, and James Herkert, Illinois Endangered Species Protection Board, pers. commun.). However, this behavior was not observed by Robins (1971a) in Michigan and Smith (1992) noted that the frequency of this behavior may be exaggerated in the literature.

Audubon referred to Henslow's sparrow as a "mouse with wings," in describing the species habit of dropping to the ground and running, rather than flying, when flushed. The flight of Henslow's sparrow has been described as erratic and undulating, with a characteristic twist of the tail just after the bird has flushed or left its perch (Sutton 1928 cited *in* Hyde 1939). When flushed they frequently fly only a few yards before again dropping to the ground.

RANGE

Prior to European settlement, Henslow's sparrow probably bred primarily in native prairie habitat. It is assumed that the species' primary breeding range coincided with the distribution of prairie habitat, but historic records are scarce. Herkert (1994a) noted that Henslow's sparrow was considered abundant in Illinois prior to 1900 and was among the most numerous prairie species in some parts of the state. John Fleckenstein (Iowa Dept. of Natural Resources, pers. commun.) noted that Henslow's sparrow was probably wide-spread and locally common before destruction of the prairie in Iowa. Hyde (1939) speculated that: "Under primitive conditions the habitat of the type required for breeding by Henslow's sparrow must have been of very limited extent east of the prairie subclimax. Such natural habitats as the coastal marshes, late stages in the succession of glacial lakes and ponds, and occasional breaks in the forest caused by fires, probably were the original main breeding places east of the prairie openings of Illinois."

With the loss of native prairie habitat to agriculture, Henslow's sparrow adapted to breeding in secondary grassland habitats, particularly hayfields and pasture. The availability of these secondary habitats also allowed the species' range to expand to the north and the east as forests were cleared for agriculture. The geographic distribution of the species continues to shift as land use changes alter the suitability of habitat.

The Nature Conservancy (1995) provided the following description of the geographic distribution of Henslow's sparrow: "BREEDS: locally from eastern South Dakota across the Great Lakes region of the eastern U.S. and southern Canada (Ontario, formerly Quebec) to New England (where now extirpated in most areas), south to Kansas, Oklahoma, Missouri, Illinois, Kentucky, West Virginia, Virginia, and North Carolina; formerly in eastern Texas... WINTERS: coastal states from South Carolina south to Florida, west to Texas...". There are also winter records from extreme southern North Carolina (Harry LeGrand, Jr., North Carolina Natural Heritage Program, pers. commun.). The AOU (1983) reported that the species occurred casually in winter north to Illinois, Indiana, New England and Nova Scotia. The AOU (1957) described breeding and wintering ranges for both the eastern and western subspecies.

Figure 1 illustrates the approximate U.S. range of Henslow's sparrow. Note that this map represents the approximate range of the species and may vary from the actual distribution,

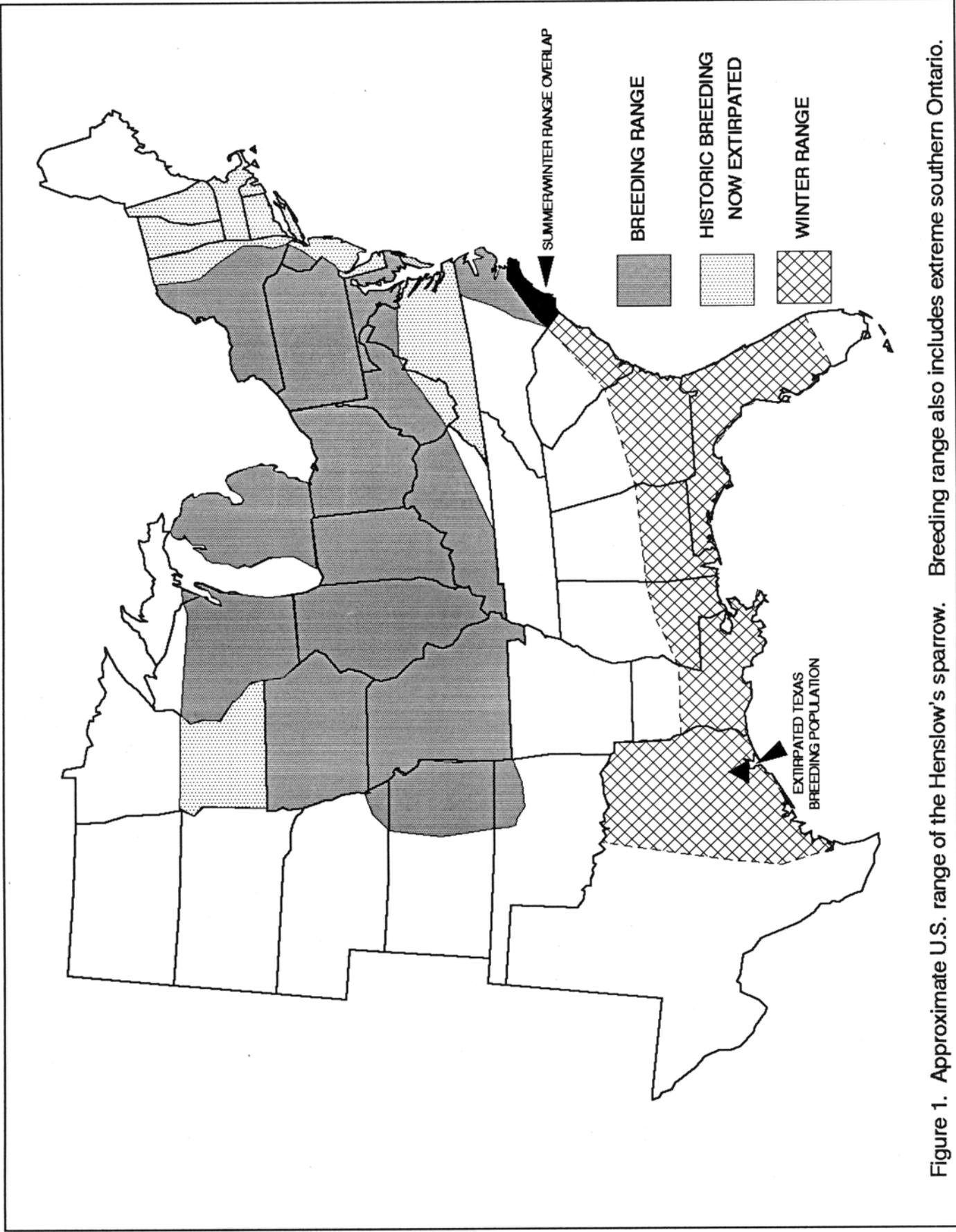


Figure 1. Approximate U.S. range of the Henslow's sparrow. Breeding range also includes extreme southern Ontario.

particularly on the periphery of the range. South Dakota is not included on the range map in Figure 1, even though this state is frequently included in Henslow's sparrow range maps. The South Dakota Ornithologist's Union (1991) noted only 4 summer records for the period 1882-1984 and considered Henslow's sparrow a casual summer visitor in the eastern quarter of the state. There were no Henslow's sparrows recorded during the South Dakota Breeding Bird Atlas project (1988-93).

As noted by the AOU (1983), the breeding range, particularly in the northwestern and eastern portion of the range, is contracting. No evidence of breeding by Henslow's sparrows has been observed in Minnesota since 1991 (Hanson 1994). It appears that Vermont, New Hampshire, Connecticut, Rhode Island, Delaware, and probably Massachusetts are now beyond the breeding range of Henslow's sparrow. (See state narratives for details on last breeding records for each of these states). The local breeding population in eastern Texas is thought to be extirpated (K. Arnold, pers. commun.). The two known colonies of the proposed subspecies in Texas were lost to woody invasion of the habitat and urban development (Eubanks and Behrstock, in prep.; John Herron, Texas Parks and Wildlife Department, pers. commun.).

It appears that the breeding range of Henslow's sparrow now extends into Oklahoma. Reinking and Hendricks (1993) documented a large breeding population in Oklahoma during 1992 and 1993. Historically, Henslow's sparrow was considered a rare migrant in Oklahoma.

HABITAT

BREEDING SEASON HABITAT REQUIREMENTS

Henslow's sparrow is a grassland bird. Hyde (1939) described breeding habitat of Henslow's sparrow as weedy or grassy fields and meadows. Breeding season habitat requirements are probably the most frequently studied aspect of the species' biology. In detailed habitat evaluations, various researchers have characterized Henslow's sparrow breeding habitat as containing the following components: 1) tall, dense grass, 2) a well-developed litter layer, 3) standing dead vegetation, 4) availability of song perches, and 5) sparse or no woody vegetation. Each of these components will be discussed individually, with reference to studies which have characterized the breeding habitat of Henslow's sparrow.

Most researchers have noted the importance of tall, dense herbaceous vegetation (generally dominated by grasses) in describing breeding season habitat selection by Henslow's sparrow (Wiens 1969 in Wisconsin; Skinner et al. 1984 in Missouri; Zimmerman 1988 in Kansas; Hanson 1994 in Minnesota; Herkert 1994a in Illinois). Robins (1971a) in Michigan noted that dense herbaceous vegetation was important, but did not comment on vegetation height. Kahl et al. (1985) in Missouri also found that dense vegetation was important to Henslow's sparrow, but maximum density of ground vegetation was typically 0.20-0.40 m tall and never greater than 0.50 m tall. However, they measured height of vegetation at maximum density, not maximum height of vegetation.

Henslow's sparrow uses the litter layer for nesting, escaping from predators, and foraging. Hanson (1994) found that both depth of litter layer and distance from the ground to the bottom of the litter layer were greater in areas occupied by Henslow's sparrow than in unoccupied areas. Wiens (1969), Kahl et al. (1985), and Zimmerman (1988) also noted the importance of a well-developed litter layer. Skinner et al. (1984) concluded that litter depth was not important to Henslow's sparrow. However, they based this conclusion on the fact that the species was frequently observed in areas with minimal or no litter, not on an evaluation of habitat selection in areas where the birds were actually breeding.

In a detailed study of breeding habitat selection by Henslow's sparrow, Zimmerman (1988) noted that the amount of standing dead vegetation within the territories of males was greater than that in areas excluded from territories. In Illinois, transects occupied by Henslow's sparrow had a higher percentage of standing dead residual vegetation than unoccupied transects (Herkert 1994a). Wiens (1969) reported that the coverage of standing dead forbs was greater in the territories of Henslow's sparrow compared to other grassland birds he studied in Wisconsin. Zimmerman (1988) hypothesized that standing dead vegetation and the litter layer depressed aboveground grass productivity and resulted in a more open substrate. He also suggested that standing dead vegetation and tall live grasses could potentially protect Henslow's sparrow nests from predation, parasitism, and microclimate extremes.

Hanson (1994) observed that when male Henslow's sparrows return to breeding areas in spring, they establish and defend territories through song while perched on last year's dead standing forbs. She noted that height of standing dead vegetation was greater in grasslands used by Henslow's sparrow than in areas not used. Wiens (1969) noted that forb height was greater in occupied areas; medium-to-heavy stemmed forbs, used as song perches, were considered an important component of territories. Robins (1971a) also noted the importance of song perches, but provided no description of the type of vegetation used. Kahl et al. (1985) described Henslow's sparrow as being very selective of song perch habitat, and noted that most males sang from woody vegetation less than 1 m tall. Nolin and Ritzenthaler (1987) found that grasslands used by nesting Henslow's sparrow in Ohio included scattered shrubs used for singing perches.

Some descriptive accounts of Henslow's sparrow breeding habitat conclude that the species avoids areas with "woody invasion." However, "scattered woody shrubs" are frequently included in descriptions of breeding habitat. Studies on breeding habitat selection have generally supported the notion that the presence of widely scattered, low-stature woody vegetation is a common component of breeding habitat.

Research has not been conclusive regarding the amount of woody vegetation which will be tolerated, although it is accepted that encroachment by woody vegetation eventually precludes use by Henslow's sparrow. Hanson (1994) and Herkert (1994a) found no difference in the number of woody stems in areas occupied by Henslow's sparrow compared to unoccupied areas. However, Zimmerman (1988) found that there was less woody vegetation in habitat included in Henslow's sparrow territories than in areas that were excluded from territories. Kahl et al. (1985) found that habitat surrounding Henslow's sparrow song perches included no woody stems greater than 2.5 cm

dbh (diameter at breast height) and few or no woody stems less than 2.5 cm dbh (range was 0-100/ha). However, they also noted that: "Although males avoided areas with woody vegetation greater than 1 m tall, most (61%) sang from dead woody vegetation less than 1 m tall." Peterson (1983) concluded that widely scattered, low (less than 1 m tall) woody vegetation comprised less than 2% of fields occupied by Henslow's sparrow in New York. Based on unpublished data collected between 1982-92 in Illinois, J. Herkert (pers. commun.) concluded that Henslow's sparrow occupy sites with "low" (absent to very sparse) coverage of woody vegetation (trees and saplings). Schulenberg (unpubl. manuscript) found that the presence of woody vegetation on a site was negatively correlated with density of Henslow's sparrow in Kansas.

General accounts of Henslow's sparrow have frequently indicated a preference for wet (or moist) sites (Graber 1968; accounts cited *in* Hyde 1939 and Drilling 1985). However, (Robins 1971a) indicated the species prefers an intermediate moisture regime. Some authors have concluded that the species occurs in a variety of moisture regimes (Peterson 1983; accounts cited *in* Drilling 1985). None of the detailed studies of habitat selection by Henslow's sparrow which were reviewed evaluated moisture regime as a component of breeding habitat (Wiens 1969, Skinner et al. 1984, Kahl et al. 1985, Zimmerman 1988, Hanson 1994, Herkert 1994a). Based primarily on anecdotal information, it appears that Henslow's sparrow may prefer moist sites, at least in parts of its range. However, a wide variety of moisture regimes are tolerated, and moisture is probably a secondary component of habitat selection compared to vegetation structure.

Habitat area is considered a limiting factor for Henslow's sparrow. Herkert (1994a) found that the species was restricted to large grassland areas in Illinois. He evaluated 24 grasslands and found Henslow's sparrow breeding on only 1 grassland less than 100 ha. He concluded that habitat area was the most important factor influencing Henslow's sparrow distribution and abundance in Illinois. Researchers in other parts of Henslow's sparrow range have also reported that the species requires large grasslands. In New York, Peterson (1983) considered habitat area as an important factor in determining Henslow's sparrow distribution; the average size of 4 fields occupied by Henslow's sparrow in his study was 66 ha. Samson (1980) suggested that the minimum grassland size required for a viable breeding population of Henslow's sparrow was 10-100 ha, but it is unclear how he derived this estimate. Swengel (in prep.) found that Henslow's sparrow was 1.8 times as abundant on hayed prairies larger than 110 ha in Missouri compared to smaller sites. Based on his observations in Kansas, Zimmerman (1988) also concluded large grasslands provided the best management opportunities for Henslow's sparrow. Smith (1992) cautioned that during periods of decline a species may only occupy the highest quality habitat. This may give researchers an inaccurate impression of the range of field sizes the species may occupy at higher population densities.

Henslow's sparrow has been found breeding in relatively small habitat patches. However, it appears that populations in small patches may not be large enough to sustain themselves, and that birds in these patches may be less likely to return year after year. Potentially, a matrix of small grassland patches, which individually may be too small to support Henslow's sparrow, may provide suitable habitat if the patches occur in relatively close proximity, but this has not been evaluated. Whitmore (1979) found 1 breeding pair of Henslow's sparrows on a 9.1 ha reclaimed

surface mine in West Virginia; however, the pair was present only the second year of a 3 year study. In Wisconsin, Wiens (1969) found 4 territorial male Henslow's sparrows in a 37 ha grassland in the first and third years of a 3 year study. The species was absent in the second year. In Minnesota, 2 fields with a combined area of 23.1 ha were used for 15 years by nesting Henslow's sparrow; the area supported 8-12 territorial males between 1987-89 (Hanson 1994). Nolin and Ritzenthaler (1987) found that the average size of 6 grasslands occupied by 1-4 pair(s) of nesting Henslow's sparrows in Ohio was 11.8 ha and the smallest grassland occupied was 8.1 ha. These figures are based on a single year's data.

Henslow's sparrow breeding habitat requirements can be met in a variety of grassland habitats. Herkert (1994a) noted that Henslow's sparrow in the midwestern states historically bred in native prairie habitat, but now they also inhabit a variety of other grassland habitats including hayfields, pasture, wet meadows, and old fields. Breeding has been documented in pastures which are lightly grazed and in infrequently mowed hayfields (Skinner et al. 1984; Smith and Smith 1992; Swengel, in prep.). However, it should be noted that the majority of pastures and hayfields, particularly in light of modern agricultural practices, are not suitable for Henslow's sparrow. David Sample (Wisconsin Dept. of Natural Resources, pers. commun.) noted that Henslow's sparrow occurs in some hayfields in Wisconsin, but that the continued trend toward earlier cutting of hay will worsen the already low quality of those habitats. Agricultural habitats will only be used by Henslow's sparrow if the structure of the vegetation meets the species' habitat needs (Hands et al. 1989). In Ohio, Henslow's sparrow "occur regularly in extensive grasslands covering reclaimed strip mines..." (Peterjohn and Rice 1991). One uncommon habitat that supported high densities of Henslow's sparrow in central Wisconsin was sphagnum bogs mossed for peat (D. Sample, pers. commun.). In the eastern part of its range, Henslow's sparrow may also nest in the upland portions of saltmarshes (Hyde 1939, Craig 1979).

No preference for native grasslands has been documented. In Illinois, Herkert (1994a) noted: "...There was no apparent preference for native or restored prairie or non-native grasslands ... with Henslow's sparrow being recorded from a nearly equal number of native or restored prairies and non-native grasslands...". D. Sample (pers. commun.) observed that the highest densities of Henslow's sparrow documented during the Wisconsin Grassland Bird Study (WGBS) were in warm- or cool-season grasslands managed for wildlife habitat.

WINTER HABITAT REQUIREMENTS

Henslow's sparrows are secretive on their wintering grounds. They spend most of their time on the ground in dense groundcover. Most accounts on winter range indicate that Henslow's sparrows are difficult to flush and rarely assume an exposed perch. Winter habitats are generally thought to be similar to breeding habitats in that they are dominated by dense groundcover. Hamel (1992) listed pine savannas and longleaf (*Pinus palustris*)/slash pine (*P. elliotii*) communities as optimal winter habitats. Hunter (1990) noted that the habitats used by wintering Henslow's sparrow in the Southeast include wet meadows, often dominated by broomsedge (*Andropogon virginicus*), and wiregrass (*Aristida* spp.) within longleaf pine woodlands. Maintained utility line corridors also provide suitable habitat where moist broomsedge is present. However, Douglas McNair (Tall Timbers Research Station, pers. commun.) cautioned that no one has evaluated whether utility line

corridors and other anthropogenic habitats are supporting viable populations of Henslow's sparrow.

Accounts of wintering birds from southeastern states offer some insights into the habitats in which birders in those states encounter Henslow's sparrow. In Florida, Henslow's sparrow winters in a variety of natural habitats, including upland pine forests with a sparse overstory of trees and dense groundcover, open prairies similar to upland pine forests but lacking trees, wet prairies, and the edges of freshwater marshes. They also occur in disturbed areas, such as grassy swales beneath powerlines, along roadsides and in moist, grassy, unmowed fields (Jim Cox, Florida Game and Fresh Water Fish Commission, pers. commun.). Mirarchi (1986) commented on winter habitat in Alabama: "The habitats used during winter have not been intensively studied, but are apparently similar to the breeding habitats. They include the thick wiregrass or broomsedge 'savannas' in open pine woods, pitcher plant (*Sarracenia* spp.) bogs, and salt marsh borders of the Gulf Coast." In North Carolina, Henslow's sparrow winters in open longleaf pine stands with a groundcover of wiregrass that has been burned during the previous year (H. LeGrand, Jr., pers. commun.). LeGrand noted: "Thick grassy cover is not enough for these birds; they must have adequate food in the form of grass seeds."

Based on his work with Henslow's sparrow in the southeast, Mark Woodrey (Mississippi Dept. of Wildlife, Fisheries, and Parks, pers. commun.) noted that Henslow's sparrow appears to winter primarily in coastal areas. Based on specimens (6 in the ornithology collection at the Mississippi Museum of Natural Science) and site records, all Mississippi records are from south of Hattiesburg (approximately 90-100 miles inland). He has not found Henslow's sparrow when conducting surveys in apparently suitable habitats further inland.

The winter habitat requirements of Henslow's sparrow have not been rigorously studied until recently. Currently, there are ongoing projects in Alabama (Sheldon Plentovich, Auburn University, pers. commun.), Florida (Engstrom and McNair, in prep.; D. McNair, pers. commun.), and Mississippi (M. Woodrey, pers. commun.) which involve evaluation of the winter ecology of Henslow's sparrow.

A study on Henslow's sparrow winter habitat requirements is being conducted in Baldwin County, Alabama (S. Plentovich, pers. commun.). The study site is International Paper Company land; one aspect of the study is to evaluate compatibility of Henslow sparrow habitat management with timber management. During the winter of 1994-95, 23 birds were banded. Henslow's sparrows were found in areas with high density of standing grasses. They were not found in areas with standing water, but preferred moist sites. Most birds were located in pitcher plant bogs or transition zones between the bogs and upland habitat. Generally, birds were in areas that had not been disturbed for 2-5 growing seasons. Individual birds were repeatedly flushed from the same sites. This observation, in concurrence with observations on the Mississippi study area, indicated that individual birds were staying in the same general area.

The primary objective of a current study in the Apalachicola National Forest (NF) in Florida is to assess how bird communities and populations of individual species (including Henslow's sparrow)

in longleaf pine forests respond to 2 different fire regimes (dormant, growing season) (Engstrom and McNair, in prep.). Preliminary results suggest that Henslow's sparrow is an uncommon-to-fairly common winter resident (mid-October to mid-April) in suitable habitat in the Apalachicola NF.

A related project on the Apalachicola NF, which began in autumn 1995, is being conducted in 2 open treeless savannahs adjacent to longleaf pine forest; the focus of this study is late autumnal migrants (D. McNair, pers. commun.). The 2 savannahs differ both in habitat characteristics and time since last burn. Effects of habitat differences and year of burn on habitat selection in autumnal migrants will be evaluated. During 1995, 91 Henslow's sparrows were captured (in approximately equal numbers in both savannahs). Preliminary data suggest that these birds probably disperse locally and winter in the Apalachicola NF.

