

# PRELIMINARY STUDIES OF THE DUSKY SEASIDE SPARROW ON THE ST. JOHNS NATIONAL WILDLIFE REFUGE

by

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## ABSTRACT

Numbers, movements, and habitat of the Dusky Seaside Sparrow (*Ammodramos maritima nigrescens*) were investigated during 1972-1973 on the newly-established St. Johns National Wildlife Refuge. Numbers declined from 110 males in 1972 to 54 in 1973. This decrease was probably due to 2 winter wildfires. Observations of banded individuals indicated that the bird is generally sedentary throughout the year and that preferred winter habitat is similar to breeding habitat. Cordgrass (*Spartina bakerii*), with a mean percent cover of  $38.1 \pm 16.3$ , was dominant over the 22 other plant species on the territories. Cover mapping showed that although 20 percent of the refuge had preferred vegetation types, only about 10 percent (400 acres) was actually available as preferred habitat.

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The U.S. Bureau of Sport Fisheries and Wildlife is in the process of acquiring slightly over 4,000 acres as a refuge for the Dusky Seaside Sparrow (*Ammodramos maritima nigrescens*). Life history and habitat requirement studies are presently being conducted so that management procedures may be initiated to maintain this subspecies. This paper is a report on initial studies begun in 1972 of numbers, movements, and habitat on the refuge.

The Dusky Seaside Sparrow, classified by the Bureau as an endangered species (1973), has one of the most restricted ranges of any North American bird. It is primarily limited to the eastern drainage of the St. Johns River basin west and southwest of Titusville in Brevard County, Florida, in an area roughly 32- x 5- km.

The salt marshes of Merritt Island, near Titusville, once contained hundreds of duskies, but continued inundation of high marsh by mosquito control impoundments has caused a drastic reduction in their numbers. Such plants as cordgrass (*Spartina bakerii*), salt grass (*Distichlis spicata*), saltwort (*Batis maritima*), and rush (*Juncus roemerianus*) have been replaced by cattail (*Typha* spp.), and submergent aquatics. For a description of the Merritt Island marshes prior to and after impoundment, see Trost (1968). This area is now part of the Merritt Island National Wildlife Refuge and management practices in cooperation with Brevard County Mosquito Control District are designed to maintain at least a remnant population of duskies on the island.

Although the dusky was first discovered on the St. Johns marshes in 1872 by Maynard (Trost 1968), this area was long neglected since birds were so plentiful on Merritt Island. In spring 1968, Sharp conducted a census of the St. Johns and estimated 894 males were present (Sharp 1968). Due to the precarious status of the dusky and continued loss of habitat by drainage, improved pasture, housing developments, and highways, the Bureau established the St. Johns National Wildlife Refuge (Fig. 1).

Although some information on life history and general habitat of the dusky has been reported by other workers (Nicholson 1928, 1929; Trost 1968; and Sharp 1968, 1969, 1970), many gaps exist in our knowledge of this bird and its habitat, particularly on the St. Johns.

I thank the staff of the Merritt Island National Wildlife Refuge for their help in much of the field work. Brian Sharp of the Patuxent Wildlife Research Center assisted in the 1972 census and Paul Sykes, Bureau of Sport Fisheries and Wildlife Research Biologist, gave helpful advice on much of the study.

Plant nomenclature follows Long and Lakela (1971).

## THE STUDY AREA

The refuge is relatively flat terrain with elevations ranging from about 8 feet above sea level on the western boundary to slightly above 15 feet on the eastern edge. Small ponds, salt pans, scattered palms (*Sabal palmetto*), and hammocks are dispersed throughout the wet savannah aspect, dominated by *Spartina*. Table 1 shows acreage occupied by vegetative types. For a description of the entire upper St. Johns, see Sincock (1958).

This region of the St. Johns basin was a lagoon when much of the area was covered by the sea during the Pleistocene Epoch and still remains a slightly brackish marsh. Soils range from sand to muck, frequently with sandy surface soils high in organic matter and clayey subsoils within 40 inches. The climate is humid - subtropical with an average annual rainfall of 55 inches (Brown et al. 1962).

Dominant land use throughout the area is cattle grazing, but ditches were dug on the refuge site in the early 1940's in an attempt to drain and convert the area to a truck farm. This farm was soon abandoned as the ditches were ineffectual and the land was again used for grazing. Cattle were taken off the refuge during the past 5 to 10 years, and no economic use has been made of the area. The Bureau began land acquisition in 1970 and about half the refuge has been acquired.

## METHODS AND MATERIALS

Dusky populations were estimated by counting singing males or obvious pairs in early morning hours of May and June and plotting these males on field maps or aerial photos. Females were not counted since they tend to be secretive and frequently remained hidden in the grass. The entire 4,000 acres was traversed in 1972 and 1973, and areas where concentrations of duskies were found were visited several times. Normally, half of a section (320 acres) could be censused between 0630 and 0930 EDT when the birds were active and easily spotted.

