

# HENSLOW'S SPARROW CONSERVATION PLAN for NORTH CAROLINA

AUGUST 18, 2022



NORTH CAROLINA WILDLIFE RESOURCES COMMISSION



*Color-banded male Henslow's Sparrow captured at the Voice of America Game Land*



**North Carolina Wildlife Resources Commission**  
**1701 Mail Service Center**  
**Raleigh, N.C. 27599-1700**  
**[ncwildlife.org](http://ncwildlife.org)**

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## EXECUTIVE SUMMARY

The Henslow's Sparrow (*Centronyx henslowii*) is considered one of the most vulnerable nongame avian species in eastern North America. A state-listed endangered species during the breeding season, they are limited by a lack of suitable habitat at both landscape and local scales. They currently breed at only two locations in North Carolina — Voice of America (VOA) Game Land (formerly Site A) and VOA Site B — each a contiguous >1200-ha grassland habitat historically maintained with annual mowing. The N.C. Wildlife Resources Commission (NCWRC) acquired VOA Game Land in 2016 and has begun managing its habitat with prescribed fire; this population has been steadily increasing since consistent monitoring began in 2011. Site B remains a federally owned facility managed with mowing, and evidence suggests that this population is experiencing a severe population decline, although dedicated monitoring is urgently needed. The success of the species' conservation will depend heavily on the use of recurring disturbance, preferably prescribed fire, to control woody stem encroachment, as well as acquisition or long-term protection of additional sites to buffer the isolated populations from catastrophic events. Consistent population monitoring and research investigating the effects of fire on behavior and nesting phenology are necessary to help determine appropriate timing and intensity of management actions.

The objective of this plan — to protect and increase abundance and distribution of breeding Henslow's Sparrow populations and grassland habitats in North Carolina — will be achieved using a combination of consistent habitat management, population monitoring, research, and land protection and management using several approaches (e.g., acquisition, conservation easements, tax reduction incentives, and partnerships).



## BIOLOGICAL INFORMATION

The Henslow's Sparrow (HESP) currently breeds across the Great Lakes region of the eastern United States 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 HESP is found in North Carolina year-round. Currently, only two breeding populations are known to exist, one each in Beaufort and Pitt counties, east of Greenville, North Carolina. During winter, HESP are distributed across a greater number of sites, occupying a gradient of habitats structurally similar to where they breed, including longleaf pine forests. The focus of this conservation plan is solely on the state-listed breeding population of HESP; however, we expect that conservation efforts will benefit many other plants and animals that also depend on similar habitats. Our objectives will be achieved using a combination of consistent habitat management, population monitoring, novel research, and land acquisition.

### Listing Status

#### State

- Endangered<sup>1</sup>
- Species of Greatest Conservation Need<sup>2</sup>
- S1B, Critically Imperiled<sup>3</sup>

#### Federal/Global

- Bird of Management Concern<sup>4</sup>
- Species of Continental Concern, Yellow Rank (not declining but vulnerable)<sup>5</sup>
- Least Concern<sup>6</sup>

### Description and Taxonomic Classification

The HESP is small (10-13 cm, 11-15 g), short-tailed with a large head, thick bill, thin but dark stripes on the breast, an olive-green cast to the supercilium and nape, and rufous-red edges to wing coverts; a dark spot is visible on the posterior margin of the ear coverts (Rising 1996). They are sexually monomorphic with males measuring slightly larger than females.

The Henslow's Sparrow belongs to the order Passeriformes, family Passerellidae, and genus *Centronyx* (Chesser et al. 2021). Currently, two weakly differentiated subspecies that intergrade broadly are recognized — *C. h. henslowii* [western form] and *C. h. susurrans* [eastern form] — distinguished most notably by bill size and plumage color (Browning 1990, Pyle 1997). Extirpated populations from Texas, *C. h. houstonensis*, and South Dakota, *C. h. occidentalis*, were overall darker and paler in appearance, respectively; however, lack of morphological differences and a high degree of individual variation in plumage characteristics precluded classification of additional subspecies (Arnold 1983, Browning 1990).