The Mississippi study is being conducted at the Sandhill Crane National Wildlife Refuge (NWR) (M. Woodrey, pers. commun.). (LeConte's sparrow [*Ammodramus leconteii*], Bachman's sparrow [*Aimophila aestivalis*], and sedge wren [*Cistothorus platensis*] are also being studied). This area is burned (primarily in winter) to maintain habitat for Mississippi sandhill cranes (*Grus canadensis pulla*). Thirty-three Henslow's sparrows were banded during the winter of 1994-95, the first field season. Repeated sightings of individuals indicated that the birds on this study area tended to stay in the same area over the course of the winter.

BIOLOGY

MIGRATION

Henslow's sparrows begin their spring migration from southern wintering grounds in mid-March to early-April (Hyde 1939, Graber 1968). Most summaries of their migration concur with Hyde's (1939) account: "By the end of the second or third week in April, the species has reached Kansas, northern Illinois, southern Michigan, and New Jersey. The middle of May sees the species at its northern limit...". Fall migration begins by mid-September and continues into December (Hyde 1939). Graber (1968) and Smith (1968) provided arrival dates at specific locations for both spring and fall migration.

A pilot study of late autumnal migrants, including Henslow's sparrow, in the Apalachicola NF in Florida began in autumn 1995 (see **WINTER HABITAT REQUIREMENTS**). Most of the 91 Henslow's sparrows captured during 1995 were hatch-year birds. D. McNair (pers. commun.) noted: "Our information on mass and fat reserves, limited recaptures, and winter census data suggests that these migrant Henslow's sparrows probably disperse locally and remain and winter in the Apalachicola NF." Data from this study suggest that the Henslow's sparrow is a fairly common-to-common autumnal migrant in northern Florida. D. McNair (citing Crawford 1974, 1981) noted that data from nocturnal accidents at a television tower near Tallahassee suggested that Henslow's sparrow was an "uncommon autumnal and rare vernal migrant in northern Florida."

With the exception of the Florida studies, we are unaware of additional systematic information on migrant populations of Henslow's sparrow. Graber (1968) stated: "Nearly all of the definitely migrating birds seen by me in Kansas, Illinois, and New Jersey were along hedgerows or at the edges of similar shrubby places." Austen et al. (1995) noted that: "The elusive nature of Henslow's Sparrows makes it difficult to spot them in migration when they may not be singing." They further noted that Henslow's sparrows are thought to migrate solitarily or in small groups at night (citing Knapton 1982) and that the relatively short distance between breeding and wintering grounds is probably covered in 1-2 weeks.

REPRODUCTION

Henslow's sparrow is referred to by most authors as being "loosely colonial", "semi-colonial", or "somewhat colonial" because territories of breeding Henslow's sparrows tend to be clumped, rather than uniformly distributed over the habitat. However, Smith (1992) cautioned that Henslow's sparrow is not colonial in the true sense of the word (as applied to herons, gulls, etc...). He noted: "The 'clumping' of Henslow's sparrow may be a secondary effect of the clumped nature of suitable habitat for this species in most situations."

Within concentrations of nesting Henslow's sparrows, males establish and maintain territories, primarily through song (Hyde 1939, Robins 1971a). Graber (1968) stated that territory boundaries "are not too rigid and may be violated occasionally." Territory size estimates range from approximately 0.3 ha (Robins 1971a in Michigan) to 0.6 ha (Wiens 1969 in Wisconsin). Verser (1990) estimated the territory of 1 banded male in Oklahoma to be approximately 1 ha. Robins (1971a) found that average territory size was smallest and the population density highest in the areas with the tallest, most dense vegetation. Robins (1967 cited *in* Robins 1971a) reported an average of 57 breeding pairs per 100 ha (23 pairs/100 ac) based on records from 27 studies. Herkert (1994b) reported an average density of 20.8 males/100 ha on grasslands where the species was present in Illinois. Hyde (1939) noted: "In fields inhabited by colonies of Henslow's sparrow the numbers of birds an acre may run rather high, but over any extensive area, taken as a whole, the population will be low because of the large amount of uninhabited land."

Some authors have suggested that the "colonial" nature of Henslow's sparrow may account for its area-sensitivity. However, Herkert (1994a), observed that the colonial tendency of the species was unlikely to account for the avoidance of small grasslands. He noted that grassland areas (with suitable habitat) as small as 10 ha should be large enough for several pairs (based on territory size), and yet Henslow's sparrow was regularly absent from grasslands much larger than 10 ha in Illinois.

Limited data are available regarding site-fidelity in Henslow's sparrow. In Kansas, none of 13 banded Henslow's sparrows were recaptured the following year, even though the sites were still suitable and supported 37 territorial males (John Zimmerman, Kansas State University, pers. commun.). Based on his work in Kansas, J. Zimmerman (pers. commun.) suspected that Henslow's sparrow did not exhibit site-fidelity. In Minnesota, 1 bird banded in 1988 (5 birds banded in total) was captured at the same site in 1989 (Hanson 1994). Robins (1967 cited *in* Austen et al. 1995) banded 24 adult, 18 nestling, and 2 juvenile Henslow's sparrows in Michigan

in 1966 and had no returns the following year. Austen et al. (1995) noted that absence of recaptures does not necessarily indicate lack of site-fidelity.

Several authors have noted the tendency for local populations of Henslow's sparrow to be unstable from year to year. Hyde (1939) stated: "It has been my experience as well as that of other observers that in certain localities Henslow's sparrow is well established as a breeder, whereas in other ones it is irregular, and its presence in a given season cannot be certainly predicted." Persistent breeding populations have been documented in some managed, protected areas (Birkenholz 1983, Drilling 1985, Zimmerman 1992, Herkert 1994a). As previously discussed, some researchers speculate large grasslands are more likely than small grassland patches to sustain breeding populations. Persistent wintering populations have not been well documented, but ongoing research suggests that such populations exist in some wintering areas managed to maintain habitat suitability.

Henslow's sparrow is monogamous (Graber 1968, Wiens 1969, Robins 1971a). The birds begin building nests in early May. Most nests are built 1-3 inches above the ground, at or near the base of a thick clump of grass (Hyde 1939, Robins 1971a). Most nests contain 4-5 eggs which are incubated for 10-11 days and young leave the nest 9-10 days after hatching. Graber (1968) detailed the appearance of the eggs. Henslow's sparrows often raise 2 broods of young per year (Hyde 1939, Robins 1971a). First clutches are normally completed by mid-to-late May and second nests are frequently initiated in July and August (Hyde 1939, Robins 1971a). Hyde (1939) and Robins (1971a) provided details of courtship, mating, incubating and brooding behaviors. Robins (1971b) detailed foraging patterns during the nestling period and compared foraging behavior of males versus females.

To our knowledge, Robins (1971a) collected the only detailed information available on Henslow's sparrow nest success. Working in Michigan, he found 11 nests which contained 40 eggs and 6 young. Young were fledged from 6 of the 11 nests (55%); all young were fledged at only 1 nest. In all, 17 young were fledged from the 11 nests. He did not document the causes of nest loss. Reinking and Hendricks (1993) summarized the fate of 7 Henslow's sparrow nests in Oklahoma in 1992-93. They found that at least 20 Henslow's sparrow nestlings were produced; 2 nests contained brown-headed cowbird (*Molothrus ater*) eggs and/or nestlings; and at least 2 nests were depredated.

Few causes of nest loss in Henslow's sparrow have been documented. Nests of Henslow's sparrow are hard to find and few nests have been observed. There are scattered reports of nest parasitism by the brown-headed cowbird (Hyde 1939, Robins 1971a, Reinking and Hendricks 1993, Zimmerman 1993, Austen et al. 1995). Friedmann (1963 cited in Smith 1992) concluded that the level of parasitism in Henslow's sparrow was low; he reported a total of 11 instances of parasitism from 5 states. Austen et al. (1995) noted: "...since the Henslow's Sparrow coevolved with the Brown-headed Cowbird, it is likely that the sparrow has become adapted to cowbird parasitism...". The level of parasitism experienced by grassland birds may be related to the level of habitat fragmentation; rates of nest parasitism may be higher in small grassland patches compared to larger patches (Johnson and Temple 1990). The level of parasitism is probably also related to

cowbird density (at the landscape level), as has been documented for forest-breeding birds (Robinson et al. 1993).

Scant information has been compiled on the frequency of predation of Henslow's sparrow eggs or young. Robins (1971a) observed a thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) preying on a young Henslow's sparrow. Based on his observations of nesting Henslow's sparrow, he concluded that: "Because of the continuous cover of the vegetation and secretive habits of Henslow's sparrow... the most important enemies were probably mammals or snakes...". Hyde (1939) frightened a blue racer (*Coluber constrictor flaviventris*) from a Henslow's sparrow nest in Michigan. Based on his observations, he concluded that snakes are probably the worst enemy of Henslow's sparrow. Graber (1968) noted that mustelids, raccoons (*Procyon lotor*), canids, opossums (*Didelphis virginiana*), and sciurids are potential predators of Henslow's sparrow and/or their eggs, but added that no documentation was recorded in the literature. Feral cats are also potential predators; McPeck (1994) reported a Henslow's sparrow killed by a cat. Researchers have documented increased nest predation with proximity of a grassland to woody cover (Gates and Gysel 1978, Johnson and Temple 1990, Burger et al. 1994). Rates of nest predation on grassland birds may be higher in small grassland patches compared to larger patches (Johnson and Temple 1990).

In areas where Henslow's sparrow nests in agricultural grasslands, trampling of nests by livestock (1 documented occurrence by Hyde 1939) and mowing of hayfields likely result in some nest losses. Hyde (1939) also reported on 1 nest failure partially due to mite infestation.

FOOD HABITS

The diet of Henslow's sparrow reflects its ground-foraging habits. Hyde (1939) evaluated the diet of Henslow's sparrow based on the contents of 17 stomachs (12 adults, 5 young birds able to fly) collected between April and October. Animal and vegetable matter constituted 82% and 18% of the food found in the stomachs (by bulk), respectively. The percentage of animal matter in the diet exceeded 85% for the period April to September; 2 stomachs collected in October contained 9-15% animal matter. Hyde concluded: "It is nearly certain that if fall, winter, and early spring specimens had been examined in proportion to those collected in summer, the percentage of vegetable matter would have been much higher." Orthopterans made up 36% of the April-October diet (and more than 50% of the April-September diet). Coleoptera composed another 19%. A detailed account of stomach contents was provided by Hyde (1939).

Hyde (1939) and Robins (1971b) published data on observations of food fed to nestling Henslow's sparrows. In both studies, orthopterans and lepidopterous larvae were the most common foods of nestlings. Robins (1971b) provided details on feeding behavior and feeding rates. He also compared the foraging patterns of adult males and adult females during the nestling stage.

We are unaware of any detailed studies of winter food habits of Henslow's sparrow. Stevenson and Anderson (1994) provided the following narrative on winter food habits for the species: "It forages on the ground, eating weed and grass seeds and smaller amounts of insects, spiders,

myriapods, and snails." Oberholser (1974) noted: "The Henslow's eats seeds of grasses, sedges, ragweed, and smartweed, also berries; animal matter in its diet included insects (chiefly beetles, weevils, true bugs, caterpillars, grasshoppers, crickets), spiders, and small mollusks."

POPULATION TRENDS AND ESTIMATES

The scientific community has expressed concern regarding Henslow's sparrow populations for decades, but it has been difficult to document population trends. Throughout its current range, the distribution of Henslow's sparrow is scattered and localized. It is not considered common anywhere within its range, with the exception of very localized populations. Henslow's sparrow has been a National Audubon Society *blue list* or a *blue list special concern* species since 1974 (last published by Tate 1986) due to apparent population declines across most of its range (Smith 1992). The International Council for Bird Preservation classified the species as near-threatened (Collar and Andrew 1988 cited in Ellison 1992). Rosenberg and Wells (1995) compiled a weighted ranking of Neotropical migrant birds in the northeastern U.S. to determine priorities for immediate conservation action. Henslow's sparrow was included in the ranking and had the highest "conservation concern score" for the 20 species considered. Rosenberg and Wells (1995) concluded that Henslow's sparrow is "perhaps the most poorly understood and critically threatened of any migratory landbird in the Northeast."

In 1987, the U.S. Fish and Wildlife Service (FWS) identified Henslow's sparrow as one of 30 "migratory nongame birds of management concern in the United States" (USFWS 1987). Henslow's sparrow was also included when the list was revised in 1995 (USFWS 1995). Widespread population decline and the species' need for restricted/vulnerable habitats were cited as the causes for concern. Butcher and Lowe (1990) subsequently examined Christmas Bird Count (CBC) data for these species "to verify the suspicion that their populations are in trouble." Based on this evaluation of CBC data for the 30 species, Butcher (1989) concluded that Henslow's sparrow was one of 2 species most in danger of extinction. Henslow's sparrow was a Category 2 candidate for review for possible addition to the Federal endangered or threatened species list from 1991 (USFWS 1991a), until use of the Category 2 list was discontinued in 1996 (USFWS 1996). Henslow's sparrow is listed as endangered, threatened, or a species of special concern in 16 states (see state narratives for details). Henslow's sparrow was designated as "Endangered" in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1993 (Austen et al. 1995).

NORTH AMERICAN BREEDING BIRD SURVEY

Large-scale changes in habitat availability for Henslow's sparrow occurred prior to any range-wide monitoring programs. The North American Breeding Bird Survey (BBS), which is designed to estimate population trends in North American breeding birds, was initiated in 1966. (Robbins et al. 1986 and Peterjohn 1994 provided details on BBS methodology). By this time, Henslow's sparrow populations had already declined from historic highs throughout most of the species' range. The abundance of Henslow's sparrow on BBS routes has been low throughout the

history of the survey. Between 1966-1994, Henslow's sparrow was represented by a total of less than 2,000 birds throughout North America (records include 20 states and Ontario). Long-term population trends of Henslow's sparrow based on BBS data are presented in Table 1.

Table 1. Trends in abundance of Henslow's sparrow based on BBS data.

AREA	1966-1994 TRENDS			1966-1979 TRENDS			1980-1994 TRENDS		
	TREND ¹	P ²	N ³	TREND	P	N	TREND	P	N
U.S.	-8.2	***	142	-5.8	**	98	-11.5	***	73
U.S. & CANADA	-8.3	***	144	-6.1	**	99	-11.1	***	74
FWS REGION 3 ⁴	-7.6	***	89	-4.6		58	-12.4	***	49
FWS REGION 5 ⁵	-12.2	***	43	-8.9	**	38	-14.5		16
MICHIGAN	-12.6	***	21	-10.2		15	-15.6	***	9
NEW YORK	-12.1	***	27	-10.8	***	26	-17.0	*	10
OHIO	-3.5		19	3.8		11	-21.1	***	12
WISCONSIN	-3.5		30	-7.7		24	-10.7	**	14

¹ average percent annual change

² statistical significance of the trend: * = 0.05 < P < 0.10
 ** = 0.01 < P < 0.05
 *** = P < 0.01

³ number of routes used in the analysis

⁴ FWS REGION 3: IL, IN, IA, MI, MN, MO, OH, WI

⁵ FWS REGION 5: CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV

BBS data indicate an average annual decline of 8.3% for Henslow's sparrow in North America between 1966-1994. During 1980-1994 the decline was even more precipitous, estimated at 11.1%. The 1966-1994 trends for FWS Regions 3 and 5 were -7.6% and -12.2% annually, respectively.

The low average relative abundance of the species leads to some difficulties in interpretation of BBS data. The guidelines for interpretation of BBS trend estimates (Bruce Peterjohn, BBS Coordinator, pers. commun.) indicate that state trends are only estimated for species observed on a minimum of 14 routes. Using this guideline, there are only 4 states (Michigan, New York, Ohio, Wisconsin) for which sufficient data are available to calculate meaningful population trends. The BBS guidelines further caution: "Large regional estimates (such as BBS Regions) based on fewer than 50 routes and continental estimates based on fewer than 100 routes may be suspect, and should be viewed with considerable caution. Be advised that even for species with sample sizes of 200-300 routes, trends may be strongly influenced by results from a small number of routes (<10) within a limited geographic area, and conclusions based on these trends should reflect the possible limitations of the data." Note that the number of routes on which Henslow's sparrow population

trend estimates are based approach the recommended minimums. For example, the continental estimate for 1966-1979 is based on 99 routes, but drops to 74 routes for 1980-1994.

In spite of the limitations on BBS data imposed by the small number of routes on which the species is detected and the low average relative abundance of the species, BBS data clearly indicate a significant population decline for this species in its breeding range (B. Peterjohn, pers. commun.).

In fact, this is one of the steepest declines estimated for any North American breeding bird. It is important to note that the larger trend estimates also tend to be less precise. Hence, we should stress the fact that the estimates are statistically significant and fairly consistent throughout the range of the species, rather than the magnitude of the estimates (B. Peterjohn, pers. commun.).

BREEDING BIRD ATLASES

Breeding Bird Atlases (BBAs) are conducted by states (and Canadian provinces) to determine the distribution and reproductive status of breeding birds within the state. The North American Ornithological Atlas Committee (NORAC 1990) provided detailed BBA methodology. Most BBAs are 5-year projects. Some states plan to periodically repeat Atlas projects. Once repeated, Atlas projects will provide valuable information on changes in Henslow sparrow distribution. Resolution of atlas data varies by state. Because Henslow's sparrow is a rare species and occurs in discrete patches of habitat, statewide surveys (such as BBAs) may not provide a very accurate picture of the distribution or status of the species. However, atlas data provide the best information available on the distribution of Henslow's sparrow on the breeding range.

In conducting BBAs, atlas participants visit atlas blocks during the height of the breeding season and seek evidence of breeding. Evidence is categorized as "possible", "probable", or "confirmed" (NORAC 1990 provided details on criteria for each category). Some states have adopted sampling designs based on Priority Blocks, which are in the same position on every quadrangle. Henslow's sparrow was detected during BBAs in 14 states and Ontario. Summaries of BBA data for each state are summarized in the state narratives. Years in which atlas field work was conducted are listed in parentheses at the beginning of each BBA description.

CHRISTMAS BIRD COUNTS

Christmas Bird Count (CBC) data represent the only population trend data available for Henslow's sparrow on winter range. The National Biological Service (NBS) provided the following guidelines for interpreting CBC data: "Christmas Bird Counts were not designed to be a statistical sample of North American birds or their trends. Consequently, the locations are biased by the preferences of bird watchers as to where they would like to count birds. Often this translates to a bias toward urban areas and regions with high avian diversity. Interpretation of trends from such counts must be tempered by their inherent biases." NBS recommends referring to Butcher (1990) and Butcher and McCulloch (1990) for details on sampling methodologies and biases associated with CBCs.

CBC data show 38 wintering sites for Henslow's sparrow scattered along the Gulf Coast of the U.S., with the greatest abundance regularly occurring at Galveston Bay, Texas (averaging 0.1

birds/party hour) (Root 1988). Based on CBC data, Butcher and Lowe (1990) reported that Henslow's sparrow declined 1.2% per year between 1963-87 ($P < 0.01$) across the winter range of the species. This estimate was based on CBCs at 64 locations. The highest count recorded during the 25-year period was 11 in 1985 in St. Tammany, Louisiana. Only 3 states (Texas, Florida, Louisiana) had 10 or more CBC locations with Henslow's sparrows (considered an adequate sample to estimate trends). In Texas, the population declined at an estimated 2.2% annually ($P < 0.01$) and in Florida the estimated decline was 2.5% annually ($P < 0.01$). The Louisiana population was considered stable. Butcher and Lowe (1990) noted that Henslow's sparrow was found irregularly at all CBC locations; only 4 (of 64) locations had Henslow's sparrow in 50% or more of years. They caution that CBC data are likely not very reliable for assessing trends in Henslow's sparrow populations.

STATE SUMMARIES

In conducting this status assessment, information was solicited from throughout the historic and current range of Henslow's sparrow. In February-March of 1995, 85 requests for information were sent to individuals in 38 states and Ontario (see APPENDIX I). Additional queries were made, as needed, to collect additional information. The state narratives (summary for Canada is included) which follow summarize the responses received. The summaries include the following information if available: a historic account; BBS summary; BBA summary; CBC summary; state research or monitoring efforts; known "major" breeding populations in the state (a large and/or persistent breeding population); state legal status; Natural Heritage Program state rank; and a brief description of habitat conditions. An entry of "none indicated" for any category indicates that the response received from that state did not specifically reference that category (e.g. "none indicated" for "**Major Populations**" does not necessarily mean that no major populations exist, but rather that no major populations were noted in the information provided by individuals in that state.).

Availability of data varied considerably among states, and this variation is reflected in the summaries. We attempted to collect and summarize all relevant information regarding Henslow's sparrow, but there is no doubt that additional information will come to light. These summaries should be viewed as the basis for an ongoing process of compiling information on the status of Henslow's sparrow and not as the endpoint of that process.

The Network of Natural Heritage Programs and Conservation Data Centers and The Nature Conservancy (TNC) provided the information on Natural Heritage Program state ranks. The ranks are defined as follows (only ranks applicable to Henslow's sparrow are listed):

1. S1 = Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. (Typically 5 or fewer occurrences or very few remaining individuals).
2. S2 = Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. (6-20 occurrences or few remaining individuals).

3. S3 = Rare and uncommon in the state. (21-100 occurrences).
4. S4 = Widespread, abundant and apparently secure in the state, with many occurrences, but there is long-term concern for the species. (Usually more than 100 occurrences).

Some state ranks incorporate 2 numeric ranks (e.g. S3S4); this format denotes a range of uncertainty about the rarity of the species in the state. The date on which the rank was assigned is indicated in parentheses after the rank. Note that some ranks were assigned many years ago and may not reflect current information regarding Henslow's sparrow status in the state.

Tables 2 and 3 summarize the status of Henslow's sparrow (by state) within the species breeding and winter ranges, respectively. These tables are located at the end of the state summaries. The preliminary assessments of survey status/needs provided in these tables should be refined through additional input from each state.

FWS REGION 2

Oklahoma

Summary: Henslow's sparrow breeds in the state.

