

Saltmarsh Sparrow – Special Feature (SOOE Extended)

Question:

Where do Saltmarsh Sparrows occur in the Piscataqua Watershed and why are the Watershed's estuaries important for supporting the Saltmarsh Sparrow?

Short Answer

Estuaries and adjacent coastal areas provide key reproductive habitat for the vulnerable Saltmarsh Sparrow – a unique, salt marsh obligate bird that breeds only in tidal salt marshes along the Atlantic coast, from Maine to Virginia (Greenlaw et al. 2020). The reproductive behavior of Saltmarsh Sparrows is shaped by the selective pressures and harsh environmental conditions of the salt marsh, and their reproduction, therefore, is closely tied to the tidal cycle (Shriver et al. 2007; Benvenuti et al. 2018). Increases in marsh flooding and high marsh habitat loss due to sea-level rise are threatening the long-term persistence of this species. In New Hampshire, two marshes in the Great Bay Estuary, Chapman's Landing and Lubberland Creek Preserve, provide critical high marsh habitat that supports breeding populations of Saltmarsh Sparrow and are among the most productive habitats across the species range. Saltmarsh Sparrows also breed in the expansive marshes of the Hampton-Seabrook Estuary. These sites are vital for saltmarsh sparrow conservation and research examining how to restore salt marshes to ensure persistence of robust Saltmarsh Sparrow populations in New Hampshire.

What We Know and Need to Know to Conserve Saltmarsh Sparrows

Female Saltmarsh Sparrows (Figure SS-1) construct ground nests in high marsh vegetation, with a nest cup raised centimeters above the marsh surface (Figure SS-2). They nest primarily in *Spartina patens* and *Juncus gerardii*, although they may also use *Spartina alterniflora* or a mixture of *S. alterniflora* and *S. patens* in higher elevation areas of the marsh, which typically flood monthly, rather than daily (Gjerdrum et al. 2005). Female Saltmarsh Sparrows are adapted for laying a clutch of eggs, incubating, and fledging their young (Figures SS-3 and SS-4) within a 23-26 day window, which must fit between two lunar spring tide events (28 days apart) that inundate the marsh and flood nests. While females can renest quickly after losing a nest to a spring tide flooding event, the window of flood-free days on the marsh is decreasing with increasing tide heights and duration, as is their ability to nest successfully, putting them at great risk for long-term persistence (Field et al. 2017).



Figure SS-1: Banded Saltmarsh Sparrow held by a researcher during monitoring activities. Photo credit: Grace McCulloch

Figure SS-2: Saltmarsh Sparrow nest with four eggs. Photo Credit: Talia Kuras



Another tidal marsh sparrow co-exists

In New Hampshire, Saltmarsh Sparrows overlap in occurrence with their sister species, the Nelson's Sparrow; the two species interbreed within this hybrid zone that spans from Thomaston, Maine to Newburyport, Massachusetts (Hodgman et al. 2002; Walsh et al. 2015). Although Nelson's Sparrows are infrequent and most of the tidal marsh sparrows in New Hampshire are Saltmarsh Sparrows, many of them may be hybrids or have some amount of genetic admixture between the two species. It is often difficult to distinguish the two species in the field. For this reason, surveys typically record them as "Sharp-tailed Sparrows", meaning that they may be either species or hybrids.

Threats to Saltmarsh Sparrows

Populations of Saltmarsh Sparrow and other tidal marsh specialist birds (Nelson's Sparrow, Great Blue Heron, Marsh Wren, Goldfinch, Yellowthroat, Cranes) are experiencing steep declines, at a rate of 9% annually range-wide and 12% annually in New England (Correll et al. 2017). As a result, since 1998, they have lost 87% of their population range-wide (Hartley and Weldon 2020). Primary threats to Saltmarsh Sparrows are habitat degradation and loss and increased rates of marsh flooding due to sea-level rise. More than 50% of U.S. tidal marshes have been lost since colonial times, including in New Hampshire, primarily due to development (Benoit and Askins 2002; Bromberg and Bertness 2005). Humans have modified marshes for centuries, including through filling, ditching, and tidal restriction. The resulting alterations in natural hydrology impact the biogeochemistry, plant communities, and accretion rates, thereby decreasing resiliency (Bromberg et al. 2009). Many marshes today are subsided, drowning with increased inundation and pooling of water on the marsh surface, and therefore poor quality for supporting vulnerable, ground-nesting Saltmarsh Sparrows.

Where to find Saltmarsh Sparrows in New Hampshire

University of New Hampshire researchers, who are members of the Saltmarsh Habitat and Avian Research Program (SHARP, www.tidalmarshbirds.org), have monitored the reproduction of Saltmarsh and Nelson's Sparrows on Chapman's Landing (a 13-ha site along the Squamscott River) and Lubberland Creek Preserve (a 11-ha site on The Nature Conservancy property) since 2011 to track long-term trends in productivity. Due to the slightly dampened tidal regime relative to coastal marshes, these two marshes support sparrow nesting with lower flooding rates and higher success than nearby coastal marshes in the Great Marsh complex, including Hampton-Seabrook Estuary. Among 24 marshes monitored by SHARP across the species range in 2011-2015, Chapman's Landing was one of the two marshes with the highest nest survival rates (Ruskin et al. 2017). Of 115 nests monitored at Chapman's Landing during the 2021 and 2022 breeding seasons, 42% (49 nests) successfully fledged one or more offspring. Nesting Saltmarsh Sparrows also are found in Hampton-Seabrook Estuary, around Tide Mill Creek and Drake's River, near Philbrick Pond in North Hampton, and in Rye at the marshes near Wallis Sands and Odiorne Point (Fairhill).