<sup>1</sup>NC Wildlife Resources Commission, Protected Wildlife Species of North Carolina, 2017

<sup>2</sup>NC Wildlife Resources Commission, NC Wildlife Action Plan, 2015

<sup>3</sup>NC Natural Heritage Program, List of Rare Animal Species of North Carolina, 2018

<sup>4</sup>US Fish & Wildlife Service, Status Assessment and Conservation Plan for the Henslow's Sparrow, 2012

<sup>5</sup>Partners in Flight, Landbird Conservation Plan, 2016

<sup>6</sup>BirdLife International, The International Union of Conservation Red List, 2019

## Life History and Habitat

The life history and habitat needs of this species in North Carolina have received little attention. As a result, related information from other parts of the breeding range is referenced to help understand and anticipate its needs in North Carolina. The HESP is often described as secretive and inconspicuous with an unobtrusive song (Burhans 2002). Both sexes spend significant time on the ground, but males sing prominently from exposed perches while defending a territory. Nocturnal singing occurs in some populations; for instance, males from Jasper County, Illinois sang more often at night than sunrise (Walk et al. 2000). Their song is described as “tse-zlik” and under ideal conditions may be heard at a distance up to nearly 200 m (JPC, pers. obs., Bajema et al. 2001).



*Voice of America Game Land, May 2018. This unit last burned August 2016.*

Birds arrive on their breeding grounds from late March to April (Herkert 2002). Depending on latitude, nesting begins late April with early clutches completed in 15 to 20 days, and nesting activities continue into August (Hyde 1939, Burhans 2002). Nests are built in 4-6 days (Hyde 1939) with early egg laying dates ranging from 30 April (Indiana) to 2 June (Ontario) and late egg laying from 18 July (Iowa) to 24 August (Ontario) (Peck and James 1987, Melde and Koford 1996, Herkert et al. 2002); we expect that HESP in North Carolina begin nesting much earlier. Females attempt two broods with clutch size ranging from 2-5 eggs and incubation lasting 11-12 days (Hyde 1939, Burhans 2002, Herkert et al. 2002). Females alone incubate and brood, but both sexes feed young and dispose of fecal sacs (Robins 1971, Herkert et al. 2002). Weighted average (by sample size) of published apparent and Mayfield nest success was 51% and 29%, respectively (Giocomo et al. 2008).

Henslow's Sparrows select grasslands with a well-developed litter layer, relatively high cover of standing dead residual vegetation, tall, dense vegetation, generally low woody stem densities, and a high percentage of grass cover and scattered forbs for song perches (Herkert 2002, Herkert et al. 2002). They have no apparent preference for native, warm-season or exotic, cool-season grasses in Illinois or Missouri (Herkert 1994b, Jaster et al. 2013). In North Carolina, habitat use is related to abundance of *Carex stricta* (straight sedge) and *Sorghum halepense* (Johnsongrass); areas dominated by *Arundinaria gigantea* (giant cane) were avoided (Mangun and Kolb 2000). At Voice of America Game Land (VOAGL), males used habitat with greater cover of graminoids and standing dead vegetation but fewer woody stems compared to unused areas (NCWRC, unpub. data). Structural characteristics of microhabitat, field size (>30 ha, Range = 10-1084 ha), and patch isolation are the most important components of use. In regions with many large and contiguous patches of habitat, HESP can occupy smaller sites because their life requisites are met by this optimal habitat (Burhans 2002). However, HESP avoid nesting in habitat adjacent to tree lines (O'Leary and Nyberg 2000, Ellison et al. 2013).

The dynamic nature of this habitat type necessitates frequent disturbance to prevent succession of woody vegetation (Reinking 2002). Breeding populations elsewhere are found on pastures and hayed prairies managed without fire (Swengel 1996, Burhans 2002). In the mid-west, HESP are generally absent in the first growing season following a fire, reaching their highest densities 2-3 years after the last burn (Herkert 2002). Recent evidence from North Carolina suggests that habitat burned in the spring will not be used for breeding the summer immediately following the burn (Mangun and Kolb 2000), but habitat can be used for breeding following a late summer burn conducted the preceding year (NCWRC, unpub. data.). Occupancy at VOAGL may also be tied to soil type and topography, i.e., lower, wetter sites are preferred.

A photograph of a juvenile Henslow's Sparrow perched on a branch. The bird is facing left, showing its brown and yellow streaked plumage. The background is a clear blue sky. The bird is perched on a thin, brown branch with some green leaves and a reddish stem.

Henslow's Sparrows now occupy an extremely restricted breeding range in North Carolina with only two known breeding populations: VOA Game Land and VOA Site B, both east of Greenville, North Carolina.

*Juvenile Henslow's Sparrow, VOA Game Land, July 2018.*

## Distribution and Population Status

Before clearing of old-growth forests by European colonists, populations of HESP along the Atlantic Coast inhabited, and were possibly limited to, edges of coastal marshes (Hyde 1939). The earliest records for North Carolina are from 1932 of a small breeding population near Chapel Hill in a swampy meadow (Coker 1933, Odum and Taylor 1934, Hyde 1939). Encounters increased in coastal North Carolina counties in the mid to late 1980s, attributed to birds occupying recently harvested pocosin swamps and pine plantations (Lynch and LeGrand 1985). Sightings of this magnitude have since ceased, and no HESP have been counted on a Breeding Bird Survey (BBS) route in North Carolina since 1995 (Fig. 1, Pardieck et al. 2018).