(Reference Mark Howery, Oklahoma Dept. of Wildlife Conservation, pers. commun.). Historically, Henslow's sparrow was considered a rare migrant in eastern Oklahoma. The first spring/summer record was in 1974 when several singing males were recorded on Lake Copan Wildlife Management Area in Washington County (approximately 10 miles south of the Kansas state line). Since 1974, there have been several observations of singing males at this location and surrounding parts of Washington and Osage counties. The first confirmed nesting record for this species was in 1987 in Washington County (Reinking and Hendricks 1993). Since that time, a large, breeding population has been documented on TNC's Tallgrass Prairie Preserve, in northern Osage County (Reinking and Hendricks 1993). Seibert (1993) reported breeding season records for Henslow's sparrow in 1993 from 2 locations in Tulsa County. Verser (1990) reported breeding-season sightings in Rogers and Tulsa Counties. Suitable tallgrass prairie habitat still remains to the east in Nowata and Craig Counties, but no one has surveyed these counties.

Based on the number of birds seen recently and the fact that all known breeding activity is recent, it appears that Henslow's sparrow has established a breeding population in Oklahoma. M. Howery (pers. commun.) noted: "Currently, we have no data to indicate a cause for the recent increase. One potential hypothesis is that populations that formerly bred farther north and east are being forced into the Osage Hills region by habitat loss elsewhere. Another hypothesis is that better habitat conditions may exist in Oklahoma now, at least locally, than in the past and, because of their relatively nomadic behavior, Henslow's Sparrows have been quick to respond and colonize these sites." S. Swengel (pers. commun.) suggested that public prairies in adjoining portions of southwestern Missouri may provide a source population of Henslow's sparrows.

BBS: In the history of BBS (1966-1994), 26 Henslow's sparrows have been recorded on 2 routes in Oklahoma; all records are from 1993-94.

BBA: No atlas project at present.

Research/monitoring: In 1992, the Sutton Avian Research Center began a 5-year prairie bird monitoring project on TNC's Tallgrass Prairie Preserve and several private ranches in Washington and Osage Counties. The objective of this study is to assess the impact of burning and grazing on the distribution, relative abundance, and nesting success of tallgrass prairie birds in Oklahoma. Relative abundance of Henslow's sparrow is being monitored with regard to land treatment and resulting vegetation variables. Nest success and cowbird parasitism rates are also being evaluated with regard to land treatment.

Henslow's sparrow was detected on several of the study plots on the preserve from 1992-94. Henslow's sparrows were on tallgrass prairie plots that had not been grazed or burned for 2-3 years. Dan Reinking (Sutton Avian Research Center, pers. commun.) estimated that the (approximately) 15,000 ha preserve might have contained as many as 3,000 Henslow's sparrows in 1992. However, this estimate is based on the results of fixed radius point counts, which were then extrapolated to what was thought to be suitable habitat. An accurate estimate is not possible at this time, but there is no doubt that this is a significant population. The population declined in 1993 and 1994 due to burning. Reinking and Hendricks (1993) summarized the fate of 7 nests found in 1992-93. All nests were located in areas which had not been spring-burned.

D. Reinking (pers. commun.) noted that a survey of seemingly appropriate habitat in northeastern Oklahoma would yield additional information on the extent of the range of Henslow's sparrow in the state. Monitoring this species would be difficult because habitat variability from year to year has significant impacts on the presence and abundance of Henslow's sparrow in the region; areas of high concentration one year may be completely devoid of Henslow's sparrow the next year due to burning or other land use practices. The near complete private ownership of land in Oklahoma also makes surveying difficult.

Major Populations: TNC's Tallgrass Prairie Preserve.

State Status: none

Natural Heritage Rank: S2 (5/1/92)

Habitat Condition: Henslow's sparrow appears to occur only on tallgrass prairie in Oklahoma. They nest on sites that have not been heavily grazed or burned in 2-4 years so that the sites support standing dead grass when the birds arrive in the spring. Sites burned or grazed more often than every 3 years do not appear to provide suitable habitat. Sites unburned or ungrazed for much more than 4 years appear to become too overgrown or have too much woody encroachment (M. Howery, pers. commun.).

The popular practice of annual spring burning of the tallgrass prairie in northeastern Oklahoma to stimulate grass production for cattle limits the amount of suitable nesting habitat for Henslow's sparrow. The highly localized and variable distribution of the species in Oklahoma is probably the result of annual burning in combination with other grazing and mowing practices (D. Reinking, pers. commun.).

D. Reinking (pers. commun.) projected that the outlook for Henslow's sparrow on TNC's Tallgrass Prairie Preserve is good. Harvey Payne (Tallgrass Prairie Preserve, pers. commun.) stated that the goal of the preserve is to recreate a functioning prairie ecosystem through the reintroduction of bison and the use of controlled burning (approximately 20% of the area per year). This rotational management should result in the maintenance of suitable habitat for Henslow's sparrow.

Texas

Summary: Henslow's sparrow winters (and formerly bred) in the state.

(Reference J. Herron, pers. commun. and references therein). Henslow's sparrow is a rare but regular winter resident in the East Texas Piney woods (pine savanna) and the Gulf Coast prairies (wet open meadows).

Greg Lasley (Texas Bird Records Committee, pers. commun.) noted that almost all Texas records are from eastern Texas. He described the species as rare and local, but quite regular in proper habitat in far east Texas. Based on the limited information available, he concluded that Henslow's sparrow is probably stable in numbers as a wintering bird in Texas. K. Arnold (pers. commun.), editor of the Texas CBCs since 1972, also is of the opinion that the Texas wintering population of Henslow's sparrow is stable. However, CBC data (see below) indicate that the wintering population declined.

A disjunct breeding population formerly bred at 2 sites in Texas. The first colony, discovered at Deer Park (Harris County), had up to 21 singing males in approximately 1 square mile when it was found in 1952. The second colony was located in Houston and consisted of 62 adults and 9 young when it was found in 1973 (Arnold 1983). There were no birds at this site in 1982. Both colonies are now extirpated. K. Arnold (pers. commun.) surveyed suitable Henslow's sparrow habitat on the upper Texas coast in 1983; he heard 1 singing male but found no other evidence of breeding in Texas.

BBS: No records of Henslow's sparrow.

BBA: (1987-91). No records of Henslow's sparrow.

CBC: Based on 19 CBC locations in Texas, the wintering population of Henslow's sparrow was estimated to decline 2.2% annually ($P < 0.01$) between 1963-87 (Butcher and Lowe 1990). The total number of birds recorded (standardized by effort) was 47. The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.04.

Root (1988) noted that the greatest winter abundance of Henslow's sparrow on CBC routes regularly occurred at Galveston Bay, Texas (averaging 0.1 birds/party hour).

Research/monitoring: There is some suggestion that wintering Henslow's sparrows may be more abundant in Texas than previously thought, but currently no research or monitoring efforts are focused on the species in Texas. J. Herron (pers. commun.) noted that Texas Partners in Flight planned to conduct training sessions on Henslow's sparrow identification and habitat requirements in April 1995 to encourage future monitoring of the species.

Henslow's sparrow was considered a state "Review Species" by the Texas Bird Records Committee (TBRC) of the Texas Ornithological Society. G. Lasley (pers. commun.) searched available resources and compiled 32 accepted Henslow's sparrow records for Texas (for the period 1892-1993); almost 100 additional undocumented records were compiled. The TBRC removed Henslow's sparrow from the list in late 1994 because they concluded that the species was regular enough in part of Texas that it no longer met the requirements to be a Review Species (4 or fewer records per year).

Major Populations: none known

State Status: None. (Noted as a Medium Priority bird on a draft Candidate Species Monitoring Plan proposed by the Endangered Resources Branch of the Texas Parks and Wildlife Dept.).

Natural Heritage Rank: S2 (non-breeding), SX (extirpated breeding status) (10/31/94).

Habitat Condition: Wintering Henslow's sparrows utilize wet meadows, wet prairies, and weedy fields of broomsedge, bluestem, and scattered young pines. These habitats are ephemeral in coastal and east Texas depending on rainfall and forestry management practices (J. Herron, pers. commun.).

Cliff Shackelford (USFS, pers. commun.) noted that wintering Henslow's sparrows are found in eastern Texas National Forests in burned areas dominated by bluestem and broomsedge. These conditions are typical on areas managed for red-cockaded woodpecker (*Picoides borealis*). He indicated that habitat conditions for wintering Henslow's sparrows on the National Forests have probably improved over the past decade. Suitable habitat on private land is ephemeral and constantly shifting.

Coastal prairie habitat suitable for Henslow's sparrow is not uncommon in east Texas but some habitat has been lost to agriculture and urban sprawl (J. Herron, pers. commun.).

FWS REGION 3

Illinois

Summary: Henslow's sparrow breeds in the state.

Herkert (1994a and citations therein) noted that historic accounts indicate that prior to 1900, Henslow's sparrow was considered abundant in Illinois. Several historic accounts noted that Henslow's sparrow was one of the most numerous prairie bird species. As recently as the 1950's, the species was considered a common summer resident in the northeastern part of the state (Chicago area). Between the late 1950's and the late 1970's, populations of Henslow's sparrow (and several other grassland birds) declined substantially in Illinois. Surveys conducted by R.R. and J.W. Graber suggested that the Illinois Henslow's sparrow population declined as much as 94% between 1957 and 1979. The decline was attributed to a 65-75% decrease in grassland habitat, and a concurrent 75% decline in the average density of Henslow's sparrow within the remaining grassland habitat.

Henslow's sparrow is currently considered a very local summer resident in Illinois. Since 1980, Henslow's sparrow has been reported as a summer resident in 14 of Illinois' 102 counties. J. Herkert (pers. commun.) concluded, based on Illinois Natural Heritage Database data, recent surveys at Goose Lake Prairie (state's largest known Henslow's sparrow population), and BBA data, that the current Henslow's sparrow population in Illinois is almost certainly less than 500 individuals, and more likely is 250 or fewer individuals.

BBS: Between 1986-94, Henslow's sparrow was represented by 14 birds on 3 BBS routes in Illinois. Data are inadequate to estimate state trends.

BBA: (1986-91). Preliminary data from Illinois' BBA project show Henslow's sparrow as a confirmed or probable nester in only 4 of Illinois' 1,009 atlas blocks (Carl Becker, Illinois Dept. of Conservation, pers. commun.).

Research/monitoring: Annual monitoring has been conducted at Goose Lake Prairie (650+ ha; Illinois' largest native prairie remnant) since 1988 (periodically since 1973). Research on the effects of prescribed burning on Henslow's sparrow has also been conducted at Goose Lake Prairie since 1988. A graduate student at Southern Illinois University is currently researching habitat preferences of Henslow's sparrow in southern Illinois (C. Becker, pers. commun.). A study of nest predation rates for Illinois grassland birds began during 1995; 4 Henslow's sparrow nests were found (J. Herkert, pers. commun.).

Major Populations: The largest known population occurs on Goose Lake Prairie where 15-55 pairs have bred consistently since the early 1970's. This population has remained relatively stable between 1972 and 1994 (J. Herkert, pers. commun.). No other sites in Illinois are known to consistently have more than 15 pairs of Henslow's sparrow (Herkert 1994a and citations therein).

State Status: In January 1994, the status of Henslow's sparrow in Illinois was changed from Threatened to Endangered because of very small population numbers and suspected population decline.

Natural Heritage Rank: S2 (7/30/87)

Habitat Condition: Herkert (1994_a) demonstrated that habitat area is the most important factor influencing Henslow's sparrow in Illinois. Henslow's sparrow was rarely encountered on grassland fragments less than 100 ha. Most of the state's prairie remnants are too small to support breeding populations of Henslow's sparrow. Less than 20% of the state's 245 native prairie remnants are > 10 ha and only 9 are > 40 ha (Herkert 1994_b citing Illinois Dept. of Conservation, unpubl. data). Secondary grassland habitats (hayfields and pastures) have also substantially declined.

In addition to loss and fragmentation of nesting habitat, C. Becker (pers. commun.) noted: "...many of Illinois' known sites for this species are in the Chicago metropolitan area, an area of the state undergoing rapid development. Another potential problem in Illinois is that several of our current sites are in CRP fields. Almost all of our southern Illinois records for this species are from CRP fields. Although all of these sites contain small numbers of Henslow's sparrow, they are the only known sites in the southern region of the state. Obviously if CRP is not reauthorized these fields will most likely be lost."

Indiana

Summary: Henslow's sparrow breeds in the state.

Historic records for Henslow's sparrow are limited to northern Indiana, where the species nested locally. It is now found throughout the state, and is considered an uncommon summer resident. Under suitable conditions, it may be locally common (Mumford and Keller 1984). Based on loss of grassland habitat, Henslow's sparrow has likely declined from earlier this century, especially in northern Indiana. Population estimates are unknown (Catherine Gremillion-Smith, Indiana Dept. of Natural Resources, pers. commun.).

BBS: Between 1986-94, Henslow's sparrow was represented by 30 birds on 10 BBS routes in Indiana. Data are inadequate to estimate state trends.

BBA: (1985-90). Probable or confirmed nesting of Henslow's sparrow was detected in 23 of Indiana's 650 atlas blocks (C. Gremillion-Smith, preliminary data). The Indiana BBA shows a statewide summer distribution with most occurrences in southcentral and southeastern Indiana.

Research/monitoring: No statewide surveys have been conducted (C. Gremillion-Smith, pers. commun.).

James Hengeveld (Indiana University, unpubl. data) conducted a survey of birds at Camp Atterbury Military Reservation in Bartholomew County in 1990. He estimated densities of Henslow's sparrow at 45.4 pairs/40 ha and 31.9 pairs/40 ha based on transect counts in grassland and old field habitats, respectively. Access to these areas is restricted, and the status of this population is unknown.

A grassland bird survey, focusing on Henslow's sparrow, was conducted on Jefferson Proving Ground (JPG), an army base in southern Indiana, during 1995.

Major Populations: Based on the 1995 survey, Phil Delphy (FWS, pers. commun.) estimated that at least 400 singing male Henslow's sparrows were present on JPG. Over 2,000 ha (of the 22,000 ha base) is classified as grassland. The 2 largest grasslands are approximately 150-300 ha in size; the remaining grasslands occur in a matrix intermixed with forests and wooded grasslands.

The status of the population (and habitat) found in 1990 on Camp Atterbury is unknown.

State Status: Threatened

Natural Heritage Rank: S2 (date of ranking not listed)

Habitat Condition: Henslow's sparrow breeds in low-lying weedy and grassy meadows, hay meadows, grassy areas bordering wetlands, old pastures, and weedy fields. Conversion to agriculture and development have resulted in loss and fragmentation of grassland habitats. Succession of grasslands to shrubland and forest have probably also resulted in some habitat loss.
Iowa

Summary: Henslow's sparrow breeds in the state.

Henslow's sparrow was probably widespread and locally common before destruction of the prairie (Thompson, in prep., citing historic accounts) but was already uncommon by 1900 (Dinsmore et al. 1984). J. Fleckenstein (pers. commun.) noted that since 1980, there were only 9 locations for singing males in Iowa. At least 5 singing males were heard at 3 of the sites. All of these were in southeastern Iowa CRP fields. Thompson (in prep.) noted that a population was found in 1987 in Van Buren County in southeastern Iowa. When located in 1987, there were 6 males in 1 field. In 1993, a single site visit yielded an estimate of at least 50 pairs found in 5 different locations within a 2-mile radius (Thompson, in prep.; J. Fleckenstein, pers. commun.). There are no confirmed nesting records for Iowa, although juvenile birds and birds carrying nesting material were observed in 1987 (Thompson, in prep., and references therein).

BBS: Between 1986-94, no Henslow's sparrows were recorded on BBS routes in Iowa. The last record on a BBS route was in 1984.

BBA: (1985-90). There were 7 reports of Henslow's sparrow in BBA blocks; 6 were from the southern 2 tiers of counties and 1 was from Fayette County. Only 1 record was categorized as a probable breeder, the rest were possible. No reports came from Hayden Prairie, a former stronghold of the species (Thompson, in prep.).

Research/monitoring: No systematic inventories for Henslow's sparrow have been conducted. J. Fleckenstein (pers. commun.) noted that a survey of southeast Iowa and a complimentary study of reproductive success of known populations have been proposed, but funding has not yet been secured.

Major Populations: Thompson (in prep.) and J. Fleckenstein (pers. commun.) noted a population found at 5 locations within a 2-mile radius area in southeastern Iowa (see **Summary** above).

State Status: Endangered

Natural Heritage Rank: S2 (5/24/94)

Habitat Condition: J. Fleckenstein (pers. commun.) noted: "While we are still suffering some conversion of grassland to cropland, the dominant threat is the potential loss of CRP acreage. As fields reach the end of their 10 year lease, beginning in 1996, potential re-conversion to rowcrops or grazing could greatly reduce the amount of potential habitat in the state."

Thompson (in prep.) noted: "The few native prairie tracts remaining in the state may be too small, too isolated, and too frequently burned to support populations. The preservation of large grasslands may be crucial to the survival of this species in the state."

Michigan

Summary: Henslow's sparrow breeds in the state.

(Reference McPeck 1991 and references therein). The first documented record for Henslow's sparrow in Michigan was in 1881. Henslow's sparrow was considered uncommon in Michigan during the early 1900's, but by the 1940's it was well distributed in the southern 4 tiers of counties.

A northward expansion of the range was evident. The first authentic record in the Upper Peninsula (UP) was in 1959. The BBA (1983-88) provided a good picture of the irregular occurrence of Henslow's sparrow in Michigan. It is currently considered an uncommon, local summer resident (McPeck 1994).

BBS: Based on data from 21 BBS routes, Michigan's Henslow's sparrow population declined at an average annual rate of 12.6% during the history of the survey (1966-94); this decline was statistically significant ($P < 0.01$). During the period 1966-79 the population declined 10.2% annually (not statistically significant). The average annual rate of population decline was even steeper during the latter years of the survey, estimated at 15.6% annually for the period 1980-94. This decline was statistically significant ($P < 0.01$) but is based on data from only 9 routes (the recommended minimum for estimating trends is 14 routes).

BBA: (1983-88). (Reference McPeck 1991). Probable or confirmed breeding by Henslow's sparrow was recorded in 76 townships in Michigan, and possible breeding was recorded in an additional 135 townships (of 1,896 total townships). Most reports were scattered across the southern two-thirds of the Lower Peninsula, and in the south-central UP, probably by expansion from Wisconsin. It was noteworthy that the species was recorded in a low number of blocks in several southern counties where it was formerly a locally common breeder.

Research/monitoring: Ray Adams (Kalamazoo Nature Center, pers. commun.) has conducted a survey of birds in the Kalamazoo area on 12 routes (600 stops) since 1970. In early years of his survey, Henslow's sparrow averaged 1.81 birds/route. In recent years, he frequently recorded no Henslow's sparrows on the entire survey. He noted that habitat loss and degradation have been widespread and most grassland birds surveyed are currently at their lowest population levels for the 25 years the survey has been conducted.

Major Populations: Thomas Weise (Michigan Dept. of Natural Resources, pers. commun.) and R. Adams (pers. commun.) were unaware of any large, persistent breeding populations.

State Status: Special concern (no legal protection associated with this designation). It does afford the species "management considerations" and tracking in the Natural Heritage Database. The status of Henslow's sparrow in Michigan is currently under review, which will probably be completed in 1996 (T. Weise, pers. commun.).

Natural Heritage Rank: S3S4 (6/24/92)

Habitat Condition: (Reference McPeck 1991). "Changes in distribution and declines in southern Michigan mirror the changes in suitable habitat, namely idle fields." After initial increases in grasslands created by forest clearing and small farms, land-use trends in recent decades have led to reduction in the amount of grassland habitat in Michigan. "Current agricultural practices, urban sprawl, and vegetational succession on abandoned farmlands have eliminated many of the extensive grasslands, particularly in southern Michigan."

Minnesota

Summary: Henslow's sparrow formerly bred in the state.

Henslow's sparrow was formerly widespread but uncommon in the southern half of Minnesota. Because of its sporadic occurrence in the state, the extent of its former range is difficult to delineate (Coffin and Pfannmuller 1988). Hanson (1994) summarized historic records. Since the 1960's, most Henslow's sparrow observations in Minnesota have occurred in southeastern counties (Hanson 1994 cites 3 exceptions). Between 1976 and 1991, O.L. Kipp State Park in Winona County supported a small colony of Henslow's sparrow (Hanson 1994 and references therein). There have been no Henslow's sparrow breeding records in the state since 1991 (Hanson 1994).

BBS: Between 1986-94, no Henslow's sparrows were recorded on BBS routes in Minnesota. The last record on a BBS route was in 1982.

BBA: Minnesota did not conduct a BBA.

Research/monitoring: Hanson (1994) surveyed 23 sites where Henslow's sparrow sightings had been reported throughout Minnesota during 1987-89. With the exception of a persistent breeding population at O.L. Kipp State Park in Winona County, only scattered records of singing male Henslow's sparrows (no females located) were recorded.

Between 1976 and 1991, Kipp State Park supported a small colony of Henslow's sparrow (Hanson 1994 and references therein). The population was composed of 19-23 birds during the period 1987-89. An extensive analysis of breeding habitat was conducted in association with this population (Hanson 1994). The population declined during 1990 and 1991, when nesting was last reported. The Minnesota Department of Natural Resources (DNR) (through a cooperative agreement with the FWS) will survey Kipp State Park (and a potential nesting area near Lake City) for Henslow's sparrow in 1995 and prepare a draft Henslow's sparrow management plan for the park.

Eliason (undated) reported on the survey of 181 native prairie sites in 6 western Minnesota counties in 1988. Singing male Henslow's sparrows had been reported from 3 of these counties in the previous decade. The species was observed on only 1 site (Big Stone NWR, Lac Qui Parle County); a male was observed over several weeks but no evidence of breeding was observed. A singing male was also reported on the eastern border of the state, but could not be subsequently located.

Major Populations: none

State Status: Special Concern (Coffin and Pfanmuller 1988). Endangered designation is pending.

Natural Heritage Rank: S3 (date of ranking not listed)

Habitat Condition: Uncultivated grasslands and overgrown fields suitable for Henslow's sparrow have been greatly reduced in extent by agriculture (Coffin and Pfanmuller 1988).

Hanson (1987a) reported that mountain bike trails were proposed for the area in Kipp State Park which supported the only persistent (until 1991) Minnesota population of Henslow's sparrow. We are not aware of the status of this development.

Missouri

Summary: Henslow's sparrow breeds in the state.

