

Ecological and Genetic Diversity in the Seaside Sparrow

The Seaside Sparrow (*Ammodramus maritimus*), a sparrow that is almost always found in salt and brackish marshes, occurs along the Atlantic Coast of the United States from New Hampshire to central Florida (where it is now extirpated as a breeder), and along the Gulf Coast from central Florida to central Texas. As a species that can be common in maritime wetlands, the Seaside

Sparrow has the potential to be a good “indicator species” of the health of salt-marshes: Where the marshes are in good condition, the birds are abundant; where the marshes are degraded, they are less common or absent. Degradation of habitat—walling, diking, draining, and pollution—are the principal threats to this species, having resulted in the extirpation of multiple populations, including several named taxa. Along the Atlantic coast, where the species has been closely studied (Woolfenden 1956; Norris 1968; Post 1970, 1981; Post et al. 1983; DeRagon 1988 in Post and Greenlaw 1994), densities, measured as males per hectare, range from 0.6–1.0 in degraded habitats to 0.3–20.0 in undrained and unaltered marshes.

First described and named by Alexander Wilson, the “Father of American Ornithology”, in 1811, on the basis of specimens from southern New Jersey (Great Egg Harbor), the Seaside Sparrow is a polytypic species (i.e., a species showing geographic variation, with more than one named subspecies) with a complex taxonomic history (Austin 1983). In the fifth edition (1957) of the AOU *Check-list of North American Birds*, three species of Seaside Sparrows are recognized: the Seaside Sparrow, the Dusky Seaside Sparrow, and the Cape Sable Seaside Sparrow. On the basis of changes of taxonomic philosophy, these three were “lumped” in subsequent editions of the *Check-list*, but this