Henslow's Sparrows now occupy an extremely restricted breeding range in North Carolina with only two known breeding populations: VOAGL (formerly VOA Site A) and VOA Site B, both east of Greenville, North Carolina in Beaufort and Pitt counties, respectively (Fig. 2). Unpublished USFWS records suggest that the VOA sites, each nearly 1200 ha, support the largest breeding populations east of the Mississippi River (Cooper 2007).

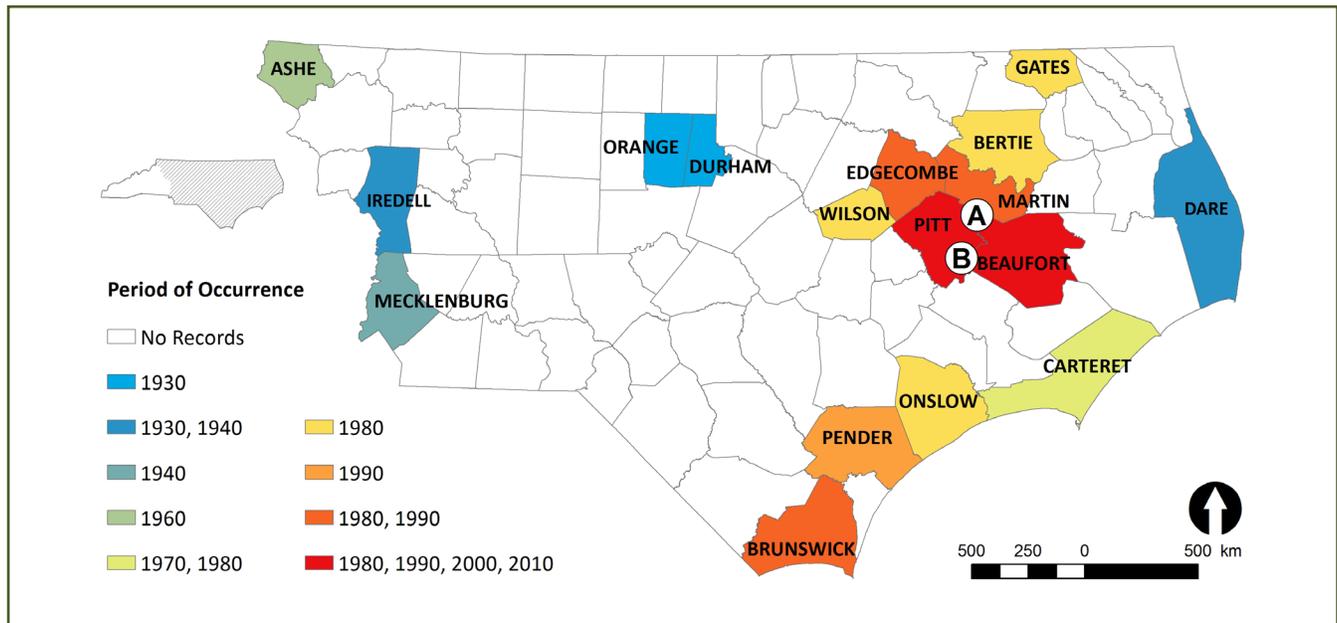


Figure 1. Breeding season records of Henslow's Sparrow in North Carolina by county per decade, including relative locations of (A) Voice of America Game Land and (B) Voice of America Site B (Coker 1933, Odum and Taylor 1934, Lynch and LeGrand 1985, Potter et al. 2006, NCWRC 2015, LeGrand et al. 2018, Pardieck et al. 2018)

John S. Wright (unpub. data, 1994-2000) reported a mean of 91.4 (SE  $\pm$  10.2, range = 67-144) and 58.0 (SE  $\pm$  6.8, range = 31- 91) singing males at VOAGL and B, respectively. Wright noted that HESP were completely absent from large areas of the VOA sites and formed loose colonies, as described elsewhere (Cully and Michaels 2000). Mangun and Kolb (2000) examined male use in 400- to 500-ha plots and estimated a mean of 49 territorial males at VOAGL but found only two males at Site B. NCWRC staff conducted standardized point count surveys (n = 45 survey points) at VOAGL from 2011-2018 during the breeding season. The mean number of males detected (48.4  $\pm$  8.3, Range = 17-78) and total number of stations with a detection (20.8  $\pm$  2.4, Range = 10-29) follow a positive trend over the eight years of surveys (Fig. 3). Point count surveys (n = 19 survey points) were established at Site B in 2015 and surveyed once; only two males were detected from

a single location, but consistent monitoring is needed. NCWRC data provide an estimated breeding season density of 0.32 sparrows/ha (95% CI = 0.19-0.58) at VOAGL, which is lower than the mean estimate of 0.41 sparrows/ha (Range = 0.11-0.97) reported from other studies elsewhere in the HESP range (Wiens 1969, Robins 1971, Herkert 1994a, Winter and Faaborg 1999, Mangun and Kolb 2000, Bajema et al. 2001, Monroe and Ritchison 2005, Cooper 2007, 2012).