Henslow's sparrow was formerly much more common and widespread throughout the prairie regions (Osage and Glaciated Plains and the Ozark Border) of Missouri (Robbins and Easterla 1992 and references therein). It is now most common on the prairie grasslands of the southern part of the Osage Plains, but is sparsely distributed across western and northern Missouri (Robbins and Easterla 1992; Dennis Figg, Missouri Dept. of Conservation, pers. commun.).

BBS: Between 1986-94, Henslow's sparrow was represented by 50 birds on 6 BBS routes in Missouri. Data are inadequate to estimate state trends.

BBA: (1986-92). Henslow's sparrow was recorded as a confirmed or probable breeder on approximately 18 blocks, and a possible breeder on an additional 12 blocks (1,216 blocks total). BBA data confirm that the species occurs across western and northern Missouri, which encompasses the historic range in the state (D. Figg, pers. commun.).

Research/monitoring: Swengel (in prep.) evaluated the response of Henslow's sparrow to management on 42 southwestern Missouri prairies between 1992-95. He concluded that prairies managed primarily by haying had more Henslow's sparrows than fire-managed prairies. He noted that Henslow's sparrow populations in southwestern Missouri appeared to be stable (if not increasing) during the years he conducted his research.

Major Populations: S. Swengel (pers. commun.) noted that Henslow's sparrow is widespread in southwestern Missouri. Based on transect counts for the 42 southwestern Missouri prairie preserves where he has conducted surveys between 1992-95, he estimated the area may support 5,000-6,000 pairs of Henslow's sparrow.

Easterla (1967 cited by D. Figg, pers. commun.) reported that Henslow's sparrow was the most abundant avian species on Taberville Prairie (680 ha public prairie). He estimated that as many as 200 pairs bred there annually from 1961-66. S. Swengel (pers. commun.) noted that Taberville Prairie supported approximately 300 pairs of Henslow's sparrow prior to 1994-95, when large sections of the prairie burned.

State Status: Rare. Protected as a nongame species (D. Figg, pers. commun.).

Natural Heritage Rank: S3 (2/1/86)

Habitat Condition: During recent years, there has been a notable increase in the number of Henslow's sparrows reported by birders. The increase is generally attributed to the availability of CRP acreage, potentially in concert with several years of wet conditions which prevented mowing of some prairies. Conversion of CRP acreage to crop production would lead to the loss of suitable grassland habitats. The continued conversion of some prairie remnants also represents a threat to the species in Missouri (D. Figg, pers. commun.).

Ohio

Summary: Henslow's sparrow breeds in the state.

(Reference Peterjohn 1989, Peterjohn and Rice 1991). The first Ohio specimen of Henslow's sparrow was collected in 1872, and the species was observed sporadically during the 1890's. It was not regularly reported until the 1920's. Henslow's sparrow range and populations in Ohio expanded during the 1920's and 1930's. The population peaked in central and northern Ohio during the 1930's. Loss of suitable habitat as a result of intensive agricultural practices led to

declines through the 1950's in northern and central Ohio, where the species has been largely eliminated. During the same period, the species expanded its range into southern and unglaciated counties, taking advantage of successional habitats in abandoned farmlands. Henslow's sparrow is now considered an uncommon to locally abundant summer resident in the southern and unglaciated counties of Ohio. Fallow fields and extensive grasslands on reclaimed strip mines are cited as the primary habitats. Peterjohn (1989) reported that the largest colonies were composed of 50-100 singing males in fields near Point Creek Reservoir (Highland and Ross Counties), Salt Fork Reservoir (Guerny County), and East Fork Reservoir (Clermont County). No information was provided on the current status of any of these populations.

BBS: Based on data from 19 BBS routes, Ohio's Henslow's sparrow population declined at an average annual rate of 3.5% during the history of the survey (1966-1994); however, this decline was not statistically significant. During the latter half of this period (1980-1994) the average annual rate of population decline was estimated at 21.1%, which was significant ($P < 0.01$). However, this latter estimate is based on data from 12 routes (the recommended minimum for estimating trends is 14 routes).

BBA: (1983-87). (Reference Peterjohn and Rice 1991). During the Ohio BBA project, Henslow's sparrow was recorded from 144 priority blocks (approximately 19% of blocks surveyed), 22 special areas, and 12 other locations within 60 counties. Breeding was probable or confirmed in 129 blocks. The species has disappeared from most intensively farmed counties in western and central Ohio.

Research/monitoring: No specific surveys are being considered at this time. The importance of the CRP to grassland-dependent wildlife in Ohio is being investigated (Denis Case, Ohio Dept. of Natural Resources, pers. commun.).

Major Populations: Peterjohn (1989) indicated there were 3 known colonies of 50-100 singing males (see **Summary** above); current status of these populations is not known (D. Case, pers. commun.). Peterjohn and Rice (1991) noted that BBA records included a number of colonies composed of 20-100+ males; status of these colonies is also unknown.

State Status: Currently listed as a species of Special Interest (an administrative category which affords no legal protection).

Natural Heritage Rank: S4 (10/31/84)

Habitat Condition: Declines in Henslow's sparrow populations in Ohio are attributed to loss of grassland habitat. Potentially, CRP lands may be an important component of habitat (D. Case, pers. commun.).

Wisconsin

Summary: Henslow's sparrow breeds in the state.

(Reference D. Sample, pers. commun.). The historic range of Henslow's sparrow in Wisconsin is poorly known. There is no reliable data on the range prior to major settlement by Europeans (i.e. roughly before 1850), although it is probable that Henslow's sparrow was common in prairie, wet meadow, and savanna habitats in the south, central, and western parts of the state. It is relatively certain that Henslow's sparrow was either largely absent from or very locally distributed in the predominantly forested regions of northern and eastern Wisconsin.

By 1900, Henslow's sparrow occurred in southeast, east/northeast, and probably throughout southern Wisconsin (D. Sample, pers. commun. citing historic accounts). During the first 3 or 4 decades of the 1900's, Henslow's sparrow likely became less common as native grasslands and wet meadows were drained and/or plowed. As forested regions were cleared for agriculture in the northcentral and eastern counties, the range of Henslow's sparrow probably expanded into those regions to some degree. However, this range expansion probably did not compensate, in terms of population size, for loss of grassland habitat in former prairie and savanna regions. Records were reported from western Wisconsin by the 1950's. There have been very few records from the northernmost, predominantly forested, counties.

Robbins (1991) noted that the normal range of Henslow's sparrow in Wisconsin covers about the southern four-fifths of the state, but nowhere in the state can the bird be called common, or even fairly common.

D. Sample (pers. commun.) noted: "An educated guess based on data from the Wisconsin Grassland Bird Study (WGBS), BBS, and knowledge of habitat availability is that there are between 500 and 1,500 breeding pairs of Henslow's sparrow in Wisconsin in a given year."

BBS: Based on data from 30 BBS routes, Wisconsin's Henslow's sparrow population declined at an average annual rate of 3.5% during the history of the survey (1966-94); however, this decline was not statistically significant. During the period 1966-79 the population declined an average of 7.7% annually (not significant). The average annual rate of population decline during the latter years of the survey (1980-94) was estimated at 10.7% annually ($P < 0.05$), and the number of routes where Henslow's sparrow was detected dropped to 14.

BBA: 1995 is the first of at least 5 field seasons for the Wisconsin BBA. D. Sample (pers. commun.) noted there is good potential that the atlas will identify new breeding populations of Henslow's sparrow.

Research/monitoring: (Reference D. Sample, pers. commun.). The WGBS (1985-92) consisted of over 800 breeding bird surveys statewide and over 360 intensively surveyed transects in southern and central Wisconsin. The survey included a wide range of grassland habitats and produced data on the distribution and abundance of Henslow's sparrow in the state. Henslow's sparrow was found in 19 counties, with the highest concentrations in publicly- owned and -managed grasslands in the central and southern parts of the state. The population is unevenly

distributed, even in areas with plentiful suitable habitat. (A publication based on the study is currently being prepared).

Several ongoing projects include the collection of data on Henslow's sparrow. Nine Henslow's sparrow territories have been monitored in an ongoing study of the impacts of grazing practices on grassland bird density and reproductive success in southwest Wisconsin. The Wisconsin DNR also annually conducts Natural Areas Breeding Bird Surveys. Several of the Natural Areas included in this survey are grasslands where Henslow's sparrow has been recorded. However, sites with Henslow's sparrow may not be surveyed every year. The Wisconsin Checklist Project (weekly bird checklists submitted from volunteer observers around the state, year-round) indicated a significant decline in Henslow's sparrow populations from 1983-93 (Rolley 1995 cited by D. Sample, pers. commun.).

Wisconsin is currently developing a statewide grassland management plan.

Major Populations: 7 locations supporting persistent populations of at least 10 pairs were identified, although it was noted that none have been regularly monitored (D. Sample, pers. commun.):

1. White River Marsh Complex (Green Lake Co.) - 25-45 pairs,
2. Governor Dodge State Park (Iowa Co.) - 10-20 pairs,
3. Bong State Recreation Area (Kenosha Co.) - 10-20 pairs,
4. Buena Vista Prairie Chicken Management Area (Portage Co.) - 15-40 pairs,
5. Grand River Marsh State Wildlife Area (Marquette and Green Lake Counties) - 15-30 pairs,
6. Scattered tracts in Jackson Co. - more than 25 pairs, and
7. Scattered tracts on state-owned and/or -managed properties (e.g. WPA's) in Columbia Co. - more than 25 pairs.

State Status: Special concern species (no legal protective status but needs to be monitored closely). Henslow's sparrow is currently proposed for State threatened status. Hearings on proposed listing are scheduled to take place in fall/winter 1995 (D. Sample, pers. commun.).

As part of the WGBS, a ranking process, using a series of standardized criteria, was conducted to determine management priority for nongame grassland bird species in Wisconsin. Henslow's sparrow was ranked first as the species of highest management concern in the preliminary ranking of 37 grassland species.

Natural Heritage Rank: S3 (5/1/91)

Habitat Condition: (Reference D. Sample, pers. commun.). "The uncut, unburned grasslands preferred by Henslow's sparrow in Wisconsin are rare habitats that are most secure on public wildlife and conservation habitat, but also on private land managed for conservation purposes." CRP fields and private prairies (such as those owned by TNC and private landowners), as well as hayfields and oldfields, are specific examples of privately-owned lands used by the species.

Maintaining high quality grassland habitat for Henslow's sparrow usually depends on active management to discourage woody vegetation and renew the vigor of grasses.

"Without further research, we do not know which sites are population sources or sinks for this species. It may become evident that additional permanent grassland cover needs to be acquired and protected to ensure the health of the Henslow's sparrow population in Wisconsin."

Habitat loss and alteration due to agriculture, succession, and urbanization are threats to Henslow's sparrow in Wisconsin. "Perhaps one of the largest overall threats to Henslow's sparrow habitat is the continued decline of small-scale dairy farming in Wisconsin and the concomitant rise in cash cropping; these changes mean continued loss of pasture, grass hay, and small grains acreage and a continued increase in rowcrops such as corn and soybeans."

FWS REGION 4

Alabama

Summary: Henslow's sparrow winters in the state.

Mirarchi (1986) suggested that Henslow's sparrow was more numerous in Alabama in winter than realized due to their secretive behavior and the dense vegetation they inhabit. Little is known of the population status of the species. There are no Natural Heritage Program records for Henslow's sparrow in the state (Mark Bailey, Alabama Natural Heritage Program, pers. commun.).

CBC: The total number of Henslow's sparrow recorded (standardized by effort) on CBCs in Alabama between 1963-87 was 15 (Butcher and Lowe 1990). The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.04. Data were inadequate to estimate trends in abundance.

Research/monitoring: During the winter of 1994-95, a study of winter habitat requirements of Henslow's sparrow was initiated in Baldwin County, Alabama (S. Plentovich, pers. commun.); 23 birds were banded. The majority of the birds have been located in pitcher plant bogs. The study is scheduled to continue next winter, subject to funding.

Major Populations: The only known winter concentration is the Baldwin County population.

State Status: Poorly Known (no legal protection) (M. Bailey, pers. commun.).

Natural Heritage Rank: S3 (10/1/91)

Habitat Condition: Current data suggest that pitcher plant bogs provide the best habitats for Henslow's sparrow in Alabama (Mirarchi 1986). Folkerts (1982) noted that these habitats are being altered and destroyed at an accelerating rate. Destruction and development of Alabama's

coastal marshes and conversion of naturally occurring longleaf pine/wiregrass communities to other types may also adversely affect the species (Mirarchi 1986).

Arkansas

Summary: Recent evidence suggests the potential for a small wintering population of Henslow's sparrow.

Until recently, Henslow's sparrow was known in Arkansas only as a rare transient and irregular winter resident. James and Neal (1986) indicated there were only 3 reports between 1974-83. Field work within the last 4 years indicated that (contrary to published range maps and descriptions) a small number (1-4 birds) of Henslow's sparrows winter in 2 areas in southern Arkansas (William Shepherd, Arkansas Natural Heritage Commission, pers. commun.).

CBC: No Henslow's sparrow's recorded in Arkansas between 1963-87 (Butcher and Lowe 1990).

Research/monitoring: none (other than W. Shepherd's records).

Major Populations: none

State Status: none

Natural Heritage Rank: SA (Accidental) (9/86)

Habitat Condition: The 2 areas where Henslow's sparrow has been observed over the past 4 winters are Warren Prairie Natural Area (a 305 ha tract in Bradley and Drew counties, protected and managed by the Arkansas Natural Heritage Commission) and Kingsland Prairie (a tract in Cleveland County, the Arkansas Natural Heritage Commission is attempting to secure funds for purchase). Both areas are "saline soil barrens." These are communities that develop on soils (Lafe series) which are too heavily laden with toxic mineral salts for tree species to become established. They have grass-dominated areas interspersed with individual or groups of loblolly pine (*Pinus taeda*).

Florida

Summary: Henslow's sparrow winters in the state.

Stevenson and Anderson (1994) listed Henslow's sparrow as a secretive and apparently rare winter resident of Florida. They found no published documentation for sight records south of Lake Okeechobee. They note that specimens of both eastern and western subspecies have been collected in Florida. Robertson and Woolfenden (1992) consider the Henslow's sparrow probably fairly common in northern Florida.

CBC: Based on 21 CBC locations in Florida, Henslow's sparrow was estimated to have declined 2.5% annually ($P < 0.01$) between 1963-87 (Butcher and Lowe 1990). The total number of birds recorded (standardized by effort) was 47. The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.07.

Research/monitoring: There is an ongoing study in the Apalachicola NF in Florida to assess how bird communities and populations of individual species (including Henslow's sparrow) in longleaf pine forests respond to 2 different fire regimes (dormant, growing season) (Engstrom and McNair, in prep.). Preliminary results suggest that Henslow's sparrow is an uncommon-to-fairly common winter resident (mid-October to mid-April) in suitable habitat in the Apalachicola NF.

A related project on the Apalachicola NF, which began in autumn 1995, is being conducted on late autumnal migrants in 2 open treeless savannahs adjacent to longleaf pine forest (D. McNair, pers. commun.). The 2 savannahs differ both in habitat characteristics and time since last burn. Effects of habitat differences and year of burn on habitat selection in autumnal migrants will be evaluated. During 1995, 91 Henslow's sparrows were captured (in approximately equal numbers in both savannahs). Preliminary data suggest that these birds probably disperse locally and winter in the Apalachicola NF.

Stevenson and Anderson (1994) list Henslow's sparrow as declining in Leon County (north Florida) based on casual bird counts conducted over a 40-year period (approximately 1954-94).

Major Populations: Apalachicola NF

State Status: none

Natural Heritage Rank: Unranked

Habitat Condition: J. Cox (pers. commun.) listed the following as areas where Henslow's sparrow is found in winter: "...upland pine forests with a sparse overstory of trees and dense ground cover, open prairies similar to upland pine forests except that they lack trees, and wet prairies and the verges of some freshwater marshes. We also find Henslow's sparrow in disturbed areas such as the grassy swales beneath powerlines and along roadsides, and in moist, grassy fields that have not been recently mowed."

Georgia

Summary: Henslow's sparrow winters in the state.

Information we received was limited to 1 record in the Natural Heritage Database from Glynn County (Greg Krakow, Georgia Natural Heritage Inventory, pers. commun).

CBC: The total number of Henslow's sparrow recorded (standardized by effort) on CBCs in Georgia between 1963-87 was 29 (Butcher and Lowe 1990). The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.03. Data were inadequate to estimate trends in abundance.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: S3 (6/2/87)

Habitat Condition: Malcolm Hodges, Jr. (TNC of Georgia, pers. commun.) noted that he has observed Henslow's sparrows at 2 locations in Georgia (including the Glynn County location noted above). Both locations were powerline right-of-ways in areas of former flatwoods, now surrounded by pine plantations. He suspects that Henslow's sparrows occur in Georgia in these types of habitat in late fall, during their migration southward. He suggests that powerlines may provide the best remaining Henslow sparrow habitat in Georgia, given the lack of maintained natural habitats in coastal areas.

Kentucky

Summary: Henslow's sparrow breeds in the state.

(Reference Palmer-Ball, Jr., in prep. and references therein). The historic status of Henslow's sparrow in Kentucky is poorly known. Prior to settlement, Henslow's sparrow probably occurred at least locally in native prairies of the East Gulf Coastal Plain and Highland Rim. Documentation of the species presence in the presettlement prairies is lacking, but the prairies would have provided optimal habitat. The type specimen was collected by Audubon in northern Kentucky in 1820. Otherwise, the species was almost unknown in the state until the mid-1940's. Between 1946 and the early 1950's, the species was reported in the Louisville area and central parts of the state. Since then, Henslow's sparrow has continued to be sporadically reported. Recently, there have been Henslow's sparrow records to the south and west of former range, but it is uncertain whether this represents a range expansion or that these birds were previously overlooked (Brainard Palmer-Ball, Jr., Kentucky State Nature Preserves Commission, pers. commun.).

Henslow's sparrow is considered a very locally distributed summer resident across Kentucky. Typically, the species is not reported from more than 6 locations per year and the numbers fluctuate from year to year. Native habitats have been eliminated, and Henslow's sparrow is now restricted to man-altered habitats, including hayfields, abandoned hayfields and pastures, airports, reclaimed surface mines, and other unmowed grassy habitats.

BBS: Between 1986-94, Henslow's sparrow was represented by 9 birds on 6 BBS routes in Kentucky. The last BBS record was in 1986. Data are inadequate to estimate state trends.

BBA: (1985-91). The atlas yielded 24 Henslow's sparrow records in priority blocks, and 10 incidental observations. Nine of the atlas observations were for confirmed or probable breeding; the remaining 15 were possible breeding records (Palmer-Ball, Jr., in prep.).

Research/monitoring: none

Major Populations: none

State Status: Special Concern (no protection) (B. Palmer-Ball, Jr., pers. commun.)

Natural Heritage Rank: S2S3 (10/10/90)

Habitat Condition: (B. Palmer-Ball, Jr., pers. commun.). "Probably the best potential for the maintenance of suitable habitat today occurs on extensive, reclaimed surface mines where thick, undisturbed grasslands occur for a number of years following the completion of reclamation work. However, while current mining reclamation standards favor the creation of suitable habitat, most land eventually succeeds to forest." More efficient farming methods have resulted in some decreases in habitat, but "set-aside" programs have probably increased habitat suitability in some areas. A decrease in grass seed production (fields maintained in thick grass and only the tops harvested for seed) has resulted in conversion of some habitat to row crop production.

Louisiana

Summary: Henslow's sparrow winters in the state.

(Reference Lowery 1974). In Louisiana, Henslow's sparrow most often winters in the grass of "pine flats," particularly in the Florida Parishes. The species may also be found in broomsedge fields. Historic and/or current population estimates or trends are unknown (Gary Lester, Louisiana Natural Heritage Program, pers. commun.).

CBC: Based on 11 CBC locations in Louisiana, there was no significant increase or decrease in the population between 1963-87 (Butcher and Lowe 1990). The total number of birds recorded (standardized by effort) was 31. The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.07.

The highest CBC recorded anywhere within the range of Henslow's sparrow during the 25-year period (1963-87) was 11 in 1985 in St. Tammany, Louisiana.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: S3 (1/3/86)

Habitat Condition: There is a suspected loss of habitat to residential and commercial development north of Lake Pontchartrain and elsewhere in the state. The ongoing conversion of pine savannas and open pine forests to pine plantations also results in loss of suitable winter habitat (G. Lester, pers. commun.).

Mississippi

Summary: Henslow's sparrow winters in the state.

CBC: The total number of Henslow's sparrow recorded (standardized by effort) on CBCs in Mississippi between 1963-87 was 3 (Butcher and Lowe 1990). The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.02. Data were inadequate to estimate trends in abundance.

Research/monitoring: The winter of 1994-95 was the first year of a 3 year study (subject to continued funding) of bird community dynamics on the Mississippi Sandhill Crane NWR. One aspect of this project is to evaluate how other species of birds respond to habitat management for cranes. Wintering populations of Henslow's sparrow, LeConte's sparrow, Bachman's sparrow, and sedge wren are being studied. Thirty-three Henslow's sparrows were banded in the first field season. Vegetation data are being collected to evaluate winter habitat requirements.

Major Populations: The only known winter concentration in the state is the population on the Mississippi Sandhill Crane NWR.

State Status: none

Natural Heritage Rank: SZN (zero nonbreeding occurrences) (12/3/94)

Habitat Condition: (Reference M. Woodrey, pers. commun.) In Mississippi, wintering Henslow's sparrows have been found primarily in broomsedge and wiregrass communities and associated weedy and shrubby areas. Wet or boggy sites appear to be most suitable.

On the Mississippi Sandhill Crane NWR, habitat managed for cranes appears to be suitable for Henslow's sparrow. Grand Bay NWR (currently managed as a satellite of the Mississippi Sandhill Crane NWR) is currently in the acquisition phase. This refuge historically included savanna habitat but is not currently being managed. Some Henslow's sparrows are present on the refuge,

but the area will have to be burned to maintain habitat suitability. Outside of these 2 refuges, there is minimal protection of savannas in the state and many are being drained for development.

North Carolina

Summary: North Carolina supports both breeding and wintering populations of Henslow's sparrow.