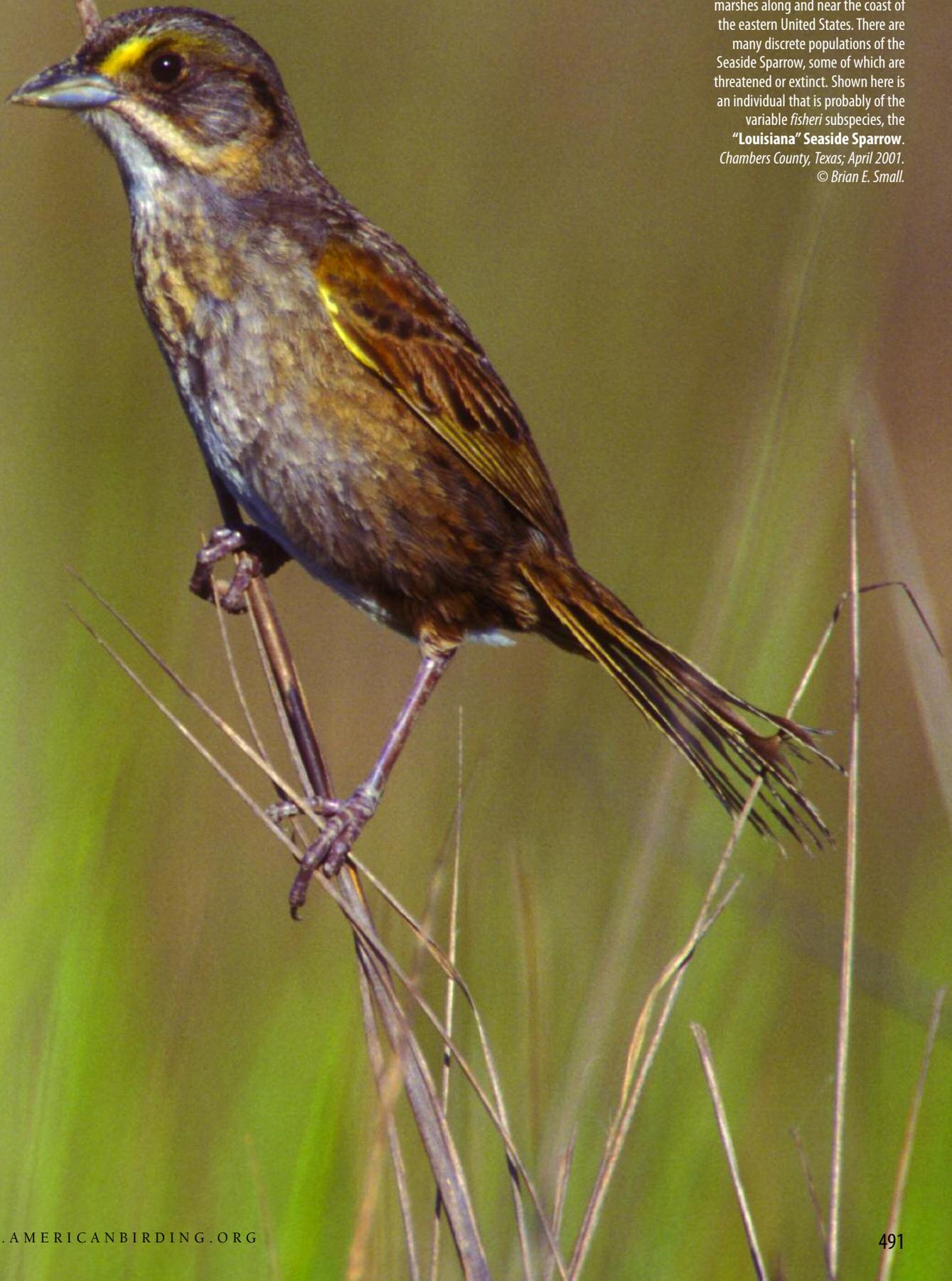
James D. Rising

Department of Zoology

University of Toronto

Toronto ON M5S 3G5

rising@zoo.utoronto.ca



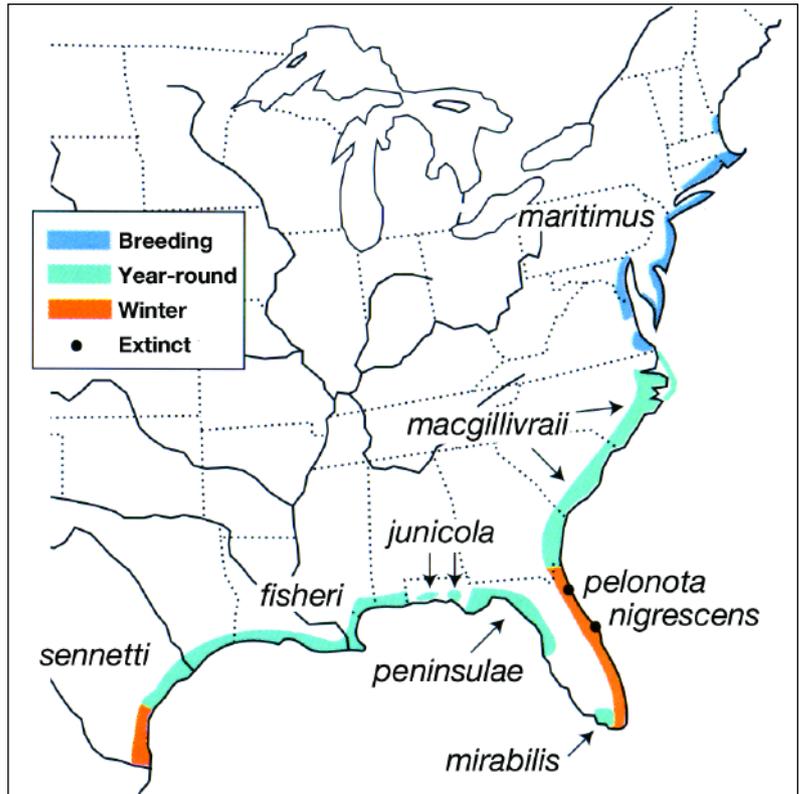
The Seaside Sparrow is restricted to marshes along and near the coast of the eastern United States. There are many discrete populations of the Seaside Sparrow, some of which are threatened or extinct. Shown here is an individual that is probably of the variable *fisheri* subspecies, the **“Louisiana” Seaside Sparrow**. Chambers County, Texas; April 2001. © Brian E. Small.

change in taxonomy seemingly was based on philosophy, not on new information about their relationships.