To study movements, duskies were mist netted and banded with Bureau aluminum and colored plastic leg bands so that each bird had a unique color combination. The procedure used was for 2 people to walk through the marsh until a dusky was sighted. A 1¼-inch mesh, 7- x 42- foot mist net was then erected between 2 poles. The 2 people then drove the dusky into the net by repeatedly flushing the bird. From 5 September 1972 to 7 March 1973, 51 individuals were captured at least once. Spring and summer 1973 observations of banded birds were made with 8 x 50 binoculars and a variable 15 x to 60 x spotting scope.

Cover mapping of the refuge was aided by the use of 1:4800 scale color and color infrared aerial photos supplied by the National Aeronautics and Space Administration, Kennedy Space Center, Florida. Vegetation types were coded and delineated directly on the photo transparencies. A planimeter and dot grids were used to measure acres in each type.

Territorial habitat preferences were determined by repeatedly flushing singing males and marking singing sites with plastic flagging. After about 20 consecutive flush points were established the territory outlines were drawn on a field map (Wiens 1969). Vegetation in the territories was sampled by line transects 15 meters apart. Plots were established by placing a wooden frame 20- x 50- cm. (inside dimensions) at 5 meter intervals along a steel tape. Percent coverage by

species was recorded on at least 40 plots per territory. Class ranges used for percent ground cover were 0-5, 5-25, 20-50, 50-75, 75-95, 95-100 (Daubenmire 1959). In addition, an estimate of horizontal vegetation density was obtained by using a density board modified from Wiens (1969). The board was 9 cm. wide and divided lengthwise into 10 cm. intervals. It was placed at each plot and the observer stood about 5 meters away to read the height above which the board was 90 percent obscured by vegetation.

## RESULTS AND DISCUSSION

### *Census and Movements.*

In spring 1972, 110 males were counted on the refuge, while in May 1973 only 54 males were observed. Sharp (1970) recorded 144 males in the same area in 1968 and 143 in 1970. The drastic decline in 1973 was primarily due to 2 wildfires which occurred in December 1972 and January 1973, burning about 1700 acres. Although small unburned patches of *Spartina* remained after the December fire (a night headfire pushed by winds up to 40 mph), the January fire was a much cleaner burn and left few unburned patches.

Displacement of duskies from burned areas apparently occurred since I searched these areas frequently but did not find any birds until early May when they suddenly were evident and defending territories. It is possible that they remained in the burned area and occupied unburned *Spartina* patches or shrub thickets. It is more likely that they moved to nearby unburned cover. Three birds banded on the area prior to the burn were recaptured in January in unburned cover, about 900 meters south of their original location.

Another problem on some parts of the refuge is shrub encroachment, mainly groundsel (*Baccharis angustifolia*) and wax myrtle (*Myrica cerifera*). Both these plants are common to the St. Johns but may have become more widespread due to droughts and a lowered water table in recent years. One section in which Sharp (Personal communication) found 31 male duskies in 1968 contained only 6 in 1972 and 3 in 1973. *Myrica* has increased from a few scattered shrubs to a dominant position over *Spartina*. This area will be control burned in November 1973 in an effort to reduce the brush.

Of 51 duskies originally banded, 16 were later recaptured prior to the spring breeding season and 14 were observed between April and June. From these observations, it appears that duskies are highly sedentary, at least in the fall. All recaptures of birds in October and November were within 200 meters of their original September capture sites. Trost (1968) felt that duskies on Merritt Island dispersed throughout the marshes in fall and winter and ranged up to 32 km. from the breeding grounds even though he never saw a banded dusky away from the original banding vicinity. From my limited observations on the St. Johns, I believe that, barring displacement factors such as large fires, they tend to remain close to the breeding grounds in similar habitat throughout the year.

Of 14 banded birds (8 males and 6 females) observed on territories, 6 males and 2 females were within 100 meters of their capture sites the previous fall. The longest observed movement was a female on territory about 800 meters from the capture site. Trost (1968) found that males returned to the same territories year after year on Merritt Island but had no data on females.

Trees appeared to exert an isolating influence on duskies. All recorded movements were between areas connected by marsh, broken only by ditches or widely scattered trees. No movements were recorded between areas of preferred habitat which were separated by stands of trees.

### *Cover mapping.*

Color infrared aerial photos were far superior to conventional color or black and white imagery, although the color photos were useful in providing sup-

plemental or substantive data. Moisture differences, vegetative types, and relative grass densities were readily discernible after ground truth data were compared to the photos. Photos obtained from a November flight were more useful than those from an April test flight due to the sharp contrast between woody and nonwoody vegetation. By November, grass growth had slowed or ceased but woody vegetation still exhibited a bright red color on the infrareds.