(Reference H. LeGrand, Jr., pers. commun.). Henslow's sparrow formerly nested in the northern Piedmont and northern mountains, but there have been no records of nesting in these areas in over 30 years and this population is probably extirpated (Lynch and LeGrand 1985). However, a breeding population was discovered in 1983 in the central and eastern Coastal Plain of North Carolina. Henslow's sparrow probably began nesting in the Coastal Plain in the 1960's or 1970's, when timber companies first began to clear extensive pocosins and plant them in loblolly pine seedlings. The first few years after clearing are prime habitat for Henslow's sparrow. Population estimates are not available, but evidence suggests that more Henslow's sparrows have nested in North Carolina since the 1980's than they ever did historically. The Henslow's sparrows breeding in North Carolina are approximately 150 miles south of the nearest known breeding sites in northern Virginia (Lynch and LeGrand 1985). The breeding population in North Carolina appears to be stable since 1984.

Henslow's sparrow winters in the Coastal Plain of North Carolina, north to the Croatan NF. The historic range in winter is poorly known, but likely ranged farther west into the central Coastal Plain. Most birds winter in open longleaf pines with stands of wiregrass that have been burned during the previous year.

BBS: Between 1986-94, Henslow's sparrow was represented by 39 birds on 4 BBS routes in North Carolina. Data are inadequate to estimate state trends.

BBA: (1988-92). Data not available.

CBC: The total number of Henslow's sparrow recorded (standardized by effort) on CBCs in North Carolina between 1963-87 was 7 (Butcher and Lowe 1990). The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.02. Data were inadequate to estimate trends in abundance.

Research/monitoring: (Reference H. LeGrand, Jr., pers. commun.). In 1983, Henslow's sparrows were heard on a BBS route in the North Carolina Coastal Plain. The discovery was noteworthy because these were the first breeding records in the state in several decades and the only breeding records for this portion of North Carolina. In 1984, additional potential sites in the Coastal Plain were searched, and Henslow's sparrow was found at 12 sites (Lynch and LeGrand 1985). Between 1983-94, the North Carolina Natural Heritage Program has logged records of Henslow's sparrow at 24 sites (ranging from 1-64 singing Henslow's sparrows per site).

The 2 largest known breeding populations are at Voice of America antenna fields (see **Major Populations** below). H. LeGrand, Jr. (pers. commun.) is hopeful that these sites (as well as another, smaller Voice of America site) can be monitored every few years.

Much of the potentially suitable habitat on recently converted pine plantations has not been surveyed. Because Henslow's sparrow has to switch sites after several years, frequent surveys would be required to evaluate the populations using these habitats.

No surveys of wintering Henslow's sparrow have been conducted.

Major Populations: (Reference H. LeGrand, Jr., pers. commun.). The 2 largest known breeding populations are at Voice of America antenna fields. These sites are described as cleared pocosins which are now maintained (by burning and mowing) in grasses, sedges, forbs, and low saplings. Both of these sites have supported (presumably) breeding populations of Henslow's sparrow since 1984. Counts were conducted at Voice of America Site A (1,200+ ha) in 1984 (20 birds), 1993 (17 birds), and 1994 (64 birds). Counts were conducted at Voice of America Site B (800+ ha) in 1984 (6 birds), 1993 (40 birds), and 1994 (48 birds). These were considered minimal counts. The future of these populations is uncertain; there is currently a proposal to allow grazing at these sites.

State Status: none

Natural Heritage Rank: S2 (breeding), S1 (nonbreeding) (2/7/91)

Habitat Condition: (Reference H. LeGrand, Jr., pers. commun.). Henslow's sparrow breeding habitat in North Carolina is primarily on cleared, formerly wooded, wetlands which are converted to pine plantations. Henslow's sparrow uses the early stages of pine plantations for a few years, before the pines become too tall (5 years at best). These pine plantations are common-to- abundant in North Carolina, covering tens to hundreds of thousands of acres of former Coastal Plain wetlands, but the stage in which these sites are suitable for Henslow's sparrow is very transitory. Acreages of pine plantations are expected to increase in future years, though acreage of new plantations in wetlands should be slowed considerably.

The largest known breeding populations of Henslow's sparrow are on cleared pocosins that are maintained in a herb/shrub stage by mowing or burning (the Voice of America sites). These sites will remain suitable for Henslow's sparrow as long as burning or mowing of the sites is continued. However, there is no assurance of the long-term administration of the Voice of America sites, or that personnel at the sites will continue to mow or burn the grounds. There is currently a proposal to allow grazing at these sites which would likely yield the habitat unsuitable for Henslow's sparrow.

Winter habitat for Henslow's sparrow is rather limited in North Carolina. TNC and other conservation organizations are protecting some of the longleaf pine habitats used by wintering

Henslow's sparrows. However, this protection is outweighed by loss in acreage to development and conversion to pine plantations.

South Carolina

Summary: Henslow's sparrow winters in the state.

(Reference D. McNair, pers. commun.). D. McNair (pers. commun.) noted that A.T. Wayne collected over 100 specimens of Henslow's sparrow from the Lower Coastal Plain of South Carolina between 1884-1927. L.M. Loomis collected at least 15 specimens in the late 1800's during spring and autumn migration from the lower Piedmont; he did not encounter the species during the winter. In contrast, McNair notes that in the last 35 years South Carolina has had no more than a total of 11 acceptable reports of Henslow's sparrow. He summarized: "Despite this apparent great decrease, we (referring to himself and W. Post) believe modern data are of little value in assessing the current status of this species in South Carolina (and elsewhere on its winter range) because of its secretive behavior, restricted habitat, and inadequate survey efforts by birdwatchers and ornithologists." McNair suspects that intensive surveys in appropriate winter habitat in South Carolina, such as Francis Marion NF, will detect this secretive species.

There is scant documentation regarding summer Henslow's sparrow records in South Carolina. Post and Gauthreaux (1989) reported that at least 3 birds, including a singing male, were found at Cross Keys in 1986. However, McNair and Post (1993) subsequently reported that these birds were misidentified. Post and Gauthreaux (1989) noted that Henslow's sparrow summered in Greenville County for several years in the late 1940's; D. McNair (pers. commun.) noted that this record involved several territorial pairs but no documentation of breeding. No nests have been documented in the state (Post and Gauthreaux 1989). Breeding populations of Henslow's sparrow have been documented on the Coastal Plain of southwestern North Carolina, and there is potential that they may also be breeding in similar habitats (e.g. cut-over pocosins) in adjacent portions of South Carolina (Post and Gauthreaux 1989).

BBS: No records of Henslow's sparrow.

BBA: The first full year of field work on the atlas was 1989. The state response made no mention of Henslow's sparrow on atlas blocks (presumably there are no records) (John Cely, South Carolina Dept. of Natural Resources, pers. commun.).

CBC: The total number of Henslow's sparrow recorded (standardized by effort) on CBCs in South Carolina between 1963-87 was 11 (Butcher and Lowe 1990). (D. McNair [pers. commun.] noted that some South Carolina CBC records are not credible). The frequency of occurrence (number of CBCs with Henslow's sparrow divided by the total number of CBCs for the state) was 0.04. Data were inadequate to estimate trends in abundance.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: Unranked

Habitat Condition: D. McNair (pers. commun.) noted that prime winter habitat (pine savannas and mature longleaf pine forests with wiregrass-dominated groundcover) has greatly decreased in South Carolina. Secondary anthropogenic habitats (moist broomsedge fields with minimal woody invasion) have also greatly declined.

FWS REGION 5

Connecticut

Summary: Henslow's sparrow historically bred in the state.

Natural Diversity Data Base files indicated only historic records of Henslow's sparrow in Connecticut (Nancy Murray, Connecticut Dept. of Environmental Protection, pers. commun.). The data base includes 6 Henslow's sparrow records for the period 1881-1939. By the early 1900's it was considered a rare nester; the last nesting record was in 1939 (Jenny Dickson, Connecticut Dept. of Environmental Protection, pers. commun.). Zeranski and Baptist (1990 cited *in* Smith 1992) considered the species extirpated from Connecticut as a nesting species, but reported observations of "nonbreeding singing males" in 1968 and 1985.

BBS: No records of Henslow's sparrow.

BBA: (1982-86). No records of Henslow's sparrow.

Research/monitoring: none

Major Populations: none

State Status: Special Concern. Henslow's sparrow is officially considered extirpated in Connecticut, but is listed as a species of Special Concern because it historically nested in the state (J. Dickson, pers. commun.).

Natural Heritage Rank: SHB (historic breeding records only) (11/1/93)

Habitat Condition: No assessment available.

Delaware

Summary: Henslow's sparrow historically bred in the state.

(Reference Smith 1992). Historically, Henslow's sparrow was a regular but uncommon breeder in Delaware but is now considered extirpated. The last breeding occurred in 1981.

BBS: In the history of BBS (1966-1994), 3 Henslow's sparrows have been recorded on 3 routes in Delaware. The last record was in 1973.

BBA: (1983-87). No records of Henslow's sparrow.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: SZN (zero nonbreeding occurrences) (2/17/94)

Habitat Condition: no assessment available

Maine

Summary: Henslow's sparrow may have historically bred in the state, but Smith (1992, citing historic accounts) reported that historical reports did not appear to be documented.

BBS: No records of Henslow's sparrow.

BBA: (1978-83). No records of Henslow's sparrow.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: SAN (accidental in nonbreeding season) (date of ranking not listed)

Habitat Condition: no assessment available

Maryland

Summary: Henslow's sparrow breeds in the state.

(Reference Lynn Davidson, Maryland Natural Heritage Program, pers. commun.). The Maryland Species Ranking Form (dated 3/8/94) indicated that abundance is unknown, but the number of breeding individuals was estimated at under 100. L. Davidson (pers. commun.) added that this estimate was based on data collected during the BBA, which was concluded in 1987, and is probably an over-estimate of current conditions. The state ranking form also noted (citing Robbins pers. commun.) that the species was easily located in nearly any county in Maryland 50 years ago, and has undergone the greatest decline of any breeding bird in the state in the last several decades. The number of currently known sites may be only 7-10. No colonies are currently known on the lower Eastern Shore.

BBS: Between 1986-94, Henslow's sparrow was represented by 1 bird on 1 BBS route in Maryland. Data are inadequate to estimate state trends.

BBA: (1983-87). The Maryland Species Ranking Form indicated 14 BBA records for Henslow's sparrow. Only 1 record was confirmed, 9 probable, and 4 possible.

Research/monitoring: The Maryland DNR and Maryland Partners in Flight are attempting to fund a status survey on reclaimed surface mines in Western Maryland, which may be the last stronghold for the species in the state (L. Davidson, pers. commun.). Current monitoring efforts are being conducted informally by birdwatchers in Western Maryland.

Major Populations: none

The Maryland Species Ranking Form indicated that 1 population (size not indicated) occurred on a TNC preserve, but was not specifically protected by a management plan.

State Status: Upgraded to Threatened in October, 1994 (L. Davidson, pers. commun.).

Natural Heritage Rank: S1 (10/7/94)

Habitat Condition: Habitat loss is probably the greatest threat in the state (L. Davidson, pers. commun.). Suitable habitat has been lost to succession, conversion to other uses, and fragmentation. This includes some reclaimed surface mines in the western portion of the state which have been planted to trees as part of state reforestation efforts.

Massachusetts

Summary: Henslow's sparrow historically bred in the state, but has apparently withdrawn from its Massachusetts range.

(Reference Kellogg and Blodget, in prep.). Henslow's sparrow has always been local and uncommon in Massachusetts, but historically was widely distributed and regularly found throughout the state eastward to Worcester and Middlesex Counties. An account from the 1920's indicated Henslow's sparrow records at 52 locations in Massachusetts encompassing all but 3 counties in the state. Bradford Blodget (Massachusetts Natural Heritage and Endangered Species Program, pers. commun.) estimated approximately 150 pairs in the state in 1900. Colonies of up to 18 pairs of Henslow's sparrow were recorded. The species zenith in Massachusetts coincided with the period of farm abandonment (1890-1935).

A steady decline in the Henslow's sparrow population began as early as 1935 in the Connecticut River Valley and a major range recession began in the state about 1950. After the mid-1950's, suitable breeding habitat became very scarce. From 1960 to date, records are of widely separated territorial males. There were 3 Henslow's sparrow occurrences documented in 1974 during the Massachusetts BBA. The next record was in 1983, followed by another gap until 1994 (1 pair). From 1960-94, the population has been 0-4 pairs, with no breeding records in most years (B. Blodget, pers. commun.).

BBS: No records of Henslow's sparrow.

BBA: (1974-79). During the BBA, only 3 Henslow's sparrow occurrences (all probable breeding) were recorded. All 3 records were from 1974.

Research/monitoring: (Reference B. Blodget, pers. commun.). During 1993-94, the Massachusetts Audubon Society and the Massachusetts Division of Fisheries and Wildlife conducted a statewide survey of grassland bird species at major grassland sites in the state. No Henslow's sparrows were found. However, 1 pair of Henslow's sparrows was independently located in 1994 (a paper by Ells regarding this pair is scheduled to appear in the Spring issue of Bird Observer).

Major Populations: none

State Status: Endangered

Natural Heritage Rank: SHB (historic breeding records only) (4/18/88)

Habitat Condition: Optimum habitats are increasingly rare in Massachusetts. Suitable habitat is being developed or becoming too overgrown for Henslow's sparrow (Veit and Petersen 1993). Continued gradual habitat loss and decline in habitat quality are expected in the near future (B. Blodget, pers. commun.). Kellogg and Blodget (in prep.) concluded: "The extremely patchy distribution of remnant habitat may be incapable of supporting a viable population of Henslow's sparrow. The semi-colonial habits of this species suggest that social factors, as well as habitat variables are probably a potent influence on nesting success." It is also noteworthy that

disturbance of nesting pairs by over zealous birdwatchers is considered a threat to the species in Massachusetts (B. Blodget, pers. commun.).

New Hampshire

Summary: Henslow's sparrow historically bred in the state.

(Reference John Kanter, New Hampshire Fish and Game Department, pers. commun.). Historic records indicate that the breeding range of Henslow's sparrow in New Hampshire once extended from the southern border of the state north to the White Mountain foothills. Historically, it was probably an uncommon, locally distributed breeding bird. Breeding season records were sporadic by the mid-1900's and essentially ceased by 1970. New Hampshire is now apparently outside the species breeding range. The last breeding season record was in 1983.

BBS: No records of Henslow's sparrow.

BBA: (1981-86). No records of Henslow's sparrow.

New Hampshire Natural Heritage Inventory records indicated 1 record of a singing male Henslow's sparrow in 1983. The bird was observed in a 1.6 ha old field, but was present at the site for only about 2 weeks spanning late May to early June.

Research/monitoring: TNC sponsored an unsuccessful search of 7 areas of historical activity in New Hampshire in 1984.

A Partnerships for Wildlife grant will fund an inventory of grassland and shrubland birds on state-owned and other protected lands, beginning in the 1995 field season (J. Kanter, pers. commun.).

Major Populations: none

State Status: Endangered

Natural Heritage Rank: SHB (historic breeding records only) (4/6/93)

Habitat Condition: Habitat change is considered the most likely major factor in the decline of Henslow's sparrow in New Hampshire, although some apparently suitable habitat remains but is unoccupied (J. Kanter, pers. commun.).

New Jersey

Summary: No historic summary of Henslow's sparrow status in New Jersey was available. There are Henslow's sparrow records for at least 7 counties scattered throughout the state. However, the current BBA project for New Jersey (ongoing since 1993) has produced only 2 possible breeding records for Henslow's sparrow. (Jim Sciascia, New Jersey Endangered and Nongame Species Program, pers. commun.).

BBS: No records of Henslow's sparrow.

BBA: (1981-85): Henslow's sparrow was a confirmed breeder in 5 blocks and recorded as probable in 4 blocks (Smith 1992). Current BBA (ongoing since 1993) has only 2 records of Henslow's sparrow as a possible breeder.

Research/monitoring: none indicated

Major Populations: none

State Status: Endangered

Natural Heritage Rank: S1 (4/23/87)

Habitat Condition: no assessment available

New York

Summary: Henslow's sparrow breeds in the state.

(Reference Robert Miller, New York State Dept. of Environmental Conservation, pers. commun.). Henslow's sparrow was considered uncommon or rare in New York in the early 1900's. The species appeared in new locations and the population may have increased between the 1920's and 1940's. Two large colonies (each containing 20 pairs) were reported in Albany County in 1925 and St. Lawrence County in 1939 (Andrle and Carrol 1988). These were the largest colonies ever reported in the state (Vertebrate Characterization Abstract 1993). Declines in the state's Henslow's sparrow populations were noted beginning in the 1950's.

Current populations of Henslow's sparrow are found primarily in western New York, the Mohawk Valley, the Appalachian Plateau, and the Great Lakes Plains (New York Endangered Species Working Group 1994). Most localities in the state support 1-2 pairs; rarely small colonies are found (Vertebrate Characterization Abstract 1993).

BBS: Based on data from 27 BBS routes, New York's Henslow's sparrow population declined at an average annual rate of 12.1% during the history of the survey (1966-94); this decline was statistically significant ($P < 0.01$). During the period 1966-79 the population declined an average of 10.8% annually ($P < 0.01$, based on 26 routes). The average rate of population decline was even

steeper during the latter years of the survey, estimated at 17.0% annually for the period 1980-94. This decline was significant ($P < 0.10$) but is based on data from only 10 routes (the recommended minimum for estimating trends is 14 routes). New York is the only northeastern state with adequate BBS data to estimate population trends for Henslow's sparrow.

BBA: (1980-85). Henslow's sparrow was noted in 7% (348) of BBA blocks, with breeding confirmed in 18% (61) of these blocks, probable in 44% (152), and possible in 39% (135). Atlas observers found 8 nests (Andrle and Carrol 1988).

An update of New York's atlas project is planned for 2000-05.

Research/monitoring: Peterson (1983) reported Henslow's sparrow (1-6 singing males) from 4 of 35 field sites survey in Broome County. Three of the sites were ungrazed pasture and 1 was an unmowed hayfield. The mean field size occupied by Henslow's sparrow was 66 ha, which was significantly greater than the size of unoccupied sites. Woody invasion of occupied sites was nonexistent or limited to less than 2% of the total area.

Smith and Smith (1992) found Henslow's sparrow in 5 of 33 pastures surveyed in the Finger Lakes NF. The smallest pasture occupied by Henslow's sparrow was 30 ha. They concluded that the carefully managed grazing program on the study area was a viable management option for Henslow's sparrow.

The Vertebrate Characterization Abstract (1993) for Henslow's sparrow indicated that the species has a "Watchlist" Heritage Inventory status (no active inventory but still of concern) in New York.

Major Populations: Saratoga National Historic Park supported 11-15 territorial males during the 1995 breeding season (Mazur and Underwood 1995).

State Status: Special Concern. This designation does not provide legal protection from "taking." Regulations to revise the official state status to "Threatened" are currently pending (R. Miller, pers. commun.).

Natural Heritage Rank: S4 (12/2/86)

Habitat Condition: The primary threat to Henslow's sparrow in the state is believed to be loss of grassland habitat due to urbanization and reforestation. Fragmentation of remaining habitat may also be a factor. Nest disturbance/destruction through haying may also contribute to local population declines (R. Miller, pers. commun.).

Pennsylvania

Summary: Henslow's sparrow breeds in the state.

(Reference Reid 1992 and Daniel Brauning, Pennsylvania Game Commission, pers. commun.). Henslow's sparrow may not have been native to Pennsylvania prior to settlement. No definite breeding records existed until 1913. It was reported in scattered colonies throughout the state, but primarily in the western portions of the state, through the mid-1900's.

BBS: Between 1986-94, Henslow's sparrow was represented by 20 birds on 13 BBS routes in Pennsylvania. Data are inadequate to estimate state trends.

BBA: (1984-88). Henslow's sparrow was noted in 7% (364) of BBA blocks, with breeding confirmed in 14% (52) of these blocks, probable in 49% (178), and possible in 37% (134). The Appalachian Plateau and Pittsburgh Plateau physiographic regions accounted for 85% of the records (Reid 1992). The BBA project demonstrated that Henslow's sparrow was more widespread in Pennsylvania than previously suspected. Several atlas volunteers noted that territories in western Pennsylvania were more likely to be used year after year than those in the eastern counties.

Research/monitoring: Henslow's sparrow was detected on 5 Pennsylvania Grassland Breeding Bird Survey routes (total 32 routes in 27 counties in 1993). The survey employed BBS procedures. A total of 55 Henslow's sparrows was recorded on 26 stops (Brauning 1993).

Major Populations: No specific populations identified. However, D. Brauning (pers. commun.) indicated that some large reclaimed surface mines were occupied annually.

State Status: Special Concern - At Risk (not a legal category, but reflects conservation status). Downlisted from "Threatened" in 1991 after the BBA project demonstrated the species was more widespread in the state than suspected.

Natural Heritage Rank: S3S4 (9/15/91)

Habitat Condition: (Reference D. Brauning, pers. commun.). More than half of the Henslow's sparrow sites in Pennsylvania are on reclaimed surface mines. These sites undergo relatively little disturbance and slow successional change. Viability of populations on these large reclaimed surface mines is largely unknown.

Henslow's sparrow is also found in old hayfields, which are subject to more modification. The state continues to experience losses in suitable old field and hayfield habitats. In agricultural habitats, mowing and other farming practices adversely impact Henslow's sparrow.

Rhode Island

Summary: Henslow's sparrow historically bred in the state.

(Reference Ferren, unpubl. manuscript and references therein). The first record for a Henslow's sparrow on territory in Rhode Island was in 1901. The species was uncommon but regular in South County for at least 40 years, reaching its highest population in the late 1930's or early 1940's in both South and Newport Counties. Numbers dropped sharply in the mid-1940's. Potato farming increased dramatically on the South County coastal plain after the early 1940's and has been suggested as a potential cause for the decline, either through direct habitat destruction or indirectly through use of DDT.

Henslow's sparrow was confined to 1-2 sites until about 1955, when the habitat at those sites was destroyed. The last suspected nesting was in 1960.

BBS: No records of Henslow's sparrow.

BBA: (1982-86). No records of Henslow's sparrow.

Research/monitoring: Because all records for the species are historic, it is not tracked in the Natural Heritage Program database (Rick Enser, Rhode Island Natural Heritage Program, pers. commun.).

Ferren (unpubl. manuscript) noted that an "army of birders" attempted to locate Henslow's sparrow in apparently suitable habitats that developed in the decade following its disappearance from the state.

Major Populations: none

State Status: none

Natural Heritage Rank: SX (extirpated) (2/11/93)

Habitat Condition: Ferren (unpubl. manuscript) noted that locations which evolved into suitable habitat after the late 1950's have never been colonized and suggested that the species disappearance was not totally due to local habitat change.