Male territory size at VOAGL is estimated to be 0.3 ha (Range = 0.2-0.5) compared to 0.45 ha (Range = 0.3-0.7) elsewhere (Wiens 1969, Robins 1971, Monroe and Ritchison 2005, Jaster et al. 2013). Territory size can increase during the breeding season, possibly in response to density and habitat quality (Cooper 2012). Additional targeted searches for HESP were conducted from 25 June to 14 July 2001 throughout the Albemarle-Pamlico Peninsula in high marsh, firebreak, and early successional pocosin and pine plantation habitats but resulted in no encounters (Paxton and Watts 2002). This outcome was attributed to a lack of suitable habitat, but singing can decrease significantly after pairing occurs (Leftwich and Ritchison 2000), thereby potentially making males more difficult to detect during their sampling period. Males at VOAGL continue to sing into mid-July (NCWRC, unpub. data), which may be characteristic of its larger population.

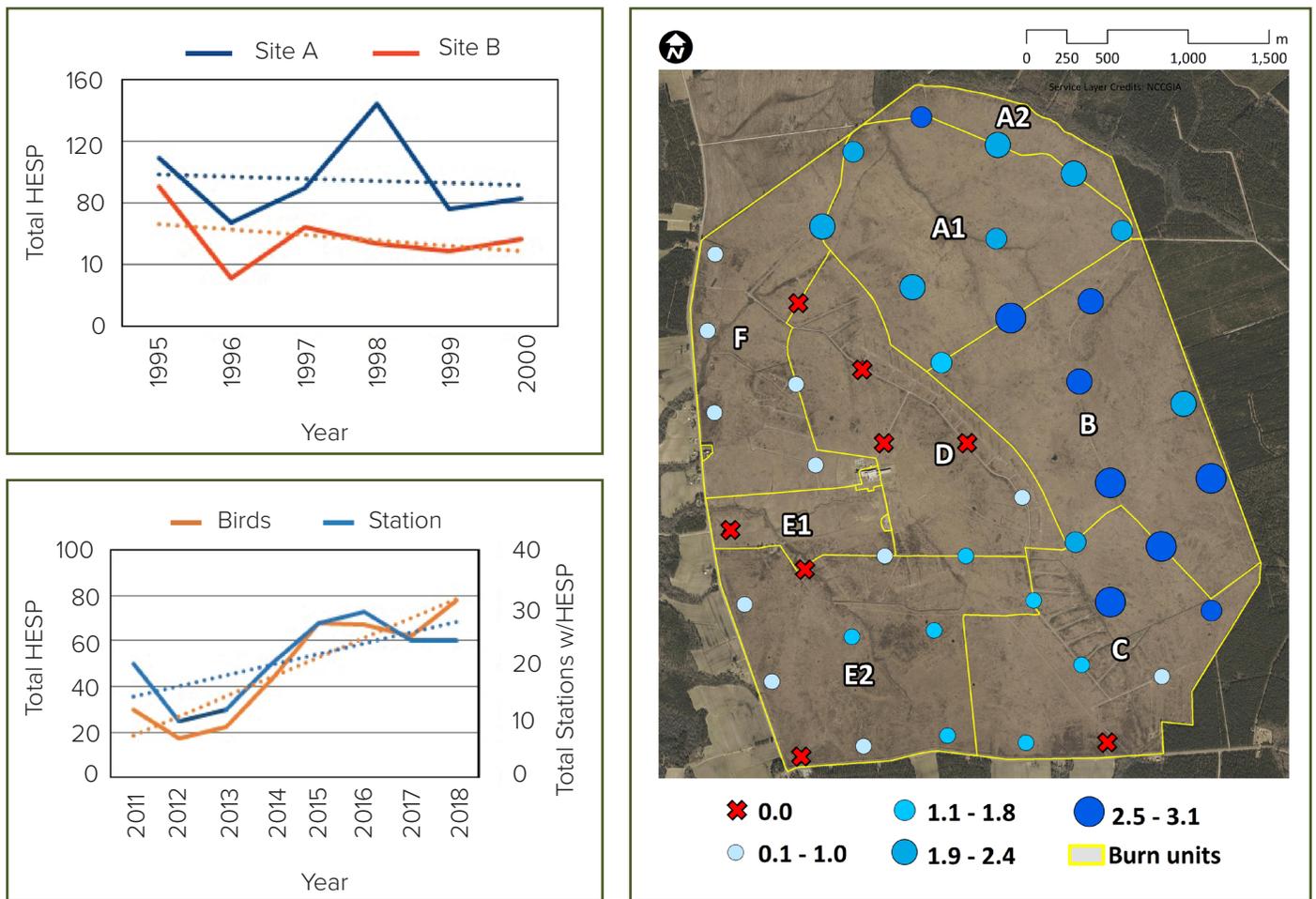


Figure 2. Total singing Henslow's Sparrows (HESP) in early surveys of both VOA sites (J. Wright, unpub. Data; top left graph) and from recent NCWRC point counts at VOAGL (bottom left graph). Survey methods differed between Wright and NCWRC. Average HESP (graduated by color) and total years found at a station (proportional by size), VOAGL, 2011-18 (right).

## THREAT ASSESSMENT

### Reason for Listing

The HESP is one of the most vulnerable nongame species in eastern North America (Burhans 2002). In North Carolina, it is listed as endangered (breeding season only) and is a Species of Greatest Conservation Need (SGCN) in the NC Wildlife Action Plan (NCWRC 2015, 2017).

### Present and Anticipated Threats

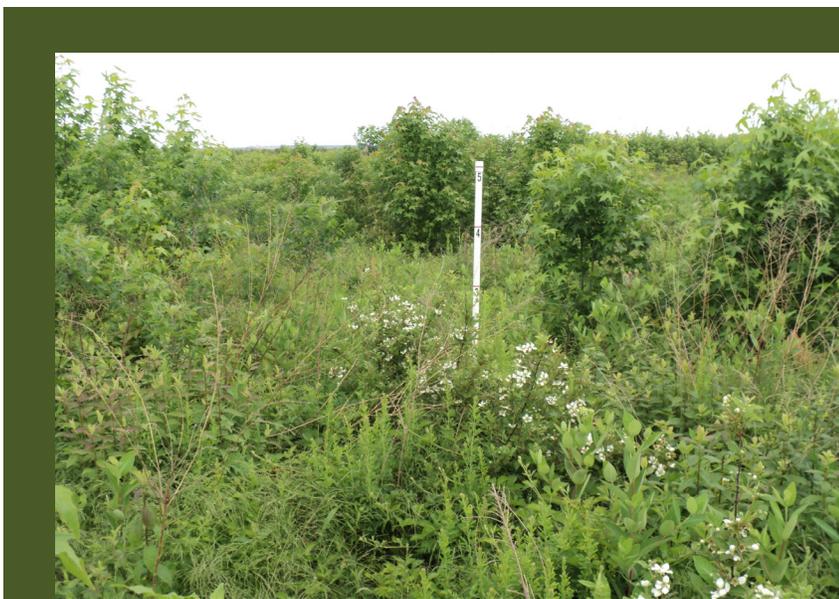
