

Determining Nesting Locations of Saltmarsh Sparrows in Tidal Marshes within New Hampshire

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Introduction

- Saltmarsh sparrows are threatened by habitat loss and increased risk of nest flooding due to accelerated rates of sea-level rise.
- These birds nest on the ground, leaving them vulnerable to high tide flooding (Fig. 3) – even centimeters above the water level make a difference.

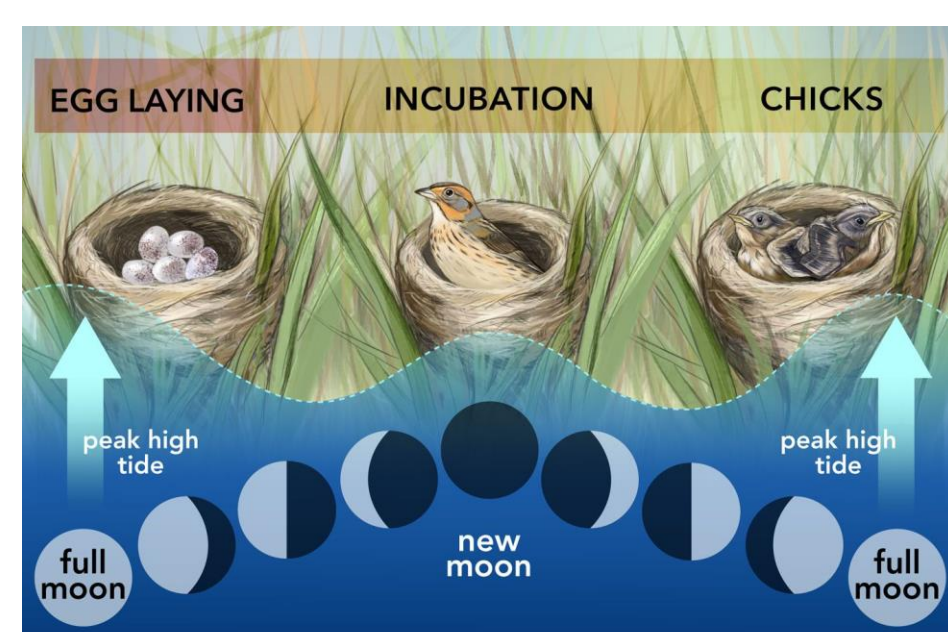


Figure 2. Nesting and tidal cycle



Photo credit: Grace McCulloch

- **Question:** Are female Saltmarsh sparrows selecting to nest in areas of the marsh at higher elevation or with higher proportion of high marsh vegetation?
- **Hypothesis:** Saltmarsh sparrow nests will differ in elevation and vegetation composition compared with paired random points.

Methodology

- We searched for nests at 9 marshes in NH (Fig. 5).
- Elevational data in feet above sea level were collected using real time kinematics (RTK) for nests and paired random points on the marsh.
- The following data were collected at each nest: nest height, canopy height, plant species, thatch depth, and estimated percentage of vegetation type.
- Two-tailed t-tests were used to compare between nests and random points.