Vermont

Summary: Henslow's sparrow historically bred in the state.

(Reference Ellison 1992 and references therein). The earliest report of Henslow's sparrow in Vermont was a nesting record in 1883. It was listed as a rare summer resident in one historic account and specific records were scarce in the early 1900's. The species increased in abundance in Vermont during the 1930's. The widest distribution of the species was from 1948-54 when it was reported from 16 towns. The last reported nesting was in 1953. The 4 most recent observations of Henslow's sparrow in Vermont (1975-86) involved late-arriving, single, singing

males briefly present in suitable habitat. These were probably lone prospecting males in search of territories. No Henslow's sparrows were recorded during a survey for the species in 1992. Vermont is apparently beyond the current breeding range of Henslow's sparrow.

BBS: Two Henslow's sparrows were recorded on 2 BBS routes in 1966, and 1 bird in 1973.

BBA: (1977-81). Henslow's sparrow was only recorded twice in Vermont during the BBA Project period; both records were of singing males (possible breeding) (Kibbe and Laughlin 1985).

Research/monitoring: In 1992, the Vermont Nongame and Natural Heritage Program, TNC, and Vermont Institute of Natural Science conducted a survey for breeding Henslow's sparrows in the Champlain Lowlands. No Henslow's sparrows were heard or observed.

Major Populations: none

State Status: Endangered

Natural Heritage Rank: SHB (historic breeding records only) (1/12/93)

Habitat Condition: Fallow fields suitable for Henslow's sparrow are uncommon in Vermont and generally too small to support Henslow's sparrow. However, C. Fichtel (Vermont Nongame and Natural Heritage Program, pers. commun.) noted that some suitable habitat is available and habitat availability does not appear to be the only factor accounting for the withdrawal of Henslow's sparrow from Vermont. Ellison (1992) evaluated historic records which suggested that Henslow's sparrows breeding in Vermont were surplus breeding birds from outside the state. He concluded: "The prospects for occurrence of Henslow's Sparrows in Vermont appear bleak without management of habitat and enhancement of populations out-of-state, not simple maintenance."

Virginia

Summary: Henslow's sparrow breeds in the state.

(Reference Brindza 1987 and references therein). Henslow's sparrow was formerly a transient and summer resident throughout most of Virginia, being rare in the mountains and valleys but increasing eastward. Since the 1940's, the species has experienced severe declines and is now rare-to-uncommon throughout Virginia. Current known breeding is restricted to small populations in 4 northeastern counties (adjacent to Maryland).

BBS: For the period 1986-94, BBS records indicated that Henslow's sparrow records are limited to 1 route, which had 4 birds in 1992 and 10 in 1993 (the route was apparently not run in 1994).

BBA: (1984-89). No Henslow's sparrow records indicated

Research/monitoring: none

Major Populations: none

State Status: Threatened

Natural Heritage Rank: S1 (1/85)

Habitat Condition: The drainage of wetlands and intensive cultivation have reduced habitat for Henslow's sparrow (Brindza 1987).

West Virginia

Summary: Henslow's sparrow breeds in the state.

(Reference Hall 1983 and references therein). Henslow's sparrow was not known in West Virginia until 1935, when 1 was collected in Preston County in October. A few scattered nesting colonies were located in the next few years. The highest populations of Henslow's sparrow in West Virginia occurred during the 1950-60's, but declined greatly in the 1970's. Henslow's sparrow may be common locally in some years, but populations do not persist (generally due to habitat becoming unsuitable). Henslow's sparrow has been most numerous in the northern part of the state.

Hall (1983) listed summer records (dating back to the 1930's) from 24 West Virginia counties, including most of the eastern part of the state. However the BBA survey found Henslow's sparrow in only 7 counties, only 1 of which was included on Hall's list (Barbara Sargent, West Virginia Natural Heritage Program, pers. commun.).

BBS: Between 1966-73, Henslow's sparrow was represented by 15 birds on 5 BBS routes in West Virginia. The species has not been recorded since. Data are inadequate to estimate state trends.

BBA: (1984-88). Henslow's sparrow was recorded in 9 atlas blocks: 2 confirmed, 3 probable, 4 possible.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: SHB (historic breeding records only) (10/28/94)

Habitat Condition: In West Virginia, the older fields once used by Henslow's sparrow are no longer suitable habitat. Very few new fields are allowed to idle for the few years needed to develop Henslow's sparrow habitat (Hall 1983).

FWS REGION 6

Kansas

Summary: Henslow's sparrow breeds in the state.

(Reference W. Busby, pers. commun.). Both the current and historic range of Henslow's sparrow in Kansas is the eastern one-third of the state. Based on predicted potential (pre-European) vegetation, it is assumed that, historically, Henslow's sparrow was probably one of the more common sparrows in eastern Kansas. The current population size is unknown, but limited field surveys indicate that the breeding population may be stable. Available habitat is highly fragmented and scattered across the eastern one-third of Kansas. W. Busby (pers. commun.) noted that Henslow's sparrow range may be extending westward. He recently found singing males at several sites in north-central Kansas in CRP fields planted to native, warm-season grasses.

BBS: Between 1986-94, Henslow's sparrow was represented by 5 birds on 1 BBS route in Kansas. The last record was in 1989. Data are inadequate to estimate state trends.

BBA: The Kansas BBA project is in progress (began in 1992). During the first 4 years of the BBA, Henslow's sparrow was recorded in 18 of approximately 520 blocks. The atlas project is expected to generate a reliable map for the breeding distribution of the species within the state.

Research/monitoring: The species is monitored at Konza Prairie Research Natural Area; this population has been studied extensively by Zimmerman (1988, 1993). Zimmerman (1988) demonstrated that Henslow's sparrow established territories on Konza in habitat patches with significantly greater coverage of standing dead vegetation compared to unoccupied habitat. Henslow's sparrow did not occupy spring-burned habitat in the growing season immediately following the burn. June transect counts in unburned (i.e. not burned that spring) watersheds yielded a range of 2.6-6.2 birds/km during 1981-86 (Zimmerman 1988).

The National Biological Service at Kansas State University will be conducting a management-related study of Henslow's sparrow in conjunction with studies of other prairie birds at Fort Riley Military Reservation beginning this year.

Schulenberg et al. (1994) censused Henslow's sparrow on burned and unburned tallgrass prairie tracts in Osage County, Kansas in 1993. Singing males were found only on unburned sites. A total of 25 singing males was distributed among 4 unburned tracts. Relative density was low on all sites.

Major Populations: The size of the Henslow's sparrow population at the Konza Prairie Research Natural Area varies each year with the amount of available habitat. However, the area consistently supports a Henslow's sparrow population.

Fort Riley Military Reservation also supports a breeding population of Henslow's sparrow. Jeff Keating (Ft. Riley, pers. commun.) indicated that 188 singing males were recorded in surveys of unburned, unhayed tallgrass prairie on the base during 1994. Based on an extrapolation of the survey results to the total amount of available habitat, he estimated that as many as 2,000 singing males may have been present. The 1994 population represented a large increase over former population levels.

State Status: Species in Need of Conservation (no legal protection, but provides recognition that the species may be in trouble and warrants more study).

Natural Heritage Rank: S3 (10/25/91)

Habitat Condition: (Reference J. Zimmerman and W. Busby, pers. commun.). In Kansas, Henslow's sparrow occurs in tallgrass prairie; several million acres of potential habitat exists. (The largest remaining tract of native tallgrass prairie in North America). However, the majority of this land is privately owned and used for agriculture; prairie management practices are generally too severe to produce suitable habitat for Henslow's sparrow. (W. Busby estimated that less than 1% of privately-owned prairie may be suitable for Henslow's sparrows). Many Flint Hill pastures are burned annually over a period of several years, resulting in higher primary productivity and higher weight gain in cattle. Annual burning results in inadequate standing dead vegetation for Henslow's sparrow. Similarly, grazing pressure for a reasonable economic return is not compatible with Henslow's sparrow use. Plantings of native grasses on CRP fields has resulted in some additional habitat, but the degree to which this habitat has been used for nesting is unknown.

Nebraska

Summary: Henslow's sparrow is an "accidental" breeding species in the state.

(Reference John Dinan, Nebraska Game and Parks Commission, pers. commun.). There are very few breeding records for Henslow's sparrow in Nebraska; it is considered an "accidental" breeding species. Johnsgard (1979) reported that the species breeds in southeastern Nebraska (Lancaster and Washington counties).

BBS: No records of Henslow's sparrow.

BBA: (1984-89). Data are not currently available (J. Dinan, pers. commun.).

Research/monitoring: none

Major Populations: none

State Status: none indicated

Natural Heritage Rank: S1 (7/83)

Habitat Condition: no assessment available

South Dakota

Summary: Henslow's sparrow is a "casual summer visitor" in the state.

(Reference Doug Blackland, South Dakota Dept. of Game, Fish and Parks, pers. commun.). Historic and current breeding range of Henslow's sparrow in South Dakota is restricted to the eastern third of the state, but there are very few records either historically or recently. The South Dakota Ornithologist's Union (1991) considered Henslow's sparrow a casual summer visitor in the eastern quarter of the state; they noted 4 summer records for the period 1882-1984.

BBS: In the history of BBS (1966-1994), 3 Henslow's sparrows have been recorded on 2 routes in South Dakota (in 1968 and 1969).

BBA: (1988-93). No Henslow's sparrows were recorded.

Research/monitoring: none

Major Populations: none

State Status: none

Natural Heritage Rank: SU (unrankable)

Habitat Condition: Wet meadow and prairie habitat is threatened by draining and plowing.

CANADA

Ontario

Summary: (Reference Austen 1994, Austen et. al. 1995, Enright 1995a and references therein). It is not known if Henslow's sparrow bred in Ontario prior to settlement, and the concomitant clearing of forests. However, presettlement prairies were extensive in southwestern Ontario. Henslow's sparrow was first reported in Ontario in 1898. The species has been known to breed in

Ontario and southwestern Quebec; since the 1960's breeding has been restricted to Ontario. The species population and range within Ontario has decreased within the last 30-40 years. It was estimated that fewer than 50 pairs bred in Ontario in any given year during 1981-85 and the numbers have declined since that period. Surveys in 1992 and 1993 found 1 singing male in each year. The species was formally registered under the Ontario Endangered Species Act in May, 1994 to give the species and its habitat legal protection.

BBS: Between 1986-94, Henslow's sparrow was represented by 4 birds on 3 BBS routes in Ontario. The last record was in 1992. Data are inadequate to estimate population trends.

BBA: (1981-85). During the Ontario BBA Henslow's sparrow was found in only 38 (2%) of 1,824 squares in southern Ontario, and in only 3 (8%) of those was breeding confirmed.

Research/monitoring: A 1992 survey for Henslow's sparrow in suitable habitat in Ontario revealed only 1 singing male. No Henslow's sparrows were located at 18 formerly occupied sites surveyed in 1992. Due to the limited success of the 1992 survey, efforts in 1993 were concentrated in areas with the greatest likelihood of Henslow's sparrow being present and where there was potential for Henslow's sparrow management. The only site where Henslow's sparrows (presumably 1 pair) were found in 1993 was at the site occupied in 1992 (Knapton 1993, Austen et al. 1995).

The Ontario Birds at Risk Newsletter (Federation of Ontario Naturalists 1994) reported that 1994 surveys of fallow agricultural fields within Haldimand-Norfolk Regional Municipality and historic sites in Prince Edward County yielded limited suitable habitat and no Henslow's sparrows. Three singing males were located independent of the survey in an old field in the Peterborough area. The newsletter also reported that there would be no formal survey for Henslow's sparrow in 1995, but that records would be kept on any observations reported.

Enright (1995a) prepared a draft habitat management plan for Henslow's sparrow in Ontario. Enright (1995b) reported on the status of recovery efforts.

Major Populations: none

Legal Status: In 1986, Henslow's sparrow was listed as Threatened by the Ontario Ministry of Natural Resources. COSEWIC designated the species as Endangered in Canada in April, 1993. The species was formally registered under the Ontario Endangered Species Act in May, 1994 to give the species and its habitat legal protection (Austen 1994)

Natural Heritage Rank: S2 (1/3/89)

Habitat Condition: In Ontario, Henslow's sparrow has been found in abandoned fields, ungrazed or lightly grazed pasture, fallow hayfields, grassy swales, and wet meadows. Long-term land use changes have resulted in the loss of native grasslands and suitable secondary grasslands. However, some sites in Ontario still have apparently suitable habitat for Henslow's sparrow, but the birds no

longer utilize this habitat. This suggests that factors, in addition to habitat loss, are also influencing Henslow's sparrow populations.

Table 2. Status of Henslow's sparrow (HESP) in states within the species' breeding range. Information in the table is abbreviated from state summaries, which include citations.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
FWS REGION 2					
OK	Rare migrant in eastern OK	First confirmed nesting in 1987; breeding population now established. State Status: none	I	TNC's Tallgrass Prairie Preserve (possibly several thousand birds); area managed and protected	Intensive surveys of suitable habitat in northeastern OK difficult; habitat is ephemeral and privately owned
TX	Formerly bred at 2 sites	Both colonies now extirpated State Status: none	E	none	Last known breeding was in 1981 BBA: no HESP records
FWS REGION 3					
IL	Abundant prior to 1900. Between 1957-79 population declined as much as 94%.	Current population estimated at 250-500 birds State Status: E	D	Goose Lake Prairie has supported 15-55 pairs since early 1970's; relatively stable 1972-94	Annual monitoring at Goose Lake since 1988. Other grasslands surveyed; no other sites consistently support more than 15 pairs. BBA: 4 of 1,009 blocks
IN	Historic records limited to northern IN	Uncommon summer resident State Status: T	U	Jefferson Proving Ground - 1995 survey estimated at least 400 pairs. Camp Atterbury population documented in 1990; current status unknown	Need to verify status of population on Camp Atterbury. Surveys may reveal additional breeding populations. BBA: 23 of 650 blocks
IA	Probably widespread and locally common prior to destruction of prairie. Uncommon by 1900.	Only 9 locations for singing males since 1980. Found primarily in southeast IA CRP fields. State Status: E	D	In 1993, at least 50 pairs were located at 5 different locations within a 2-mile radius in southeastern IA; current status unknown.	All known populations are in CRP fields; fate of CRP program will affect potential and need for surveys. Survey of southeast IA has been proposed to NBS. BBA: 1 record (probable)

Table 2 (continued). Status of Henslow's sparrow in states within the species' breeding range.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
MI	First record 1881. Well distributed in southern counties by 1940's. Range expanded north with clearing.	Uncommon, local summer resident. BBS: 12.6% annual decline 1966-94. State Status: SC (under review)	D	none known	Surveys of suitable habitat may reveal locations of breeding populations. BBA: 76 of 1,896 townships
MN	Formerly widespread but uncommon	No breeding records since 1992. State Status: SC (under review)	E	Kipp State Park supported the last known breeding population (1976-91).	Recent surveys of suitable habitat have produced no evidence of breeding. Survey of Kipp State Park was scheduled for 1995.
MO	Formerly more common and widespread throughout prairie regions of state.	Declined to a fraction of former abundance but still present throughout historic range. State Status: none	U	Taberville Prairie - as many as 200 pairs 1961-66; population still present. Most public prairies in southwest MO support HESP.	Need to identify and monitor large, persistent populations. BBA: 18 of 1,216 blocks
OH	Rare to absent presettlement. Range and population expanded in 1920-30's.	Uncommon to locally abundant in southern and unglaciated counties. BBS: 21.1% annual decline 1980-94. State Status: none	D	Some large populations have been located in the past, but the current status of these is unknown.	If habitat is still suitable, determine status of populations located in the recent past. Surveys of suitable habitat may reveal additional populations. BBA: 129 blocks
WI	Probably common in suitable presettlement habitat. Range expanded north with clearing of forests.	Current population estimated at 500 - 1,500 pairs in southern 4/5 of state. BBS: 10.7% annual decline 1980-94. State Status: SC (T status proposed)	D	7 locations with populations of at least 10 pairs; none have been regularly monitored.	Need to monitor known persistent populations. Ongoing BBA may identify additional breeding populations.

Table 2 (continued). Status of Henslow's sparrow in states within the species' breeding range.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
FWS REGION 4					
KY	Probably occurred in native prairies. Type specimen collected in KY in 1820. Almost unknown until 1940's. Sporadic records since then.	Uncommon and locally distributed; typically reports from no more than 6 locations annually. BBA records extended known range to east and west. State Status: SC	U	none known	No extensive surveys have been conducted. Populations may be greater than known but currently no evidence of large, persistent populations. BBA: 9 of 727 blocks
NC	No nesting records in the former range in northern Piedmont and northern mountains in over 30 years.	Breeding population discovered in central and eastern Coastal Plain in 1983 on pocosins cleared for pine plantations. State Status: none	S	2 populations have persisted since 1984; 1994 counts produced minimal estimate of 48 and 64 birds.	Periodic monitoring of 2 largest pops. is planned. Surveys of recently converted pine plantations may identify additional populations, but habitat is only suitable for a few years after conversion.
SC	Breeding season records limited to several pair in 1940's; breeding not confirmed	No evidence of breeding. State Status: none	U/E?	none	Additional documentation needed to assess need for surveys.
FWS REGION 5					
CT	6 records 1881-1939. Rare by the early 1900's. Last nesting record 1939.	State Status: SC (officially extirpated but listed SC due to historic records).	E	none	No indication of need for survey under current conditions. BBA: no HESP records
DE	Regular but uncommon breeder. Last breeding record 1981.	State Status: none	E	none	No indication of need for survey under current conditions. BBA: no HESP records

Table 2 (continued). Status of Henslow's sparrow in states within the species' breeding range.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
ME	Historic breeding reports are not documented.	State Status: none	E	none	No indication of need for survey under current conditions. BBA: no HESP records
MD	Considered fairly common on Eastern and Western Shores.	7-10 current sites. 1987 estimate of <100 individuals, probably fewer now. State Status: T	D	none known	Status survey currently proposed. Informal monitoring conducted in Western MD. BBA: 10 records
MA	Local and uncommon, but wide and regular distribution. Estimate 150 pairs in 1900. Decline began approx. 1935.	1960-94, population has been 0-4 pairs; no breeding in most years. State Status: E	D/E?	none	1993-94 grassland bird survey found no HESP. 1 pair recorded in 1994. No indication of need for survey under current conditions. BBA: 3 records (1974)
NH	Uncommon and local. Records sporadic by mid-1900's, ceased approximately 1970.	Last breeding record 1983. State Status: E	E	none	Unsuccessful search of 7 historic sites in 1984. Grass/shrub bird survey planned beginning 1995. No indication of need for additional survey under current conditions. BBA: no HESP records
NJ	Information on historic status not available.	Range contraction since 1981-85 survey. State Status: E	U	none	BBA: ongoing since 1993, only 2 possible breeding records
NY	Rare early 1900's. Population may have increased 1920-40's. Declines began in 1950's.	Irregular and localized; most localities 1-2 pairs. BBS: 12.1% annual decline 1966-94. State Status: T (pending)	D	11-15 pairs at Saratoga National Historic Park in 1995.	Update of BBA planned for 2000-2005. Surveys of suitable habitat may reveal breeding populations. BBA: 213 blocks

Table 2 (continued). Status of Henslow's sparrow in states within the species' breeding range.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
PA	May not have been native. First nesting record 1913. Scattered colonies, primarily western PA, through 1970's.	BBA revealed wider distribution than known; primarily in western and southcentral counties. State Status: SC	D	None identified, but noted that some large reclaimed surface mines are occupied annually.	Identify and monitor large, persistent pops. Determine viability on reclaimed surface mines with high densities of HESP. BBA: 230 blocks
RI	First record 1901. Uncommon but regular through early 1940's. Population declined in 1940's.	Last suspected nesting was in 1960. State Status: none	E	none	Attempts to locate HESP since its disappearance have failed. No indication of need for survey under current conditions. BBA: no HESP records
VT	First record 1883. Records scarce in early 1900's but increased during 30's.	Last reported nesting in 1953. State Status: E	E	none	No HESP recorded during 1992 survey. No indication of need for survey under current conditions. BBA: no HESP records
VA	Formerly throughout state, increasing eastward. Severe declines since 1940's.	Rare to uncommon. Restricted to small populations in 4 northeastern counties. State Status: T	U	none	No systematic survey has been conducted. Development of HESP conservation team is planned. BBA: no records indicated
WV	First record 1935. Pop. peaked in 1950's-60's, but declined in 1970's.	Erratic, uncommon-to-rare summer resident. State Status: none	U	none	Additional documentation needed to determine if surveys are needed. BBA: 5 blocks

Table 2 (continued). Status of Henslow's sparrow in states within the species' breeding range.

STATE	HISTORIC STATUS	CURRENT STATUS ¹	POP. TREND ²	KNOWN PERISTENT POPULATIONS	SURVEY STATUS/NEEDS ³
FWS REGION 6					
KS	Probably one of the more common sparrows in eastern KS.	Current range is eastern third of KS; habitat highly fragmented. State Status: none	U	Konza Prairie - population varies but is persistent. Ft. Riley - 188 singing males counted in 1994 (may be as many as 2,000)	Monitoring ongoing on Konza and Ft. Riley. BBA may provide additional info. Much potential prairie habitat exists, but management practices preclude HESP.
NE	Very few records	"Accidental" breeding species State Status: none	U	none	No evidence of consistent breeding. BBA (1984-89) data not available.
SD	Very few records	"Casual" summer visitor. State Status: none	U	none	No evidence of consistent breeding. BBA: no HESP records.
CANADA					
ONT.	Historically bred in Ontario and Quebec, but recently only in Ontario. Population and range declined in the past 30-40 years.	Very few records in recent years. Legal Status: designated Endangered in Canada in 1993.	D	none	Surveys in 1992 and 1993 found 1 singing male each year. None found in 1994 survey. No formal survey planned for 1995, but casual records will be kept. BBA: 38 of 1,824 squares (includes possible records).

¹ State Legal Status: E=Endangered, T=Threatened, SC=Special Concern

² Current Population Trend: I=Increasing, D=Decreasing, S=Stable, E=Extirpated, U= Unknown. Trends are based on BBS for states with adequate data to estimate trends (MI, NY, OH, and WI). Other Trend rankings are based on input from states, and may not be based on survey data.