**Habitat requisites.**— The most deleterious threat to the HESP throughout its range is loss and degradation of grassland habitat from urban development, expansion of agricultural lands, and natural succession of vegetation due to fire suppression (Herkert 2002, Herkert et al. 2002). The HESP is limited by its need for large habitat patches, often >100 ha (247 ac) (Burhans 2002), which are extremely scarce in North Carolina where only 6.4% of the landscape in 2016 was classified as herbaceous or perennial grassland (U.S. Geological Survey 2016). Furthermore, it is unlikely that any ≥100-ha grassland area would be properly managed by private entities, without incentives, to sustain breeding populations for prolonged periods, primarily because such management is expensive and labor-intensive.

### Small population size, isolation, and restricted distribution.

— Such characteristics as these increase susceptibility of VOA sparrows to catastrophic events, such as wildfires, and climate change (DeWan et al. 2010). However, high levels of dispersal estimated by genetic, bio-acoustic, and stable isotope methods (Ibargüen 2004) suggest that inbreeding at these two sites would not be a concern following traditional one-migrant-per-generation principles (Mills and Allendorf 1996, Vucetich and Waite 2000).

### Brood parasitism and predation.

— The Henslow's Sparrow is an infrequent cowbird host with low to moderate parasitism frequencies (Peck and James 1987, Winter 1999, Reinking et al. 2000). Predators of HESP include mammals and snakes, which take both adults and nestlings (Hyde 1939, Robins 1971). This is considered a non-significant threat at this time and will not be addressed.