Photo credit: Brooke Healy

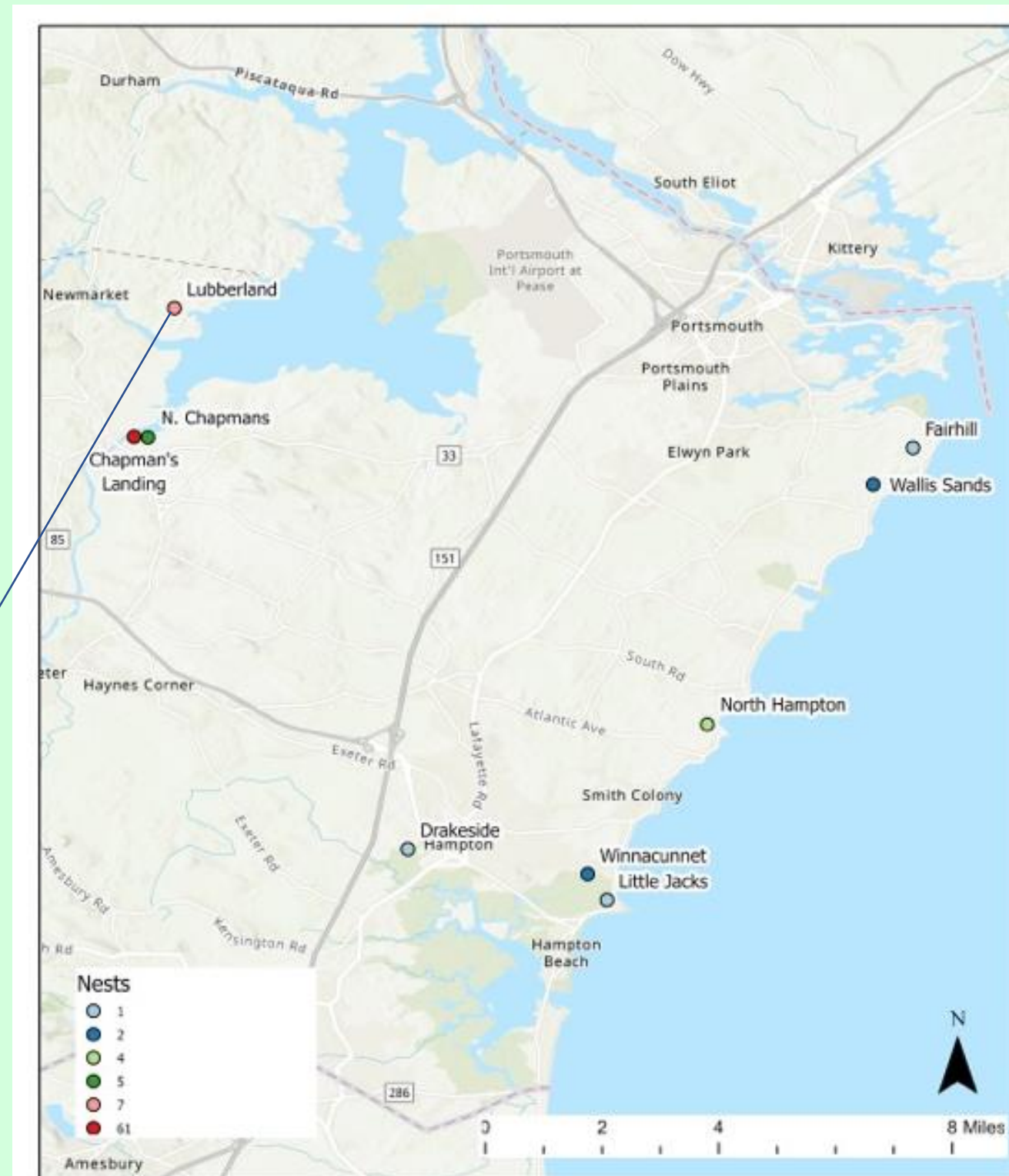


Figure 5. Marshes studied across New Hampshire and number of nests found at each site.