At present, only one species (the Seaside Sparrow) is recognized, and nine subspecies are generally accepted (see AOU 1957, Robbins 1983). These are as follows: *Ammodramus m. maritimus* (Northern Seaside Sparrow, from southern Maine and New Hampshire south to southern Virginia); *A. m. macgillivraii* (MacGillivray's Seaside Sparrow, from the coastal Carolinas and Georgia); *A. m. pelonota* (the extinct Smyrna Seaside Sparrow, in northeastern Florida, formerly from Amelia Island to New Smyrna); *A. m. nigrescens* (the extinct Dusky Seaside Sparrow, formerly from eastern Orange and northern Brevard Counties, Florida); *A. m. mirabilis* (the threatened Cape Sable Seaside Sparrow, which apparently no longer occurs in the Cape Sable region of southwestern Florida, but which does occur in certain freshwater marshes in the Everglades); *A. m. peninsulae* (Scott's Seaside Sparrow, of the Florida Gulf Coast, from Tampa Bay to Pepperfish Keys); *A. m. junicola* (Wakulla Seaside Sparrow, in the panhandle of Florida, from southern Taylor County to Escambia Bay); *A. m. fisheri* (Louisiana Seaside Sparrow, from Pensacola, Florida, to San Antonio Bay, Texas); and *A. m. sennetti* (Texas Seaside Sparrow, from Nueces and Copano Bays, Texas).

Of these, the Atlantic coastal races (except for *nigrescens*) are all similar both in appearance and at the molecular level (Avisé and Nelson 1989), as are the Gulf Coast races. However, the rare and local Cape Sable Seaside Sparrow (*mirabilis*) and the extinct Dusky Seaside Sparrow (*nigrescens*) are quite distinctive in appearance—especially the Dusky Seaside, with dense blackish streaking on its underparts—with songs unlike those of other seaside sparrows (although the songs have not been carefully studied). Concerning the song of the Dusky Seaside Sparrow, Hardy (1983:97–98) writes:

The race *nigrescens* possesses a song as distinctive from the songs of other Seasides as is this form's plumage. The structure is very simple and mostly noise. The opening rapid clicks [of most Seaside Sparrows] are replaced by a very rapid frequency-modulated buzz. ... [T]he Dusky's song [is] much more insect-like than most songs of other races. ... [T]he ... Cape Sable Seaside Sparrow ... also has a distinctive song quite unlike the song of any other Seaside Sparrow. The song is all



Nine subspecies of the Seaside Sparrow are recognized by the American Ornithologists' Union. They breed along or near the coast from Maine to Texas. Map courtesy of © Birds of North America.

noise—even more insect-like than the Dusky's—and consists of two or three deliberately uttered and more widely spaced clicks (almost like the rapid snapping of fingers), a very rapid frequency-modulated central buzz, no trill, no warble, and finally a thin terminal buzz.

Molecular evidence shows that the Gulf Coast and Atlantic Seaside Sparrows are clearly separable, and also they look different: The Atlantic birds, which are indeed variable, are mostly grayish, whereas the Gulf Coast birds are grayish as well, but with buffy-brown, bright ochraceous, or faint yellowish-buff overtones (Funderburg and Quay 1983, Rising and Beadle 1996, Beadle and Rising 2002). The limited molecular data available also show that the Gulf Coast and Atlantic populations are different (Avisé and Nelson 1989). Thus, these Gulf and Atlantic Seaside Sparrows differ both in appearance and genetically.