Table 1 contains the descriptions and areas of cover types. Although 794 acres of preferred dusky cover comprising 20 percent of the refuge were indicated, this is not a true picture of available habitat for duskies. Since the birds do not inhabit areas within about 50 meters of trees and prefer unbroken grass dominated by *Spartina* (Table 2), trees and proximity to highways reduced available preferred habitat to about 400 acres (10 percent of the total area). Duskies were found occasionally in types 2 and 2 - 3 but the scarcity of birds in these wetter areas suggests that they were not preferred sites.

#### *Breeding Habitat.*

Sizes of 14 territories ranged from .40 acres to 2.62 acres and averaged 1.26 acres. Sharp (1968) estimated an average of 3 acres per male on adjacent areas in the St. Johns whereas Trost (1968) reported that Merritt Island duskies defended a roughly circular territory about 100 yards in diameter.

Table 2 shows percent coverage and frequency of vegetation on 7 territories. As was expected, *Spartina*, with a mean percent cover of  $38.1 \pm 16.3$  (confidence intervals at 95 percent level), completely dominated the territories, only 3 other species had cover values of over 1 percent. Sharp (1968) examined 20 m<sup>2</sup> quadrats and also found *Spartina* much greater in density and frequency than other species. He found no *Fimbristylis* or *Cladium* and little *Juncus*, all of which were prominent on my plots.

Horizontal density of vegetation on the territories, as measured by the cover board, was  $50 \pm 20$  cm.

Before we can effectively manage this refuge for the Dusky Seaside Sparrow, an understanding of the bird's ecology is essential, I feel that our study has already filled some of the many gaps in our knowledge of the dusky on the St. Johns.

Table 1. Cover types on the St. Johns National Wildlife Refuge.

Cover Type	Description	Acres	Percent Total Area
1	Ponds with aquatic vegetation mainly coontail ( <i>Ceratophyllum demersum</i> ), muskgrass ( <i>Chara</i> spp.), bladderwort ( <i>Utricularia</i> spp.) and cattail ( <i>Typha</i> spp.)	163	4
2	Wet areas shallowly flooded much of the year; dominant vegetation - sawgrass ( <i>Cladium jamaicensis</i> ), cattail, rush ( <i>Juncus roemerianus</i> ) and dense cordgrass ( <i>Spartina bakerii</i> )	1059	26
3	Moist soils occasionally flooded after heavy rains; dominant vegetation medium dense cordgrass; preferred Dusky Seaside Sparrow cover	794	20
4	Dry, often sandy areas; characteristic vegetation short, sparse cordgrass, broomsedge ( <i>Andropogon</i> spp.) and forbs	576	14
5	Hammocks and clumps of trees consisting mainly of palm ( <i>Sabal palmetto</i> ), live oak ( <i>Quercus virginiana</i> ) and slash pine ( <i>Pinus elliotii</i> )	355	9
6	Salt pans; highly saline areas with halophytic plants such as glasswort ( <i>Salicornia</i> spp.), sea purslane ( <i>Sesuvium portulacastrum</i> ), dropseed ( <i>Sporobolus virginicus</i> ) and salt grass ( <i>Distichlis spicata</i> )	64	2
7	Dense thickets of groundsel ( <i>Baccharis angustifolia</i> ) or wax myrtle ( <i>Myrica cerifera</i> )	446	11
8	Borrow pits and spoil	55	1
9	Power line right-of-way	31	1
2-3	Mixture of wet-moist types	275	7
3-4	Mixture of moist-dry types	148	4
3-7	Moist with thickets dispersed throughout	81	2

Table 2. Plant species cover and frequency of 317-1/10 m<sup>2</sup> plots on 7 Dusky Seaside Sparrow territories.

Species	Mean Percent Cover	Mean Percent Frequency
<i>Spartina bakerii</i>	38.1	93.7
<i>Juncus roemerianus</i>	2.6	16.1
<i>Fimbristylis castanea</i>	1.5	32.8
<i>Cladium jamaicensis</i>	1.1	12.9
<i>Baccharis angustifolia</i>	.8	5.6
<i>Solidago leavenworthii</i>	.7	7.6
<i>Crinum americanum</i>	.7	4.4
<i>Ipomoea sagittata</i>	.5	13.2
<i>Distichlis spicata</i>	.4	8.2
<i>Centella asiatica</i>	.4	5.0
<i>Mikania scandens</i>	.3	5.0
<i>Muhlenbergia capillaris</i>	.3	3.1
<i>Sesuvium portulacastrum</i>	.3	3.1
<i>Bacopa monnieri</i>	.2	2.8
<i>Cynanchum palustre</i>	.1	5.4
<i>Sabatia</i> sp.	Tr <sup>a</sup>	2.2
<i>Setaria geniculata</i>	Tr	1.6
<i>Juncus biflorus</i>	Tr	.6
<i>Lycium carolinianum</i>	Tr	.3
<i>Eleocharis parvula</i>	Tr	.3
<i>Andropogon virginicus</i>	Tr	.3
<i>Dichromena</i> sp.	Tr	.3
<i>Pluchea rosea</i>	Tr	.3

<sup>a</sup>Indicates less than .1 percent cover.