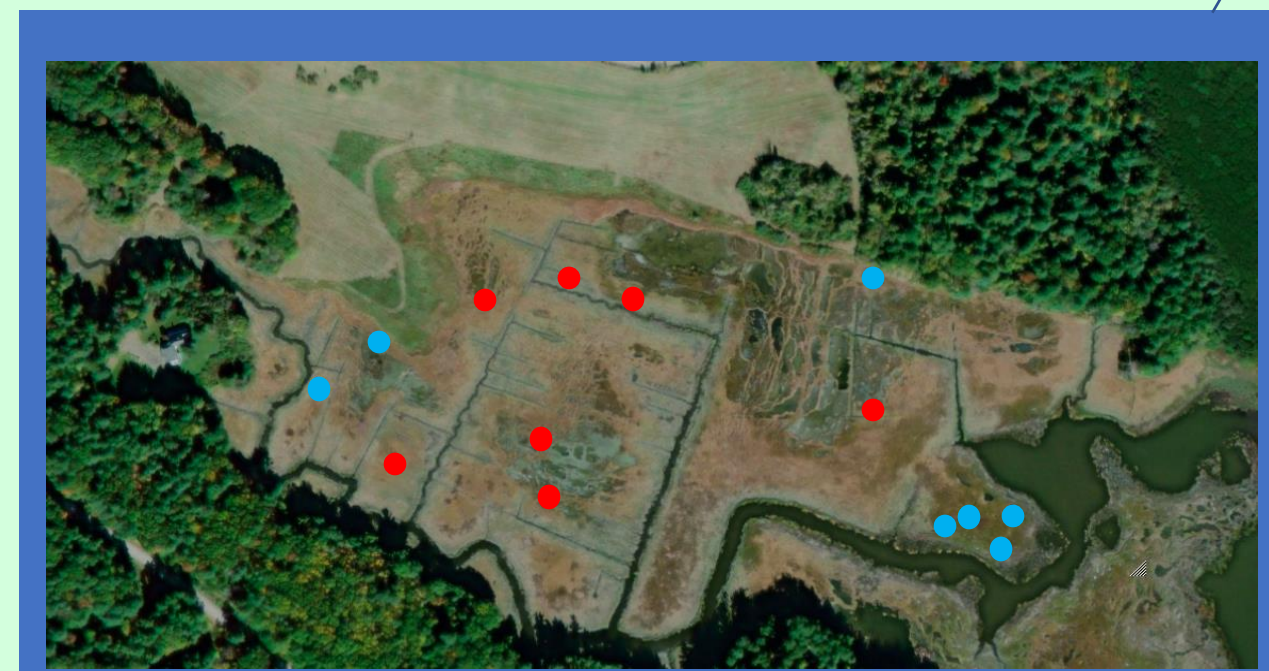


Figure 4. Nests (red) and random points (blue) at the Lubberland Creek marsh

Saltmarsh sparrows use *Spartina patens* to create intricate nest bowls above thatch.



Figure 1. Sparrow nest with eggs, left
 Adult Saltmarsh sparrow (*Ammodramus caudatus*), middle
 Sparrow nest with hatchlings, right

Results

- Elevation at nests were higher than random paired points ($p = 0.035$, t-test)
- Nests had a lower average of *Spartina alterniflora* (35%) than random points (45%) ($p = 0.026$, t-test)
- Nests had a higher average of *Spartina patens* (46%) than random points (36%) ($p = 0.063$, t-test)

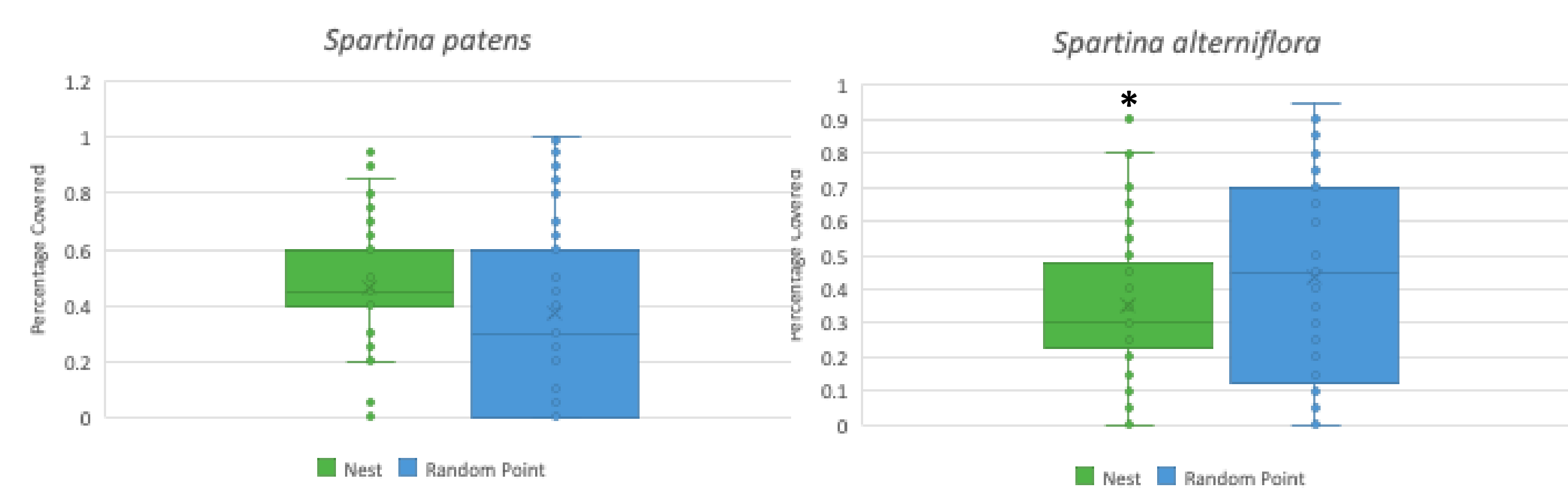


Figure 6. Percentage of *Spartina patens* in a 1m-by-1m square around nest or paired random points

Figure 7. Percentage of *Spartina alterniflora* in a 1m-by-1m square around nest or paired random points