³ BBA included if available -- expressed as the number of blocks in which breeding was "probable" or "confirmed"

Table 3. Status of Henslow's sparrow (HESP) in states within the species' winter range. Information in the table is abbreviated from state summaries, which include citations.

STATE	HISTORIC STATUS	CURRENT STATUS	POP. TREND ¹	KNOWN WINTER CONCENTRATIONS	SURVEY STATUS/NEEDS
FWS REGION 2					
TX	Historic range was eastern third of TX	Rare but regular winter resident in eastern third of TX State Status: none	D/S?	Greatest abundance on CBC counts regularly occurs at Galveston Bay, TX	Need for monitoring throughout eastern TX; there is suspicion HESP may be more abundant than previously thought.
FWS REGION 4					
AL	Historic status not indicated	Little known. Seen most consistently in southern AL pitcher plant bogs. State Status: none	U	Only documented concentration is at the site of ongoing research in Baldwin Co.; 23 birds banded in 1994-95.	Need for surveys in suitable habitat; may be more numerous than realized. Results of current research will help guide future efforts.
AR	No records	Recent evidence suggests potential for small winter pop. State Status: none	U	None	Continue to monitor 2 sites which have supported 1-4 HESP in recent years. Search other suitable habitat.
FL	Historic status not indicated	Locally, fairly common in northern FL State Status: none	D	Apalachicola National Forest	Need for surveys in north (and possibly central) FL in suitable habitat.
GA	Historic status not indicated	Little known. Natural Heritage Database has only 1 record. State Status: none	U	None known	Virtually nothing known re: HESP. Need to clarify species' winter status in GA.
LA	Historic status not indicated	Primarily found in western and eastern "pine flats" State Status: none	S	None known. Highest recorded CBC count was 11 at St. Tammany, LA in 1985.	Need for surveys in suitable habitat.

Table 3 (continued). Status of Henslow's sparrow in states within the species' winter range.

STATE	HISTORIC STATUS	CURRENT STATUS	POP. TREND ¹	KNOWN WINTER CONCENTRATIONS	SURVEY STATUS/NEEDS
MS	Historic status not indicated	Winters in suitable habitat in coastal areas State Status: none	U	Sandhill Crane NWR (HESP research ongoing); 33 birds banded in 1994-95.	Ongoing research on Sandhill Crane NWR. Need for surveys in suitable habitat.
NC	Poorly known; probably ranged farther west into central Coast. Plain	Winters in Coastal Plain, north to Croatan Natl. Forest State Status: none	U	None known	Wintering habitat is limited. Need to clarify species' winter status in NC.
SC	Historic status not indicated	Rare in Coastal Plain. Very rare in Piedmont. State Status: none	U	None known	Need to clarify species' winter status in SC.

¹ Population Trend (based on Christmas Bird Count data): I=Increasing, D=Decreasing, S=Stable, U= Unknown

THREATS

In accordance with the Endangered Species Act of 1973, 5 factors are used to determine whether a species is endangered or threatened:

- (A) the present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) overutilization for commercial, recreational, scientific, or educational purposes;
- (C) disease or predation;
- (D) the inadequacy of existing regulatory mechanisms;
- (E) other natural or manmade factors affecting its continued existence.

Based on literature available on the species and input provided by the states, known threats to Henslow's sparrow will be summarized according to these listing factors.

PRESENT OR THREATENED HABITAT LOSS

Loss of suitable habitat is probably the major threat to Henslow's sparrow. In the literature, reports, and personal communications reviewed for this status assessment, habitat loss was universally cited as the probable major cause for the decline of this species (Drilling 1985, Hands et. al. 1989, Hunter 1990, Smith 1992, Herkert 1994a). Samson and Knopf (1994) noted that "grassland bird species have shown more consistent and steeper, geographically widespread declines" than any other group of North American wildlife species. These widespread declines of many grassland bird species provide strong empirical evidence that loss and deteriorating quality of grassland habitats is an underlying cause for population declines.

Human activities which destroy grassland habitats suitable for breeding or wintering Henslow's sparrows represent a threat to the species. Activities which have contributed to habitat loss include (but are not limited to): conversion of pasture and hayfields to row crop production; conversion of grasslands to pine plantations; agricultural practices such as earlier and more frequent mowing of hay fields; wetland draining; and urbanization. Natural succession of vegetation can also render areas unsuitable for Henslow's sparrow; habitat must be maintained through natural or man-made cyclic disturbances.

Henslow's sparrow has relatively specific breeding habitat requirements, and therefore the species' population trends have mirrored trends in availability of suitable habitat. On a rangewide basis, current habitat conditions for Henslow's sparrow are probably worse than at any other time in history. Some surveys suggest that the area of native prairie has declined as much as 99.9% since European settlement (Samson and Knopf 1994). In the Midwest, less than 1% of the region's original native prairie remains intact (Herkert et al. 1995). Herkert (1994b) noted that in Illinois less than 1,000 ha of high-quality prairie habitat remained of almost 9 million ha that existed prior

to settlement. The availability of secondary agricultural habitats has also declined. Much agricultural land has been lost to development or reverted to forest.

The suitability of remaining agricultural habitats for Henslow's sparrow has declined as hayfields and pasture have been converted to row crop production. Bollinger and Gavin (1992) estimated that area in hay in the eastern United States has declined 45% since the early 1900's and much less land is used for permanent pasture. In Illinois, Herkert (1994b) estimated that area in hay declined over 50% between 1960 and 1989, and area in pasture declined over 75% since 1906.

Disturbances in remaining hayfields have intensified with trends toward earlier and more frequent mowing. Wetland drainage has also been a factor in habitat loss for Henslow's sparrow (Brindza 1987); the species often nests in wet meadows adjacent to wetlands. Not only has the overall quantity of habitat declined, but also the average patch size of remaining grassland habitats has declined dramatically. The highly fragmented nature of remaining grassland habitats has serious implications for area-sensitive species such as Henslow's sparrow.

Across the range of Henslow's sparrow, researchers have noted the preference of the species for relatively large grasslands for breeding (see **BREEDING SEASON HABITAT REQUIREMENTS**). Herkert (1994b) noted that area-sensitive grassland birds, including Henslow's sparrow, are among those experiencing the greatest population declines. These species are negatively affected by reduction in average grassland patch size (which has occurred throughout Henslow's sparrow range), in addition to overall loss of grassland habitat. For example, Herkert noted that in Illinois less than 20% of the states 245 native prairie remnants are greater than 10 ha and only 9 are greater than 40 ha. Henslow's sparrow was rarely encountered in grassland fragments less than 100 ha (Herkert 1994a). Herkert (1994b) concluded that the large majority of native prairie remnants in Illinois are too small to support area-sensitive grassland birds, such as Henslow's sparrow.

There have been large scale losses of grassland habitats in the winter range of the species, as well as the breeding range. Frost et al. (1986) summarized the status and management of fire-dependent savannas and prairies of the southeast; these areas represent prime Henslow's sparrow winter habitat. They estimated that less than 10% remains of the area once occupied by these grasslands. Lynn (1991 cited in Herkert 1994b) demonstrated that suitable grassland winter habitat in the southeast declined substantially between 1950 and 1987 due to conversion to row crops and pine plantations. McFarlane (1995) evaluated the status of tallgrass coastal prairies in Louisiana and Texas, important wintering habitat for numerous grassland birds including Henslow's sparrow. He documented a 99.99% loss of tallgrass prairie in Louisiana and 99.6%-99.8% loss in Texas.

D. McNair (pers. commun.) summarized the condition of Henslow's sparrow winter habitat: "The winter range of the Henslow's sparrow is largely congruent with the Lower Coastal Plain of the Southeast USA where the longleaf pine forest was the dominant ecosystem. This ecosystem has been reduced to approximately 3% of its former extent. It is expected that Henslow's sparrow populations in this and other natural habitats (e.g., slash pine forest) have become highly fragmented as a result. Anthropogenic habitats used by Henslow's sparrow may include

broomsedge fields and powerline corridors. Broomsedge fields may once have been an important habitat. It is unclear if viable populations occupy these anthropogenic habitats now since modern studies are lacking."

Threats to Henslow's sparrow winter habitats include: exclusion or reduction of frequency of fire; drainage; urbanization; and conversion to agriculture or pine plantation. Protection and maintenance (through fire) of natural pinelands is imperative for Henslow's sparrow winter habitat management (Engstrom and McNair, in prep.; H. LeGrand, Jr., pers. commun.).

It is reasonable to assume that suitable habitat for migrating Henslow's sparrows has also declined, as grassland habitats have declined. However, it is difficult to assess habitat conditions for migrating Henslow's sparrows, as habitat use during migration had not been studied, until a pilot study began in autumn 1995 (D. McNair, pers. commun.).

The future of grassland habitats is uncertain. The grassland habitats required by Henslow's sparrow are transitory in nature and require cyclic disturbance (natural or man-made) to be maintained. Projecting future habitat conditions for Henslow's sparrow would require an evaluation of ownership and land use patterns for breeding and wintering habitat. Such an evaluation would be useful, but has not been conducted to date. However, it is clear that the specific habitat requirements of this species are not frequently met on intensively managed agricultural lands. The intensity of management typical on private hayfields and pastures is not compatible with Henslow's sparrow breeding habitat requirements (Herkert 1994a; Swengel, in prep.; J. Zimmerman and W. Busby, pers. commun.). Publicly-owned lands and lands owned by private conservation organizations probably offer the most potential for Henslow's sparrow management. In Pennsylvania and Ohio, reclaimed surface mines provide suitable breeding habitat for Henslow's sparrow (Peterjohn 1989; D. Brauning, pers. commun.). However, how long this habitat will remain suitable for Henslow's sparrow and the viability of populations in this habitat are unknown.

Even on some publicly-owned grasslands, there is uncertainty regarding whether or not management will be conducive to Henslow's sparrow. For example, most Henslow's sparrow habitat in Wisconsin occurs on publicly-owned and -managed grass fields which are typically managed for waterfowl and pheasants. D. Sample (pers. commun.) noted: "Habitat managed for gamebirds offers benefits to Henslow's sparrow that are indirect only. Any changes in management practices for gamebirds may or may not benefit Henslow's sparrow; such changes in management could thus pose a potential threat to Henslow's sparrow."

Private lands enrolled in the CRP provide Henslow's sparrow habitat in some states. Schulenberg (unpubl. manuscript) documented Henslow's sparrow use of a CRP field in Kansas. Individuals in several states have noted the potential importance of the CRP to Henslow's sparrow (C. Becker in Illinois, D. Case in Ohio, D. Figg in Missouri, J. Fleckenstein in Iowa, D. Sample in Wisconsin, pers. commun.). The future of the CRP and associated guidelines have important implications for Henslow's sparrow populations. Many CRP fields currently utilized by Henslow's sparrow will likely become unsuitable habitat if they are taken out of the program. D. Sample (pers. commun.)

noted that if the CRP is continued, early summer mowing of CRP fields released due to drought conditions constitutes a threat to Henslow's sparrow using those fields.

While scientists generally concur on loss of habitat as the major factor in the decline of Henslow's sparrow populations, there is also mounting evidence that other factors may also be involved. In parts of Henslow's sparrow breeding range, the species is not utilizing seemingly suitable habitat.

D. Sample (pers. commun.) noted that in Wisconsin, Henslow's sparrows are unevenly distributed, even in areas with plentiful suitable habitat. Illinois also has seemingly suitable habitat which is unoccupied (J. Herkert pers. commun.). Austen et al. (1995) noted that in Canada, Henslow's sparrow no longer breeds in some areas with apparently suitable habitat, and suggests other factors may be involved.

OVERUTILIZATION

Susceptibility of Henslow's sparrow to human disturbance is not documented, but is potentially a limiting factor. Hyde (1939) noted that Henslow's sparrows interrupted their activities temporarily and/or gave an alarm call when they detected human disturbance. Hanson (1987b) noted that vehicle traffic during a single night in a 28 ha field caused the boundaries of 2 of 6 Henslow's sparrow territories within the field to shift.

As Henslow's sparrow becomes increasingly rare, the potential for disturbance increases. In some parts of the species' range, biologists are concerned that disturbance may already pose a threat. B. Blodget (pers. commun.) stated: "Annoyance and disturbance of nesting pairs by over zealous birdwatchers is a recreational threat in this state (Massachusetts) to pairs that are 'hot-lined'." Peck and James (1987 cited *in* Austen et al. 1995) stated that a "lack of suitable habitat and disturbances in nesting colonies have apparently almost eliminated this species as a breeding bird in Ontario." Austen et al. (1995) noted in the draft National Recovery Plan for Henslow's Sparrow in Canada: "The advantages of increasing the information base (on Henslow's sparrow) must be carefully weighed against the potential harm done by research activities." Disturbance by birders and photographers is considered a potential threat and confidentiality of site records is considered important in Canada. The potential for disturbance should be considered when planning research and monitoring efforts on U.S. populations of Henslow's sparrow as well, particularly in those states where the entire known population is limited to a few sites.

DISEASE OR PREDATION

To our knowledge, no diseases of Henslow's sparrow have been reported, and essentially no information is available regarding ectoparasites. Hyde (1939) described the species as being relatively free from lice.

Few causes of nest loss in Henslow's sparrow have been documented. Nest parasitism and nest predation in Henslow's sparrow are discussed in more detail in the **REPRODUCTION** section. Nests of Henslow's sparrow are hard to find and few nests have been observed. There are scattered

reports of nest parasitism by brown-headed cowbirds; but the level of parasitism has not been well documented. Austen et al. (1995) noted: "...since the Henslow's Sparrow coevolved with the Brown-headed Cowbird, it is likely that the sparrow has become adapted to cowbird parasitism...". However, rejection of cowbird eggs or other potential behaviors to minimize the impacts of cowbird parasitism have not been observed in Henslow's sparrow. Scant information has also been compiled on the frequency of predation of Henslow's sparrow eggs or young. Based on observations and speculation by researchers, mammals and snakes are probably the major nest predators (Hyde 1939, Robins 1971a).

Researchers have documented increased nest predation and nest parasitism with proximity of a grassland to woody edges (Gates and Gysel 1978, Johnson and Temple 1990, Burger et al. 1994). Johnson and Temple (1990) suggested that nest predation and parasitism may be lower in large prairie patches, because they have smaller edge to area ratios, and have a relatively high proportion of their total area far from edges. While the extent to which nest parasitism and nest predation affect Henslow's sparrow productivity is unknown, we suspect that fragmentation of grassland habitats exacerbates the potential for parasitism and predation to impact populations. Fragmentation leads to smaller grassland patch sizes, and closer proximity to woody edges. The level of parasitism is probably also related to cowbird density (at the landscape level), as has been documented for forest-breeding birds (Robinson et al. 1993).

Preliminary data for grassland birds in Illinois suggest high rates of nest predation. During the summer of 1995, researchers found 4 Henslow's sparrow nests; none of the nests were parasitized but at least 3 were lost to predators (J. Herkert, pers. commun.).

The literature includes only scattered reports of predation on adult Henslow's sparrows. Stoddard (1931 cited in Hyde 1939) found the remains of a Henslow's sparrow in 1 of 1,098 northern harrier (*Circus cyaneus*) pellets examined and Sutton (1928 cited in Hyde 1939) reported Henslow's sparrow remains from the stomach of a sharp-shinned hawk (*Accipiter striatus*).

Lynn (1991 cited in Herkert 1994b) suggested that the quality of many grasslands in the southeastern U.S. may have been reduced by the accidental introduction of the exotic red fire ant in the 1930's. Grisham (1994) noted that there is evidence that migrating grassland birds, including grassland sparrows, are declining in numbers because of the fire ant. However, Yosef and Lohrer (1995) studied the impact of fire ants on loggerhead shrike (*Lanius ludovicianus*) populations in southern Florida and concluded that the relationship between bird populations and fire ants should be reevaluated. The results of their research do not substantiate claims that grasslands in the Gulf Coast region are of reduced value to wintering bird species because of fire ant infestation.

INADEQUACY OF EXISTING REGULATORY MECHANISMS

The Lacey Act, Convention for the Protection of Migratory Birds, Migratory Bird Treaty Act of 1918 (MBTA), and Convention on Nature Protection and Wildlife Preservation in the Western

Hemisphere were attempts to halt the unregulated killing, import, and/or sale of migratory birds (USFWS 1991b). The MBTA established Federal responsibility for protection of the international migratory bird resource. The MBTA makes it "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill... any migratory bird, any part, nest, or egg of any such bird... included in the terms of the conventions...".

The MBTA provides Henslow's sparrow protection from direct take throughout its range; however, current regulatory mechanisms are inadequate to protect the grassland habitats on which the species depends. Section 404 of the Clean Water Act and the National Environmental Policy Act of 1969 (NEPA) may, in some cases, provide protection for habitats used by Henslow's sparrow.

Wetlands are regulated by the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act. Section 404 prohibits the discharge of dredged or fill materials into waters of the United States, including wetlands. Any activity that involves placement of dredged or fill material in a wetland requires a permit from the COE. Grasslands adjacent to wetlands may be used by breeding and wintering Henslow's sparrows, thus Section 404 probably results in the protection of a limited amount of habitat for the species. However, currently proposed congressional changes to the Clean Water Act could seriously lessen existing protection.

NEPA requires all Federal agencies to consult with each other on proposals for legislation or other major Federal actions significantly affecting the quality of the human environment. Significant fish and wildlife habitats, including grassland habitats, are afforded some protection through NEPA.

Henslow's sparrow is afforded legal protection under some state laws. State laws are frequently limited to protection from direct take and may not extend to the protection of habitat. Henslow's sparrow is listed as endangered, threatened, or a species of special concern in 16 states (see state narratives for details); the species currently breeds in 11 of those states. Henslow's sparrow has no protected status or special concern designation in 6 states in which it currently breeds, or in any of the 9 states within its winter range. Henslow's sparrow was designated as "Endangered" in Canada in 1993 (Austen et al. 1995).

OTHER NATURAL OR MANMADE FACTORS

Austen et al. (1995) suggested that Henslow's sparrow breeding populations in portions of the species' range may have fallen below a threshold minimum viable population size. Henslow's sparrows appear to be influenced by social facilitation in habitat selection (Ellison 1992). Kellogg and Blodget (in prep.) noted: "The semi-colonial habits of this species suggest that social factors, as well as habitat variables, are probably a potent influence on nesting success." They suggested that the extremely patchy distribution of remnant habitat in portions of Henslow's sparrow range may not be adequate to support viable populations of the species.

Impacts of pesticide use on Henslow's sparrow have not been evaluated but represent a potential threat (Hands et al. 1989); a high percentage of the diet of Henslow's sparrow consists of insects. Ferren (unpubl. manuscript) noted that the decline of Henslow's sparrow in Rhode Island may have been related to an increase in potato farming (in the 1940's), either directly through habitat loss or indirectly through the impacts of DDT use.

Hazards associated with migration are known to be a cause of mortality. Stevenson and Anderson (1994) reported that for the period 1955-1980, 39 Henslow's sparrows were killed when striking a Florida television tower during fall migration and 4 were killed during spring migration. Mumford and Keller (1984) noted that 32 dead Henslow's sparrows were found along Lake Michigan after an April 1960 storm.

MANAGEMENT

BREEDING HABITAT MANAGEMENT

Cyclic disturbances are necessary to maintain grasslands, and consequently grassland bird populations, including Henslow's sparrow. Prescribed burns, mowing (haying), and grazing are the 3 management tools most frequently recommended for maintaining grassland habitat suitable for breeding Henslow's sparrows. All of these techniques can be successfully applied to Henslow's sparrow breeding habitat. However, the timing, extent and frequency of disturbance are important considerations. Herkert 1994b stressed that management plans must address both size of the management area and vegetation structure.

PRESCRIBED BURNING

Henslow's sparrow avoids areas immediately following a burn. Herkert (1994b) in Illinois, Swengel (in prep.) in Missouri, Reinking and Hendricks (1993) in Oklahoma, and Zimmerman (1988) and Schulenberg et al. (1994), both in Kansas, found that Henslow's sparrow does not use grasslands the summer following a spring burn. However, in North Carolina, 2 sites, which supported 48 and 64 Henslow's sparrows during the 1994 breeding season, were burned within the previous year (timing of burn not known) (H. LeGrand, Jr., pers. commun.). Both of these sites were cleared pocosins, and were presumably wet. The wet nature of the sites may partially explain why Henslow's sparrow was able to use the sites within a year of burning. J. Herkert (pers. commun.) noted that Henslow's sparrow may occupy wet prairies, which tend to burn less efficiently, sooner after burning than dry prairies.

The timing of recolonization by Henslow's sparrow after burning has been somewhat variable. Henslow's sparrow recolonized Illinois grasslands at low densities in the second growing season after a burn, but did not reach maximum breeding densities until at least 3 growing seasons after a burn (Herkert 1994a). In Missouri, Henslow's sparrow recolonized burned prairies in the second growing season after a prescribed fire, and the density of Henslow's sparrow did not increase over

the following 2 growing seasons (Swengel, in prep.). Swengel (in prep.) noted that Henslow's sparrow populations recover more quickly after fire or mowing in Missouri compared to populations in the Upper Midwest, which he attributes to faster litter accumulation in southern than in northern prairies. He noted that this variation in litter buildup rates is an important consideration when choosing intervals between management treatments.

Based on data from Illinois, annual burning or very aggressive burning (i.e. half the site burned one year and the other half the next) is too intensive for Henslow's sparrow (J. Herkert, pers. commun.). Less aggressive burning balances the need to maintain grassland habitat (i.e. control woody encroachment) with the need to develop the vegetation structure that Henslow's sparrow requires.

Generally, it is accepted that rotational prescribed burning can maintain habitat suitability for Henslow's sparrow. Herkert (1994b) recommended that management units for Henslow's sparrow should be at least 20-30 ha. On large grasslands (>100 ha) he recommended burning 20-30% of the area per year in a rotating series. Zimmerman (1988) also recommended a minimum of 30 ha tracts for Henslow's sparrow management, burned on a 3-4 year cycle.

The goal of management at TNC's Tallgrass Prairie Preserve in Oklahoma is to recreate a functioning prairie ecosystem (H. Payne, pers. commun.). Management includes the reintroduction of bison and the use of controlled burning (to simulate natural fires that occurred in native prairies). Personnel from the George Miksch Sutton Avian Research Center are currently in the midst of a 5 year study to evaluate the impacts of this prairie management program on breeding prairie songbirds. This work should improve our understanding of how management affects Henslow's sparrow and other breeding prairie birds.