Figure SS-3: Saltmarsh Sparrow nestlings in a nest. Photo credit: Talia Kuras



Figure SS-4: Three banded Saltmarsh Sparrow nestlings, nearing the age when they are ready to fledge the nest. Photo Credit: Talia Kuras

In addition to the key breeding sites described above, Sharp-tailed Sparrows also are found in smaller numbers around Great Bay on small areas of marsh north of Chapman's Landing, along both sides of the mouth of the Squamscott River, including near the Great Bay National Estuarine Research Reserve Discovery Center, and near the Portsmouth Country Club. Along the coast, they also occur in smaller numbers throughout other areas of the Hampton-Seabrook Estuary, North Hampton, and Rye (Figure SS-5).

Continued, systematic monitoring of the occurrence and demographics of Saltmarsh Sparrows in New Hampshire is necessary to understand how they respond to ongoing and planned marsh restoration. Marsh restoration is critical to ensure resilience, to provide critical ecosystem services, and support endemic wildlife. We do not yet know which specific restoration methods – such as microtopography (sediment) mounds, runneling, and ditch remediation – will best support breeding populations of Saltmarsh Sparrow. Future work will help us understand which restoration methods provide the most protection of the Saltmarsh Sparrow.

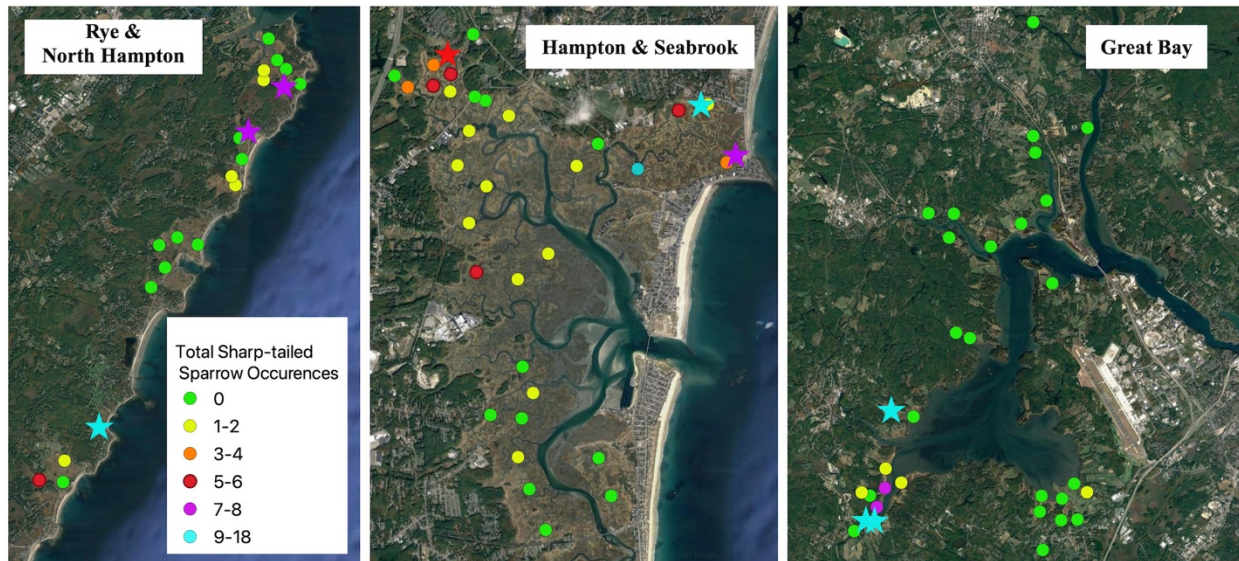


Figure SS-5. Locations where Saltmarsh and Nelson’s Sparrows, and their hybrids (collectively referred to as “Sharp-tailed Sparrows”), were detected in three main areas in New Hampshire – coastal marshes in Rye and North Hampton, Hampton-Seabrook Estuary and Great Bay Estuary. Colors indicate the total number of detections during two rounds of point count surveys in 2022. Stars indicate sites where nesting sparrows have been documented.

Methods and Data Sources

Since 2011, SHARP partners have been monitoring Saltmarsh Sparrow occupancy, abundance, and demographic parameters, using systematic survey protocols on marshes from Maine – Virginia. Survey results, protocols, and numerous publications by SHARP researchers can be found at www.tidalmarshbirds.org.

Additional information for this document came from published and unpublished work of UNH graduate students in Adrienne Kovach’s lab. Current ongoing research on Saltmarsh Sparrows in Great Bay and Hampton Seabrook Estuaries and other New Hampshire marshes is conducted by UNH researchers in partnership with Great Bay National Estuarine Research Reserve.

Marshes are surveyed for sparrow occupancy using standard avian point count surveys, by which all birds seen and heard are recorded during 10-minute survey windows, conducted twice per season at each survey point. To document reproduction, marshes are searched systematically for nests, and found nests are monitored every 3-5 days to determine their fate – fledged, flooded, or predated.

Acknowledgements and Credit

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