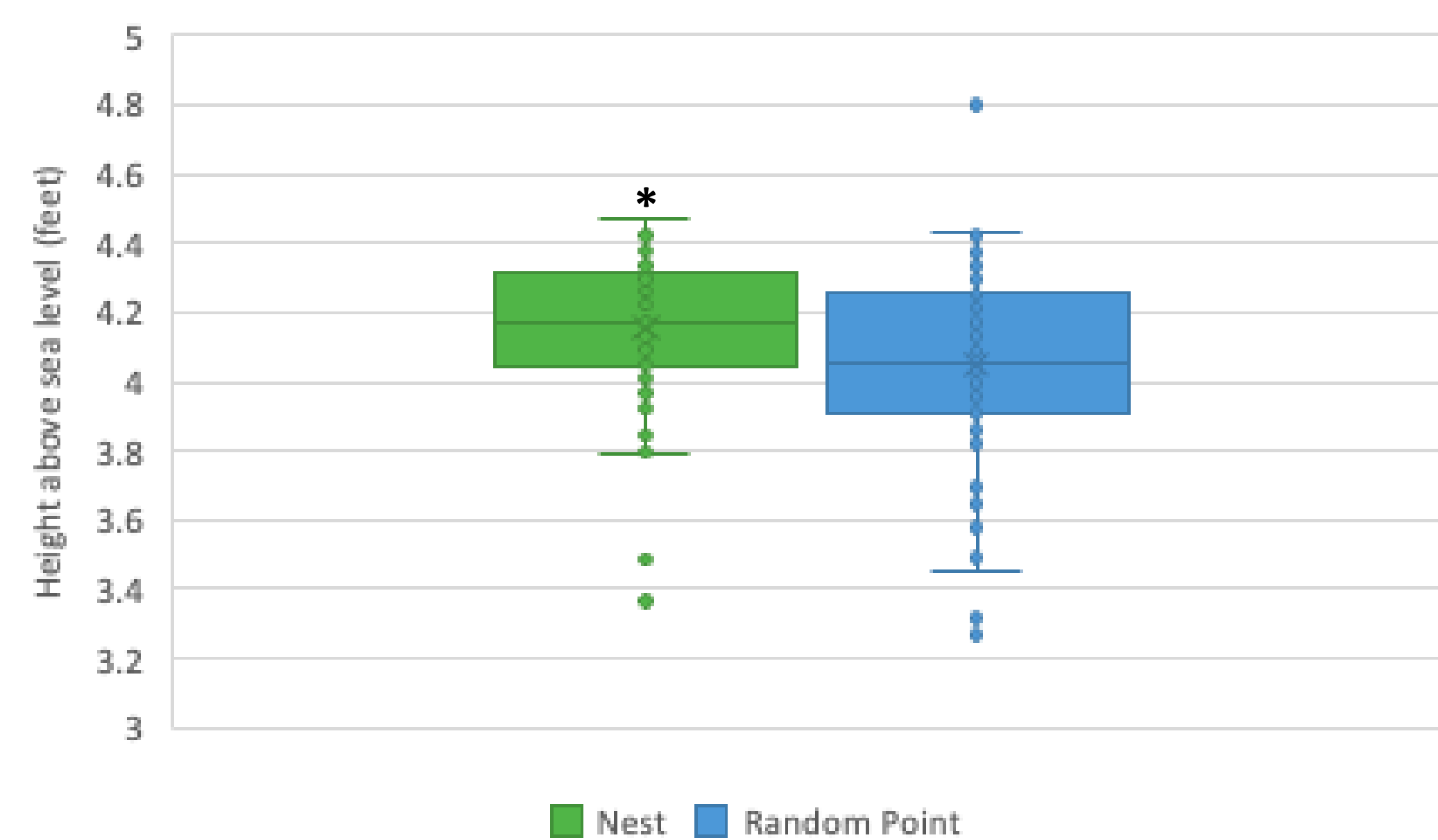


Figure 8. Nest elevation measured in feet above sea level at nests compared to paired random points

Marsh Vegetation

- A marsh is divided into two zones:
 - Low marsh, which is flooded every day at high tide.
 - Usually comprised of Salt Marsh Cordgrass (*Spartina alterniflora*)
 - High marsh, which is flooded with the monthly highest high tides.
 - Usually comprised of Salt Marsh Hay (*Spartina patens*), Saltgrass (*Distichlis spicata*) and Saltmarsh Rush (*Juncus gerardii*)