MOWING

Recently mowed areas, like recently burned areas, are generally avoided by Henslow's sparrow (Herkert 1994a). Herkert (1994a) and Swengel (in prep.) concluded that the frequency of disturbance in privately-owned midwestern hayfields severely limits or eliminates nesting by Henslow's sparrow. D. Sample (pers. commun.) noted that Henslow's sparrow tends to abandon hayfields when mowing occurs, which is most likely before young hatch or fledge. Based on his work in Wisconsin, he recommended that any mowing on Henslow's sparrow habitat should, at the earliest, be after July 15 (after July 30 preferred).

Swengel (in prep.) promoted use of mowing as a management tool for Henslow's sparrow breeding habitat. Based on his work on 42 southwestern Missouri prairies, he concluded that prairies managed primarily by haying had almost 2 times as many Henslow's sparrows as prairies managed primarily with fire. This "conservation haying," as practiced on Missouri public prairies, occurs primarily in July, generally once every 2 years. Swengel concluded: "Unlike standard farming practices used for business profit, the unintensified use of haying or grazing as practiced at many southwestern Missouri prairies are true examples of sustainable use that can be designed to conserve prairie birds." Based on his research, Swengel recommended annual to triennial

mid-to-late summer haying, and light grazing, instead of fire, to manage for Henslow's sparrow (as well as dickcissel [*Spiza americana*] and grasshopper sparrow [*Ammodramus savannarum*]).

Other researchers have also found that unintensified mowing is compatible with management for Henslow's sparrow. Smith and Smith (1992) concluded that maintenance mowing in mid-August, on publicly-owned pastures in New York, allowed Henslow's sparrows to raise their first broods undisturbed, while still leaving enough time for regrowth to provide standing dead vegetation the following spring. Austen et al. (1995) noted that the mowing on the New York study area was conducted to control woody invasion and that the thatch was left on the ground. Skinner (1975) found high densities of Henslow's sparrow in fields combined for seed with 45.7 cm high cover, but none were found in hayed fields. Austen et al. (1995) suggested that mowing and leaving the mowed hay in place, or "sloppy mowing" (leaving patches of unmowed vegetation) may be useful management techniques for Henslow's sparrow management in Canada.

In addition to his work on southwestern Missouri prairies, S. Swengel (pers. commun.) also conducted extensive surveys of prairie birds between 1987-95 at sites within Henslow's sparrow breeding range in parts of Wisconsin, Minnesota, South Dakota, North Dakota, Iowa, and Illinois. He found no Henslow's sparrows in more than 55 prairie preserves in states north of Missouri that are within current or recent Henslow's sparrow breeding range.

In contrast to relatively high numbers of Henslow's sparrow he documented in southwestern Missouri hayed prairies, he noted that "...fire managed prairies in the Upper Midwest are virtually devoid of Henslow's sparrows." He asserts that fire management is hastening the demise of the species in the Upper Midwest. Given the success of "conservation haying" for Henslow's sparrow management in Missouri, additional research on the merits of haying (versus fire-management) is warranted.

GRAZING

Henslow's sparrow use of lightly grazed pastures has been documented (Skinner 1975, Skinner et al. 1984, Smith and Smith 1992). Smith and Smith (1992) found Henslow's sparrow in 5 of 33 pastures surveyed in the Finger Lakes NF in New York. Pastures were stocked such that only 60% of the annual production of vegetation was consumed by cattle (stocking rate of .12 to .25 head of cattle per ha), and maintenance mowing was used to control woody invasion. They concluded that carefully managed grazing was a viable, cost-effective management option for Henslow's sparrow (as well as grasshopper sparrow).

Even though light grazing is compatible with Henslow's sparrow management, the species is not generally associated with grazed areas (Peterson 1983, Zimmerman 1988). The level of grazing pressure required for a reasonable economic return is generally not compatible with Henslow's sparrow use.

Light grazing can provide an alternative to fire for grassland bird management (S. Swengel, pers. commun.). In 1992, the Sutton Avian Research Center began a 5-year prairie bird monitoring

project on TNC's Tallgrass Prairie Preserve and several private ranches in Washington and Osage Counties. The objective of this study is to assess the impact of burning and grazing on the distribution, relative abundance, and nesting success of tallgrass prairie birds (including Henslow's sparrow) in Oklahoma. The results of this research will provide needed insight into the levels of grazing compatible with grassland bird management. Additional research is needed, including an evaluation of opportunities to incorporate grassland bird management into agricultural practices, such as rotational grazing (Temple et al. 1995).

WINTER HABITAT MANAGEMENT

Longleaf pine forest, historically the dominant ecosystem in the lower Coastal Plain of the southeastern U.S., provides prime winter habitat for Henslow's sparrow. Protection and maintenance, through fire, of natural pinelands is imperative not only for Henslow's sparrow but also other rare animals and plants. Fire suppression poses a threat to Henslow's sparrow winter habitat (Engstrom and McNair, in prep.; H. LeGrand, Jr., pers. commun.). Wiregrass and many other grasses do not bloom and set seed except immediately after a fire; therefore, frequent fires are required to maintain habitat suitability (H. LeGrand, Jr., pers. commun.).

Historically, many of the natural winter habitats of Henslow's sparrow burned frequently in summer as the result of lightning strikes (Engstrom and McNair 1995, Shriver and Vickery 1995). Currently, most management burns are conducted in winter, due to the greater ease of conducting control burns at that time. It is the impression of some researchers and managers that summer burning would produce better habitat for wintering songbirds than winter burns (Engstrom and McNair, in prep.; J. Cox, H. LeGrand, Jr., M. Woodrey, pers. commun.). Spring/summer burned areas could also be recolonized by wintering sparrows more quickly than fall/winter burned areas. Habitat is not suitable for Henslow's sparrow in the winter immediately following a fall burn (H. LeGrand, Jr., D. McNair, M. Woodrey, pers. commun.). However, areas which are burned in spring or early summer appear to provide suitable habitat in the first winter following the burn. Frost et al. (1986) reported that summer fires are more effective for management of fire-dependent savannas and prairies in the Southeast.

The primary objective of a current study in the Apalachicola NF in Florida is to assess how bird communities and populations of individual species (including Henslow's sparrow) in longleaf pine forests respond to 2 different fire regimes (dormant, growing season) (Engstrom and McNair, in prep.). Results of this study will vastly improve our ability to predict the impact of season of burn on wintering and migrating populations of Henslow's sparrow.

The importance of prescribed burning in maintaining natural pine forests, prime Henslow's sparrow wintering habitat, has been established. However, effects of other management practices are not documented. D. McNair (pers. commun.) noted there is no information available on the impacts of mowing and grazing on winter habitat. It would be useful to assess how mowing and grazing would impact Henslow's sparrow winter habitat, especially secondary habitats, such as broomsedge fields and powerline corridors. Hunter (1990) suggested that there may be opportunities to manage cropland for Henslow's sparrow winter habitat through inefficient

farming on national wildlife refuges and Federal inventory lands. If such practices proved valuable, they could potentially be expanded to CRP lands.

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

The grassland ecosystems on which Henslow's sparrow depends are considered among the most endangered ecosystems in North America (Samson and Knopf 1994). As Samson and Knopf (1994) point out: "The potential for species extinction on grassland is of serious concern. Fifty-five grassland species in the United States are threatened or endangered, and 728 are candidates." They note that one-third of endangered species in Canada are grassland-dependent. Declines in Henslow's sparrow populations throughout North America are but one indication of the consequences of the destruction and degradation of grassland ecosystems.

Any effort to manage for Henslow's sparrow should not be viewed in isolation, but rather should be seen as an opportunity to benefit a wide-range of species associated with grassland habitats. For example, Henslow's sparrows have been found in association with many species of grassland birds. Robins (1971a) identified 6 species as "avian breeding associates" of Henslow's sparrow on a Michigan study area: red-winged blackbird (*Aegialius phoeniceus*), sedge wren, Eastern meadowlark (*Sturnella magna*), bobolink, savannah sparrow (*Passerculus sandwichensis*), and grasshopper sparrow. Other authors have listed additional potential breeding associates (Hyde 1939, Wiens 1969, Herkert 1991, Austen et al. 1995), many of which are declining.

Integrated management for grassland-dependent species is a sound ecological approach, and also makes most efficient use of economic and logistic resources. Several researchers have noted that there is potential for grassland management for breeding Henslow's sparrows to be coordinated with management for other species (Herkert 1994c; Austen et al. 1995; Swengel, in prep.). There are programs in place which offer potential for integrated management. Menges et al. (1995) noted that grasslands restored as part of the North American Waterfowl Management Plan provide benefits to grassland songbirds as well. In the Prairie Pothole region, efforts are underway to merge conservation planning for waterfowl and nongame birds (Pashley and Warhurst 1995).

There is potential to coordinate habitat management on winter range as well. C. Shackelford (pers. commun.) noted that wintering Henslow's sparrows are found in eastern Texas national forests in areas managed for the Federally endangered red-cockaded woodpecker. Hunter (1990) considered management for red-cockaded woodpecker as an opportunity to effectively manage many pine forests. M. Woodrey (pers. commun.) found wintering Henslow's sparrows in association with Bachman's sparrow and sedge wren (both are "migratory nongame birds of management concern"), as well as LeConte's sparrow, on the Sandhill Crane NWR in Mississippi (an area managed primarily for the Federally endangered Mississippi sandhill crane). The Apalachicola NF, which has the only known winter concentration of Henslow's sparrow in Florida, also has large populations of red-cockaded woodpecker and Bachman's sparrow (D. McNair, pers. commun.).

Austen et al. (1995) stressed that grassland management programs for Henslow's sparrow in Canada would also benefit other grassland species, many of which are in decline. In fact, they consider the potential for recovery of Henslow's sparrow in Canada to be low, but noted that recovery activities will very likely promote the conservation and protection of other grassland species, particularly those declining in number, such as grasshopper sparrow.

Herkert (1994c) stressed that the size of the management unit is a primary consideration in the management of Midwestern prairie bird populations. Many species of prairie birds experiencing the largest population declines, including Henslow's sparrow, bobolink, eastern meadowlark, grasshopper sparrow, and savannah sparrow, are those which are typically restricted to large grasslands in the Midwest. To benefit these species, efforts should be concentrated on preventing fragmentation of existing large grasslands. Herkert (1994b) recognized the need for the protection of existing grasslands: "Although the mechanisms that are driving midwestern grassland bird declines remain somewhat poorly understood, management efforts directed toward the protection of large, contiguous grassland areas (on the breeding grounds and possibly on the wintering grounds as well) offer the most promising avenue for avoiding further population declines of these species." Small grasslands tend to offer minimal habitat value to Henslow's sparrow, as well as some other declining grassland bird species. Herkert (1994b) also noted the need to minimize hay-cutting or other disturbances during the breeding season and eliminate and control habitat features, such as woody encroachment, that attract nest predators and nest parasites.

Henslow's sparrow has more specific habitat requirements, and is probably more area-sensitive, than most other species of grassland birds. Therefore, it is likely that the management potential of many areas for Henslow's sparrow could be improved if Henslow's sparrow habitat requirements were specifically considered. Swengel (in prep.) and Austen et al. (1995) both commented on the potential use of Henslow's sparrow as an "indicator species." They suggested that because management for Henslow's sparrow is consistent with, but more exacting than, management for other declining grassland species, that it may be a useful indicator to the health and productivity of large, grassland habitats within the species breeding range. The Henslow's sparrow also has narrow habitat requirements on winter range. D. McNair (pers. commun.) noted that Henslow's sparrow (as well as Bachman's sparrow) are the best bioindicator species to assess the health of groundcover in mature longleaf pine forests and pine savannas because of the exacting habitat requirements of these species.

Habitat management efforts for Henslow's sparrow should be focused on maintaining (or improving) habitat suitability for the largest, viable populations. Austen et al. (1995) noted that the persistence of colonies for several years in some undisturbed, protected areas provides circumstantial evidence of species site-fidelity (although individual site-fidelity is questionable).

There is limited information regarding colonization of restored grasslands by Henslow's sparrow. Almost without exception, state accounts of Henslow's sparrow indicate that the species nests in scattered concentrations, while other apparently suitable habitat nearby is frequently unoccupied. This habit makes it difficult to predict if a restored area, even if it produces apparently suitable habitat, will be colonized by Henslow's sparrow. Volkert (1992) reported colonization of a

restored prairie in Wisconsin by Henslow's sparrow 3 years after planting. J. Herkert (pers. commun.) found singing male Henslow's sparrows in 2 separate prairie restorations in Illinois in 1995; both restorations were relatively close to other grasslands which supported Henslow's sparrow. As previously noted, individuals in many states suggested that CRP fields are utilized by Henslow's sparrow, although the extent of use is not well documented. These observations are cause for optimism that restoration has the potential to benefit Henslow's sparrow, particularly if restored areas are in the vicinity of existing populations. In association with grassland restoration projects within the species' range, it would be valuable to evaluate the degree of use by Henslow's sparrow.

There is a need to evaluate the potential for improving current grassland management practices, particularly on publicly-owned lands. Federal, State, and local governments, along with the private sector, need to coordinate and improve management efforts, and if needed develop grassland management guidelines. Herkert et al. (1993) compiled management guidelines for grassland birds in Illinois which outline rotational management programs, used to maintain a variety of grassland habitats (APPENDIX II). These guidelines do not emphasize Henslow's sparrow, but rather stress the conservation of grassland bird communities. These guidelines provide a good starting point for grassland management programs across the breeding range of Henslow's sparrow, although the management would have to be tailored to local conditions.

Currently, public lands are supporting most large, persistent populations of Henslow's sparrow. However, we also need to evaluate potential for habitat management on private lands, such as integrating grassland bird management considerations into CRP guidelines. Delisle and Savidge (1995) provided recommendations for improving the value of agricultural land retirement programs, such as CRP, for breeding grassland birds in the Great Plains. Opportunities to incorporate grassland bird management into agricultural practices, such as rotational grazing (Temple et al. 1995), should also be evaluated. We also need to consider incentives for landowners to manage grasslands suitable for Henslow's sparrow and other grassland birds. Private organizations, such as TNC, are currently managing grasslands which support populations of Henslow's sparrow. The efforts of these organizations need to be recognized and encouraged.

Several recent initiatives demonstrate that conservation and management of grassland birds are receiving increased attention. In October of 1995, the Sutton Avian Research Center and the Association of Field Ornithologists hosted the International Conference and Training Workshop on the Conservation and Ecology of Grassland Birds in Tulsa, Oklahoma. The State of Wisconsin is currently developing a statewide management plan for grassland birds (Sample and Mossman 1995). The Missouri Department of Conservation has developed an innovative program to try to restore unfragmented grassland habitat on publicly-owned properties along with surrounding private lands. Rosenberg and Wells (1995) developed a framework for a conservation plan for grassland birds in the Northeast, and noted that the Northeast Working Group of Partners in Flight established a Grassland Working Group in 1995. Herkert et al. (1995) outlined required elements for grassland bird conservation in the Midwest. These efforts are encouraging and provide a basis for continued progress toward integrated grassland management.

RESEARCH AND MONITORING NEEDS

MONITOR PERSISTENT BREEDING POPULATIONS

BBS data document that Henslow's sparrow populations have declined, but our understanding of the causes of declines is incomplete. As already discussed, habitat loss is suspected as the major cause of Henslow's sparrow population declines, but most researchers agree that other factors are also involved. As a starting point for evaluating population declines, we need to monitor the status of the largest, persistent populations (i.e. habitat is being maintained). Monitoring should be conducted annually if feasible. Table 2 lists (by state) the large, persistent populations of Henslow's sparrow that were documented in response to our request for information for this status assessment. An effort should be made to identify additional persistent populations in areas of suitable habitat and amend this list.

There is a need to coordinate and standardize monitoring of as many known large populations as is feasible. A database of all known or suspected breeding sites, and any research or monitoring efforts associated with those sites, should be established and maintained. Researchers frequently comment that Henslow's sparrow populations in any given area tend to fluctuate from year-to-year. It would be valuable to have monitoring data from known populations across the range of the species for a series of years to determine if disjunct populations exhibit similar trends in a given year (J. Herkert, pers. commun.).

Monitoring of known populations in conjunction with documentation of habitat management will improve our understanding of how management affects Henslow's sparrow populations. We need to compile information on the effects of the frequency and timing of grassland management activities (burning, mowing, grazing) on existing persistent populations.

BBS data for Henslow's sparrow will become increasingly difficult to interpret as populations continue to decline and become increasingly restricted to localized habitats (B. Peterjohn, pers. commun.). The species is already considered inadequately sampled by the BBS, based on current sampling criterion, to estimate population trends in most states. D. Sample (pers. commun.) noted: "Species like the Henslow's sparrow, with vocalizations that are soft and difficult to hear, localized distributions, and restricted to relatively rare habitat types are not likely to be well-monitored by the BBS. It is likely that special monitoring efforts will be required to track the status of this species over the long-term." There is a need to evaluate the feasibility of modifying or amending existing surveys to improve the potential to detect Henslow's sparrow.

Survey design must allow for the ephemeral nature of Henslow's sparrow habitat. Henslow's sparrow dependence on successional habitats complicates the development of a monitoring program for this species. We must recognize that populations of Henslow's sparrows will naturally decline in an area if suitable grassland habitat is not maintained. Furthermore, the species may colonize new sites if suitable habitat is created.

EVALUATE STATUS AND ECOLOGY ON WINTER RANGE

Our knowledge of the ecology and status of Henslow's sparrow on winter range is limited; however, ongoing research has provided valuable information. A systematic survey of suitable habitat on the winter range of Henslow's sparrow is needed to identify key wintering areas. Currently, the only known persistent winter populations of Henslow's sparrow are in the North Gulf Coastal Plain at the sites of ongoing research in Alabama (S. Plentovich, pers. commun.), Florida (Engstrom and McNair, in prep.), and Mississippi (M. Woodrey, pers. commun.).

Research into the habitat requirements and ecology of the species on winter range is also needed. Results and insights from the 3 ongoing projects will be valuable in determining research priorities for additional work on winter range.

OTHER RESEARCH AND MONITORING NEEDS

Long-term demographic data on Henslow's sparrow populations are lacking. For example, apparently there is only 1 study on annual productivity (based on 11 nests; Robins 1971a). Virtually nothing is known regarding sources of mortality. Several authors (Drilling 1985, Hands et al. 1989, Smith 1992, Austen et al. 1995) have listed Henslow's sparrow research needs. These lists may serve as a good starting point for prioritizing future research priorities. However, in planning research, we must balance the need for information with the potential threats posed by the research.

Research and monitoring efforts in the U.S. should be coordinated with efforts in Canada (Henslow's sparrow is listed as an endangered species and a draft recovery plan has been prepared). The formation of a binational committee on Henslow's sparrow is an element of the draft recovery plan for Canada.

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APPENDIX I

REQUEST FOR INFORMATION FOR THE HENSLOW'S SPARROW STATUS ASSESSMENT.

MAILING LIST FOR EACH FWS REGION FOLLOWS LETTER.

REGION 2 STATES CONTACTED: OK, TX

REGION 3 STATES CONTACTED: IL, IN, IA, MI, MN, MO, OH, WI

REGION 4 STATES CONTACTED: AL, AR, FL, GA, KY, LA, MS, NC, SC

REGION 5 STATES CONTACTED: CT, DE, ME, MD, MA, NH, NJ, NY,
PA, RI, VT, VA, WV

REGION 6 STATES CONTACTED: KS, NE, ND, SD

MAILING LISTS INCLUDE NOTES ON CHANGES IN CONTACTS
(AND ADDITIONAL CONTACTS) FOR FUTURE CORRESPONDENCE

February 21, 1995

« 1»

« 2»

« 3» **SEE MAILING LISTS FOR ADDRESSEES**

« 4»

« 5»

Dear « 6»:

The U.S. Fish and Wildlife Service (FWS) is currently conducting a status assessment for the Henslow's sparrow (*Ammodramus henslowii*). The purpose of the status assessment is to review and summarize existing information to determine if the species should be added to the Federal List of Threatened and Endangered Species. The species is currently listed as a Category 2 species in the Federal Register, Volume 56, No. 225, Thursday, Nov. 21, 1991, 50 CFR, Part 17, Endangered and Threatened Wildlife and Plants, Animal Notice of Review. Category 2 species are those for which information now in possession of the FWS indicates that listing the species as endangered or threatened is possibly appropriate, but conclusive data on biological vulnerability and threat are not currently available to support proposed rules.

We would appreciate any information you can provide regarding Henslow's sparrow. In particular, we request that you provide the following information if available:

1. Historic and current range of Henslow's sparrow (indicate breeding or wintering range) in your state. What is the source of this information?
2. Historic and current population estimates and/or trends in your state. If possible, please characterize the population as increasing, stable, or decreasing. What is the source of this information?
3. Are state range and population estimates for this species reliable and current? If not, what surveys or monitoring programs are needed to determine the status of this species in your state?
4. What is the current protective status of the Henslow's sparrow under state laws and regulations?
5. Are you aware of any current Henslow's sparrow research and/or monitoring efforts in your state?
6. Summarize any threats to the Henslow's sparrow in your state. Specifically, please assess the following 5 categories of threats:

- A.The present or threatened destruction, modification, or curtailment of its habitat or range. (Please be as specific as possible).
- B.Overutilization for commercial, recreation, scientific, or educational purposes.
- C.Disease or predation.
- D.Inadequacy of existing regulatory mechanisms.
- E.Other natural or manmade factors affecting its continued existence.

7.How would you characterize Henslow's sparrow habitat requirements and habitat condition in your state? We would also appreciate references (published or unpublished) which you can provide or recommend which discuss the biology and/or habitat requirements of this species.

Please provide any additional comments which you feel may be relevant to the Henslow's sparrow status assessment. Please contact us if new data become available after you respond to this request. If additional data are available in your state which are not provided in your reply to this request, please supply the name, address, and phone number of the individual we should contact.

This is going to be a big job for a large team of partners and we thank you in advance for your help in preparing the Henslow's sparrow status assessment. We hope to compile information that will be useful to the states, as well as the FWS, so that we can work together to best manage Henslow's sparrows. Please provide your comments and recommendations to Lori Pruitt at the Bloomington, Indiana Field Office by March 31, 1995. If you can not respond by that date, please let us know. If you have any questions or suggestions please call Lori at (812) 334-4261, extension 211.

Sincerely yours,

David C. Hudak
Supervisor

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