CASE STUDIES: THE ISOLATED FLORIDA POPULATIONS

A. m. pelonota

Where do the isolated Florida populations fit in? Well, we don't know about *pelonota*, the Smyrna Seaside Sparrow, and we never will. It is extinct. However, it was very like

the other Atlantic Seasides in appearance, and was probably just an isolated population of *macgillivraii*. Many of us mourn the loss of a population. And while *pelonota* may have appeared to be much like all other Atlantic Coastal Seaside Sparrows, it was unique, and unique in ways that we now will never be able to know, because it is gone. We will never know more about its biology, and its loss also tells us that prime saltmarsh habitats in northern Florida, along with their associated biota, were greatly altered (see Kale 1996). A major culprit in this habitat alteration was the northward invasion of mangroves into the sparrow's preferred habitat; the spraying of DDT for mosquito control

may also have played a role in the demise of *pelonota*. On the whole, though, we don't know much about *pelonota* or the natural community in which it was found.

A. m. nigrescens

The Dusky Seaside Sparrow is currently considered to have been a phenotypically distinct race of the Seaside Sparrow. As noted above, it was originally described as a distinct species, and it was accepted as such as recently as 1957 by the AOU *Check-list* committee. A good discussion of its demise is provided by Mark Jerome Walters's *A Shadow and a Song* (1992), and much of the information in the next two

Could the extinction of the distinctive "**Dusky**" Seaside Sparrow have been prevented? In hindsight, many biologists feel, the answer is "yes". Apathy, politics, and even taxonomic philosophy conspired to doom the taxon—which may actually have been a full species. *Merritt Island NWR, Florida; date unknown.*
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paragraphs is drawn from his account.

Dusky Seaside Sparrows were common in the saltmarshes on Merritt Island, Florida, and also in nearby freshwater marshes west of the Indian River along the St. Johns River. Merritt Island is adjacent to Cape Canaveral, which became the site of the John F. Kennedy Space Center. During the Cold War, there was pressure on the U.S. government to get into space, and Cape Canaveral was a good place from which to launch rockets. Astronauts and engineers did not wish to share their work space with mosquitoes, so there was pressure to reduce the mosquito density in the area. This reduction was accomplished by spraying with DDT and by impounding marshes, which effectively destroyed the habitat of the local Seaside Sparrows and many other organisms living in the marshes—but apparently it was good for ducks (see Trost 1968, Kale and Maehr 1990).

Additionally, there was pressure to build roads through the St. Johns marshes, mostly to service Disney World to the west, in Orlando. The habitat in the St. Johns marshes was much compromised by the road construction and other development. After some time, some of the marsh land in this area was purchased by The Nature Conservancy and later turned into a national wildlife refuge. But fires, legally set by ranchers with property adjacent to the refuge, destroyed the sparrow's habitat. Fire was an important element in the maintenance of the grasslands which the sparrows inhabited, but, depending on the marsh, a fire once every five to eight years was sufficient to curb the encroachment of woody vegetation, and they were best set during the wet season when natural fires started by lightning strikes had occurred historically. Ranchers burned more frequently than that, and they tended to do so during the dry season, when the heat of the fire often damaged the marsh.

In 1973, the AOU *Check-list* committee “lumped” both the Dusky and Cape Sable Seaside Sparrows into the Seaside Sparrow (AOU 1973), citing Mayr and Short (1970) and Beecher (1955). Mayr and Short had written (1970:84):

“The well-marked, allopatric Florida races *nigrescens* and *mirabilis* are conspecific with *maritima*, as Beecher (1955) suggested.”

And it was done. No reason was given as to *why* they were conspecific—just that Mayr and Short had said so, and that Beecher had suggested it. In reality, Beecher did not “suggest” this. In his 1955 paper, he does not discuss species-level taxonomy (other than to suggest that the Seaside and Sharp-tailed Sparrows were closely related); in listing the Dusky and Cape Sable Sparrows by subspecific

names (namely, *nigrescens* and *mirabilis*), he was following a commonly used taxonomy of that time. Inasmuch as the AOU (1931) had earlier treated these as distinct species, Beecher perhaps intended to suggest that they were conspecific, but he didn't say so. The habitat degradation and fires decimated the Dusky's population, and the “demotion” of it to the status of subspecies reduced interest in its conservation. As well, many Brevard County residents did not support expanding the sparrow's refuge. Walters (1992) reports that in one local newspaper, it was opined that:

...land, which is closed to the public to protect the delicate habitat of the sparrow, could readily be developed for grazing by digging a few canals.