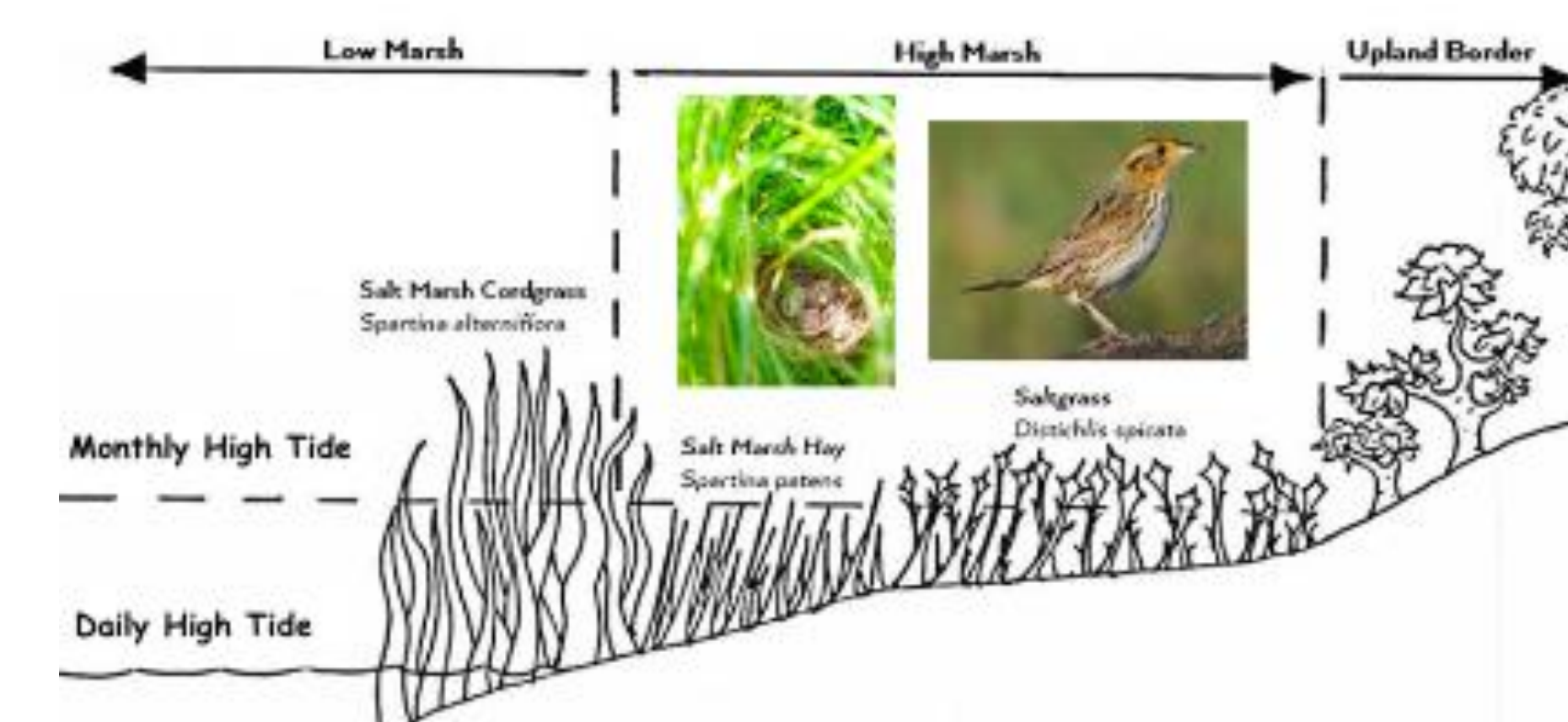


Figure 3. Marsh vegetation zones (credit: Grace McCulloch)

Conclusions

- Saltmarsh sparrows nested in higher elevation areas of the marsh than random points, supporting the hypothesis.
- Saltmarsh sparrows may use elevation as a character of nest site selection.
- Sparrow's nest had less low marsh vegetation than random points, as predicted, and more high marsh vegetation, although it was not statistically significant.
- Sparrows appear to be selecting for less low marsh vegetation and more high marsh vegetation.

Bibliography

Benvenuti, B, Walsh, J, O'Brien, KM, Kovach, AI. Plasticity in nesting adaptations of a tidal marsh endemic bird. *Ecol Evol.* 2018; 8: 10780–10793. <https://doi.org/10.1002/ece3.4528>
 Cornell Lab of Ornithology. (n.d.). *Saltmarsh Sparrow Overview*, all about birds, Cornell Lab of Ornithology. Retrieved March 3rd, 2023, from https://www.allaboutbirds.org/guide/Saltmarsh_Sparrow/overview#

Acknowledgements

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