Example of woody stem encroachment at VOA Game Land in 2014. Pole marked in 1-ft. increments would not be visible today due to extensive growth if there was no disturbance from burning or other management.

**Contaminants.**— Bartuszevige et al. (2000) reported common avian grassland associates with detectable levels of organochlorine pesticide contamination; birds that frequented moist grassland habitats had significantly higher levels of these compounds. It is unknown if chemical contaminants affect HESP in North Carolina. This is considered a non-significant threat at this time and will not be addressed.

**Disease.**— Limited study of disease is available (Burhans 2002). Red mites (*Trombicula bisignata*) have been found on breeding specimens from Michigan (Hyde 1939). In Wisconsin, a 6.1% prevalence of pox-like lesions was reported and evidence of missing digits (9.7%) – potential sign of current or past infections of Avipoxvirus – which could be linked to temperature (Ellison et al. 2014). Ticks (*Ixodidae*) have been detected on two of fourteen males (14.2%) captured at VOAGL in 2016 and 2018, and one additional male was missing a portion of its right hallux (hind toe). This is considered a non-significant threat at this time and will not be addressed.

**Collisions.**— Mortality from collisions with man-made structures, such as wind turbines and communication towers, during migration is poorly understood but does occur (Longcore et al. 2013). This is considered a non-significant threat at this time and will not be addressed.

### **Historic and Ongoing Conservation Efforts**

NCWRC acquired VOA Site A in February 2016 from the Federal Lands to Parks program. The property was officially opened to the public as Voice of America Game Land in August 2017 and designated for permit hunts only. The HESP and maintenance of early successional grassland habitat are the focal points of management.

Voice of America Site B remains an active broadcasting, federally owned facility. Mowing continues biannually in its primary area (approx. 440 ha) and annually in the secondary areas (IBB station manager, pers. comm.). Henslow's Sparrows are found only in the secondary areas. Specific timing of this practice is unclear but has commenced as early as July in recent years.

## CONSERVATION GOAL, OBJECTIVES, and ACTIONS

### Conservation Goal

The overarching conservation goal for the HESP is to protect and increase abundance and distribution of breeding populations and their associated grassland habitats in North Carolina.

### Conservation Objectives

1. Acquire, protect, and manage early successional, grassland **habitat** in North Carolina.
2. Estimate **population** carrying capacity of VOA Game Land using best available estimates from annual surveys and HESP response to habitat management.
3. Engage with **Voice of America Site B** to promote conservation of HESP and early successional habitat.
4. Conduct studies to increase understanding of HESP needs in North Carolina.

## CONSERVATION ACTIONS

### 1. Habitat Protection and Management

#### A. Voice of America Game Land

1. Prohibit development, such as additional infrastructure or impervious surfaces, but not activities required for habitat management, on eastern half of property. Restrict development elsewhere until sufficient evidence indicates activities will not adversely impact colonization of remaining areas.
2. Maintain rotational disturbance of vegetation, including but not limited to prescribed burning, that will promote and enhance native vegetation.
  - a. Avoid disturbing occupied habitat during the nesting season, April-July, unless fire is needed to maintain the early successional habitat.
3. Apply mechanical or chemical treatments to eliminate pockets of dense or large woody stems.
  - a. Seek alternate funding sources for tree control treatments beyond prescribed burning to enable contracting for less WRC staff commitment.
4. Restore native grasses known to provide necessary structural characteristics, especially in areas where they are currently deficient or have been degraded.

#### B. Other Sites

1. Continue to support and collaborate with public agencies and private landowners to acquire or manage early successional habitats, especially those near established populations.
2. Restore and protect longleaf pine savannah forests, which HESP require during the non-breeding season, to increase annual survivorship and recruitment of migrants into breeding population gene pool.

## **2. Population Management**

### **A. Surveys and monitoring**

1. Continue annual point count surveys of singing males at VOAGL to provide coarse abundance, trend, and distributional information. Modeling efforts using these data may indicate less frequent surveys are needed.
2. Initiate similar, recurring surveys at VOA Site B.
3. Support efforts to expand surveys to locate new breeding populations in potentially suitable habitat, such as large abandoned or fallow farm fields, clear-cuts, and peripheries of tactical landing zones on military installations, using site visits and remotely sensed data.