The last few Dusky Seaside Sparrows, so far as we know, were all males. Six known individuals were named by the color of the bands that they wore: Green, Orange, Blue, White, Red, and Yellow. In 1981, all of them except for Green were captured and brought into captivity, with the idea of mating them with female Scott's (*peninsulae*) Seaside Sparrows from the Gulf Coast of Florida. As we later learned, Dusky Seaside Sparrows were more closely related to other Atlantic coastal Seaside Sparrows than to those on the Gulf Coast, even though Scott's was geographically closer to them (Avisé and Nelson 1989). Following capture, Red died, but the others survived, being maintained in captivity by a cooperative effort involving several parties, including a teaching zoo, the Florida Museum of Natural History, and (ironically) Disney World.

The U.S. Fish & Wildlife Service did not support the crossbreeding program, noting that even though the Dusky's were endangered, they did not have a mandate to protect “hybrids” (which did not seem to affect their judgment on Peregrine Falcons, but I guess sparrows are different). Nonetheless, one Scott's female “accidentally” got into a cage with a Dusky, and they mated and fledged three young. The researchers then facilitated backcrossing (crossing hybrid young with the Dusky or other hybrid young) and built up a small hybrid population, but there was no support for this program. Over time, all of the hybrids died.

Green was probably the last Dusky to die in the wild; Orange died in his cage on 16 June 1987.

A. m. mirabilis

The distinctive Cape Sable Seaside Sparrow also has an interesting history.

Morphologically, it is the most olive-green of all of the populations, being closer in coloration to the birds from coastal Texas than to any others; but this similarity could

easily, and probably does, reflect convergence. The Cape Sable is the most isolated of all the Seaside Sparrows. It was first named in 1918 on the basis of birds from a population living in marl prairie on Cape Sable, Monroe County, Florida. (Marl refers to a crumbly, sandy sort of soil.) In 1935, a strong hurricane pushed eight-foot-high waves over their habitat at Cape Sable, probably eliminating these Seaside Sparrows from the coastal marl prairie; in any event, there have been no reliable records from there since that time (Stimson 1968). However, Seaside Sparrows in other places have been able to survive severe hurricanes that have flooded coastal marshes. The sparrows have not been seen at Cape Sable since the hurricane, but today the habitat may not be suitable.

Happily, there are scattered populations of Cape Sable Seaside Sparrows, mostly adjacent to Taylor and Shark Sloughs in Everglades National Park, with most of the birds inhabiting *Muhlenbergia* prairies near Taylor Slough. In the early 1970s, there were an estimated 1,900–2,800 Cape Sables there (Werner and Woolfenden

Most populations of the Seaside Sparrow are associated with saltmarshes in the immediate vicinity of the coast. The threatened “**Cape Sable**” **Seaside Sparrow** (right), however, can be found in certain freshwater marshes within the Everglades.



Everglades National Park, Florida; 20 May 1998. © Ron Saldino / VIREO.

Everglades National Park, Florida; March 1996. © Brian E. Small.



The Seaside Sparrow presents the following take-home message to the birder: Pay attention to variation. Accurate bird identification requires attention to variation, and successful conservation actions demand it. Shown here is an individual of the nominate *maritimus* race, the “Northern” Seaside Sparrow, of New England and the mid-Atlantic states. *New Jersey*; June 2002. © Kevin T. Karlson.

1983). If efforts to maintain the natural habitat of the Everglades are successful—and these efforts will require prudent burning and refraining from draining marshes—these birds may have a long future.

Summary

The different populations of Seaside Sparrows are closely related, but because of their sedentary nature there is little movement of individuals among populations. The resulting isolation allows differentiation of populations as they adapt independently to the different conditions of each marsh that they occupy. Thus, in order to preserve the diversity that remains in Seaside Sparrows, it is important to protect all of the populations that still exist.

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