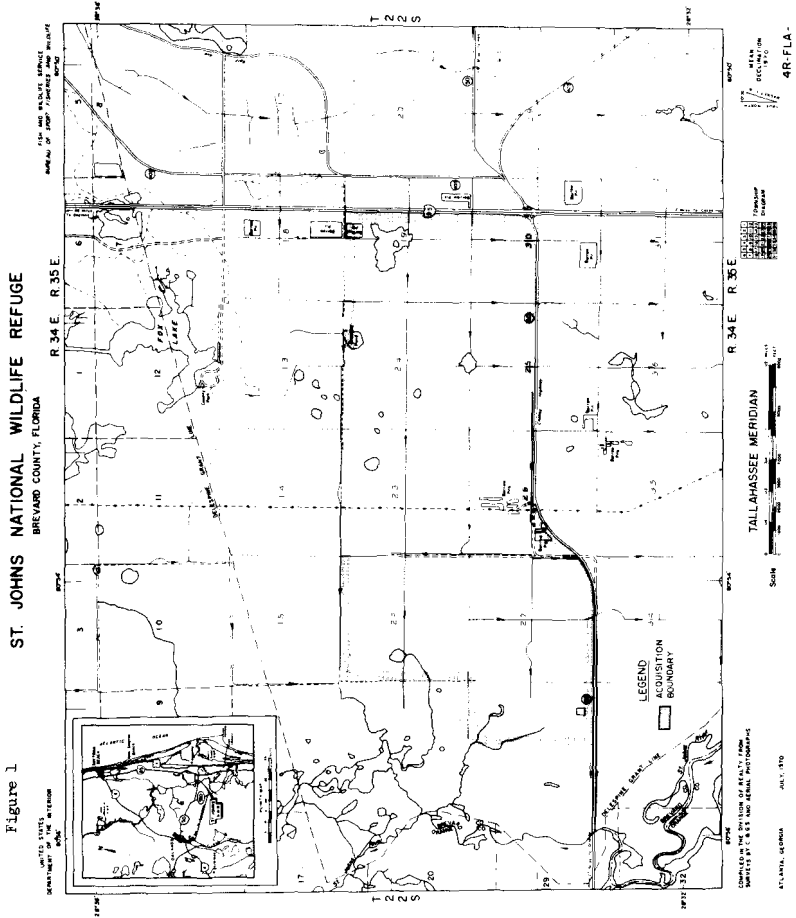


Figure 1. St. Johns National Wildlife Refuge, Brevard County, Florida.

## LITERATURE CITED

- Brown, D. W., W. E. Kenner, J. W. Crooks, and J. B. Foster. 1962. Water resources of Brevard County, Florida. Florida Geol. Surv. Rep. of Invest. No. 8. 104 pp.
- Daubenmire, R. 1959. A canopy-coverage method of vegetational analysis. Northwest Sc. 33(1):43-64.
- Long, R. W. and O. Lakela. 1971. A flora of tropical Florida. Univ. of Miami Press, Coral Gables. 962 pp.
- Nicholson, D. J. 1928. Nesting habits of the seaside sparrows in Florida. Wilson Bull. 40:224-237.
- . 1929. Breeding of the dusky seaside sparrow on the mainland of Florida. Auk. 46:391.
- Sharp, B. 1968. Numbers, distribution, and management of the dusky seaside sparrow. M.S. Thesis. Univ. of Wisconsin. 76 pp.
- . 1969. Conservation of the dusky seaside sparrow on Merritt Island, Florida. Bio. Conserv. 1(2):175-176.
- . 1970. A population estimate of the dusky seaside sparrow. Wilson Bull. 8(2):158-166.
- Sincock, J. L. 1958. Waterfowl ecology in the St. Johns River Valley as related to the proposed conservation areas and changes in the hydrology from Lake Harney to Ft. Pierce, Florida. Florida Game and Fresh Water Fish Comm. P-R Proj. Rep., W-19-R, 122 pp. Mimeogr.
- Trost, C. H. 1968. Dusky seaside sparrow. Pages 849-859 in A. C. Bent (O. L. Austin ed.). Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. U. S. Natl. Mus. Bull. 237: 1889 pp.
- U. S. Bureau of Sport Fisheries and Wildlife. 1973. Threatened wildlife of the United States. Resource Publ. 114. 289 pp.
- Wiens, J. A. 1969. An approach to the study of ecological relationships among grassland birds. Ornithol. Monogr. No. 8 93 pp.