## **3. Voice of America Site B**

1. Revisit unsigned Memorandum of Understanding; help develop plan to stabilize and grow HESP population.
2. Confirm that Henslow's Sparrow habitat continues to receive annual mowing during the non-breeding season.
3. Work with site managers to propose using prescribed fire or lengthening the current mowing rotation in all or a portion of the secondary area.
4. Identify alternative funding sources or more affordable approaches to offset management costs while protecting transmission lines.
5. As permitted, apply management prescriptions and guidelines used at VOAGL.
6. Prepare for potential future offering and transfer to the state of North Carolina.

## **4. Conduct Research**

1. Determine if unoccupied areas on VOAGL (based on surveys and monitoring of HESP and of habitat conditions relative to management activities) are unsuitable because of management strategy or other environmental or man-made conditions, e.g., soil type, hydrology, elevation profile, edge effects.
2. Examine genetic markers using novel and modern techniques to provide context to the HESP's evolutionary history and examine signatures of gene flow and changes in the breeding population size over time.
3. Quantify peak occupancy and detectability using repeated visits throughout breeding season.
4. Determine impacts of disturbance type and frequency on behavior, including nesting phenology and success.
5. Estimate territory size to assist with abundance estimates.
6. During capture and handling of HESP for research purposes, examine and sample for Avipoxvirus infection and ectoparasite infestation to confirm assumption of disease as an insignificant population effect.

## Incentives (Tax break, Cost-sharing)

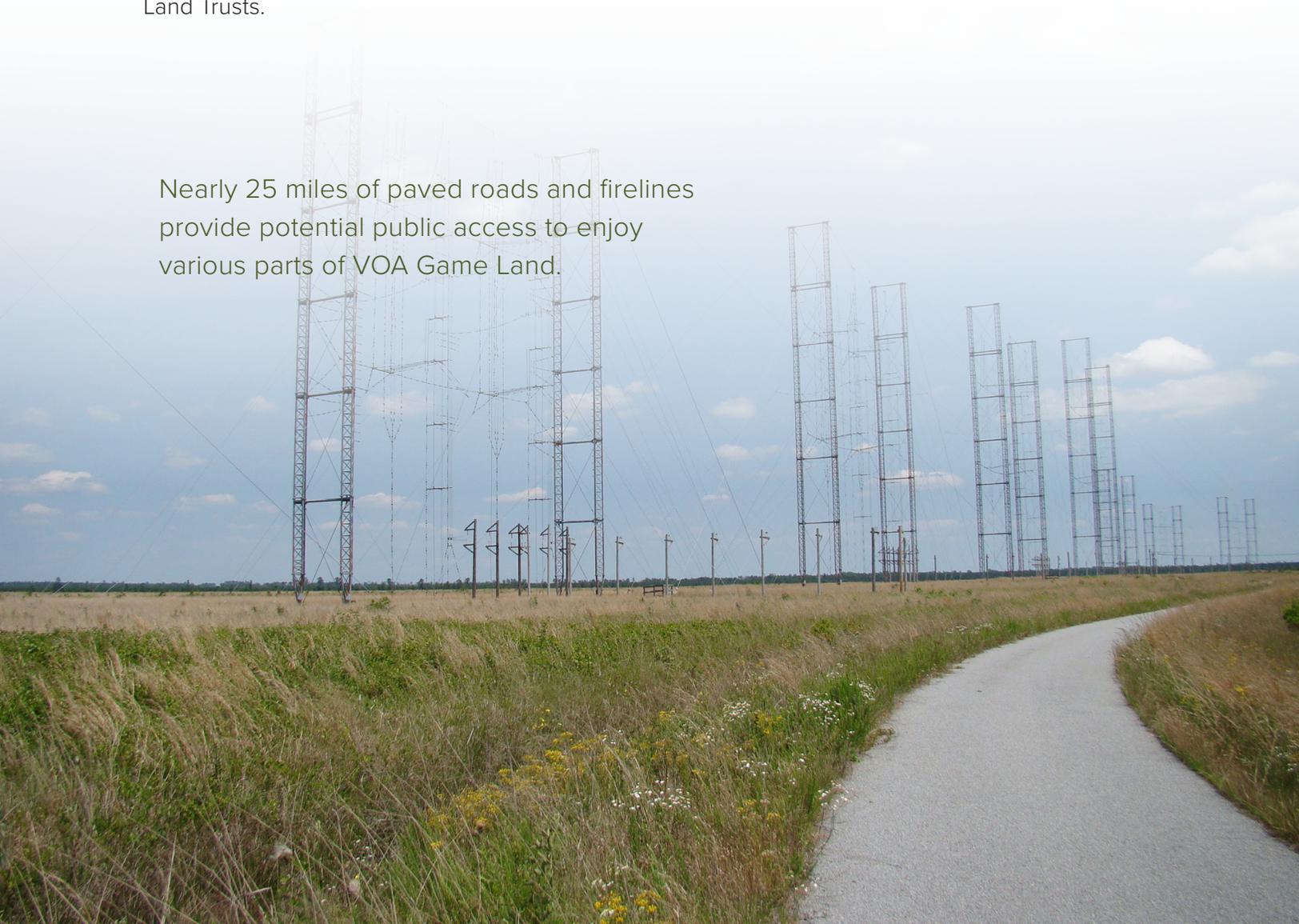
*Private landowners play a vital role in all species conservation plans by creating or enhancing habitat. The following programs are available to encourage meaningful and long-term habitat protection occurring on private property:*

**Wildlife Conservation Land Program.** Reduces tax assessment for landowners with 20-800 qualifying acres, including early successional habitat, managed under a written wildlife habitat conservation agreement that addresses needs of species designated as state endangered, threatened, or special concern. Administered by NCWRC.

**Present-Use Value.** Lowers classification from assessed market value for landowners with at least one 10-acre tract of agricultural land that produced \$1,000 average gross income over three preceding years. Administered by NC Department of Revenue.

**Conservation Easement.** Provides federal tax benefits to landowners who donate conservation agreements on properties that protect natural habitats for fish, wildlife, and plants and preserve land for public outdoor recreation, educational opportunities, or as historically significant. Administered by non-profit Land Trusts.

Nearly 25 miles of paved roads and firelines provide potential public access to enjoy various parts of VOA Game Land.



**Conservation Reserve Program.** Yearly rental payments with 10- to 15-year contracts to private landowners who remove environmentally sensitive land from agricultural production, and plant species that improve environmental health and quality. Recent increases in breeding populations in other parts of the Henslow's Sparrow range appear to be associated with creation of undisturbed grassland habitat through this program (Herkert 2007). Administered by Farm Service Agency.

**Environmental Quality Incentives Program.** Financial assistance covers partial costs associated with implementing conservation practices on cropland, rangeland, pastureland. Administered by Natural Resources Conservation Service.

**Partners for Fish and Wildlife.** Cost-sharing reimbursement to landowners who implement a cooperative agreement, including native grass and forb planting, that benefits rare, threatened and endangered species. Administered by U.S. Fish and Wildlife Service.

## Education and Outreach

1. Provide routine status updates targeting various outlets, such as professional journals, Carolina Bird Club, NC Partners in Flight, Cape Fear Arch Conservation Collaboration, Onslow Bight Conservation Forum, and other interested academic and citizen groups.
2. Register VOAGL with the NC Coastal Birding Trail and the National Audubon Society's Important Bird Areas Program.
3. Develop a bird checklist for VOAGL.
4. Encourage birders to enter observations into eBird ([www.ebird.org](http://www.ebird.org)).

## Regulations

No state regulations are proposed at this time. Henslow's Sparrows are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703–712), and is a state listed endangered species [15A NCAC 101.0103(b)(2)(D)].

## GLOSSARY

**Avipoxvirus:** A viral infection characterized by proliferative lesions of the skin and diphtheric membranes of the respiratory tract, mouth and oesophagus, which affects over 232 species in 23 orders of birds.

**Conservation easement:** A restriction placed on a piece of property to protect its associated resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity while the land remains in private hands.

**Cool-season grass:** Types of grasses that grow more slowly during a longer period and make most of their active growth during fall and spring months when the minimum daily temperature is approximately 40° F. These species can grow in dense mats that are almost impenetrable by wildlife and consequently are poor providers of nesting and escape cover for many species.

**Grassland:** Any upland habitat in which the principal vegetation is grasses.

**Habitat:** A physical location with the resources and conditions present that produce occupancy— including survival and reproduction, or both—by a given organism.

**Litter:** Dead or decomposing plant material, including leaves, bark, needles, and twigs, that have fallen and accumulate on the ground.

**Microhabitat:** Small-scale physical and vegetation requirements of an organism or a community of organisms.

**Monomorphic:** Having the same basic appearance throughout the life cycle.

**Population:** Group of individuals of a single species in a defined area.

**Prescribed fire:** A planned fire used to meet habitat management objectives; also referred to as a “controlled burn”.

**Subspecies:** A population of species in which individuals show the same structurally definable variation from other populations of the same species but are normally separated geographically or by habitat use.

**Territory:** Any area defended and used by an organism.

**Warm-season grass:** Types of grasses that grow more rapidly during a relatively short period of time with photosynthetic potential much higher than that of cool-season grasses. They make most of their active growth when minimum daily temperatures reach approximately 60° F and are dormant during autumn and winter. Once established, they are drought tolerant and almost completely disease free.

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Matthew Winks