"Hope is the Thing with Feathers"

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Rare events in the natural world can inspire awe and offer hope. Such is the case with one particular Saltmarsh Sparrow (*Ammospiza caudacutus*) who hatched on July 7, 2019 at Jacob's Point in Warren RI. Her story is representative of the struggle of her species, which has survived as an obligate saltmarsh specialist for millennia. With rising tides due to climate change however, coastal marshes are flooding and sparrow nests are being inundated with greater frequency. This specific sparrow offers a rare glimmer of hope for members of the Saltmarsh Sparrow Research Initiative, who are bearing witness to the extinction of an extraordinary species.

Why is this species extraordinary? It demonstrates a polygamous breeding strategy, nests on the ground and escapes from predators by running rather than flying, has only a rudimentary "song", does not defend territories, and breeds nowhere else in the world except in healthy coastal marshes from VA to ME. The female sparrow is among the hardest working of birds. She alone constructs the nests, incubates the eggs, and feeds and defends the chicks while they are nestlings– and even after they fledge. Her perseverance is rewarded only when the nesting cycle is not in synchrony with the flooding cycle.

We are a small team of volunteers and student interns who arrive before sunrise to set up mist nets to safely capture these sparrows for the purpose of taking measurements and applying leg bands to identify individuals. Much time is spent searching for their teacup-size nests within the 35-acre marsh. On June 25, 2019, we flushed a female from her nest. It was camouflaged by a dome that she wove of living marsh grasses (*Spartina patens*). She was incubating five eggs, rather than the usual finding of 2-4 eggs per nest, perhaps hedging her bets despite the energetic costs of feeding more nestlings. While entering the data into my field notebook, I noticed that this day would have been my mother's 100th birthday– perhaps this was auspicious.

The female continued to incubate her eggs for the next nine days, until a flooding tide washed three eggs out of the nest.

On July 7th, only one chick and one egg remained in the flattened nest.

Our field notes on July 11th recorded that the hatchling was "alive... but not as robust as yesterday"; the remaining egg was cold and never hatched. We took pictures of the chick "hugging" the egg in her nest for the next two days, and described her as "alive, but weak".


The image of this three day old nestling, clinging onto a lifeless egg seemed reminiscent of Harlow's infant monkey, clutching its inanimate "mother".

On day 6, we were concerned that the hatchling's mother had not been seen for several days; perhaps she had been killed by a predator or had abandoned her disheveled nest? We debated whether to apply any leg bands at all, since it was unlikely that she would live through the summer. Although it seemed like a "Hail Mary" pass, we adhered to our research protocol and banded the chick. On her right leg, we applied a **Pu**rple color band above a uniquely numbered aluminum ID band (designated as **X** by banding convention). On her left leg, we applied one **O**range color band. Her banding code thus became **PuX O** and her USGS band number was 2811-22106.

Any optimism faded the next day when we found her shivering outside of her protective nest, 2-3 days earlier than usual. Prospects for this chick were dimming. Two days later, we could not even locate her. My mind explored the competing concepts of attachment and scientific objectivity. One cannot study Saltmarsh Sparrows without developing great respect for their struggle to survive against great odds. There is no switch within their DNA that can be flipped to allow them to adapt to an environment that is changing at warp speed. Documenting the declining status of an endangered species can water seeds of pessimism.

My thoughts were interrupted by the unmistakable chipping sound of a female Saltmarsh Sparrow communicating to her fledgling. I quietly backed away and crouched behind a High-tide Bush (*Iva frutescens*) to watch through binoculars. She perched on a branch with larvae in her bill, disappeared into the underbrush briefly, then flew out with an empty beak, revealing the chick's location. Eureka! (So much for scientific detachment.)

At nine days old and well-feathered, this fledgling had successfully launched on the 50th anniversary of the first manned Apollo11 launch to the moon. These two feats seemed equally impressive to me. I wanted to honor this rite-of-passage and give her a name. In the past, it was considered taboo to name an animal that was a research subject, lest the researchers lose objectivity. Credit Jane Goodall for challenging this prohibition, allowing us to view animals as the sentient beings that they actually are. Why not name this chick *Apollo*?

Fast-forward $1^{1}/_{2}$ years: Marae Coxey Lindquist, a Ph.D. student at UNC Wilmington, captured a bird with PuX O bands on Feb. 6, 2021 at Hammocks Beach State Park in Onslow County, NC, approximately 700 miles from where this sparrow hatched in Warren, RI. She and her research partner Evangeline Buckland, have been studying Seaside and Saltmarsh Sparrows on their wintering grounds in southeast NC since 2019.

Bird banders live for this moment: receiving a message from a bander hundreds of miles away that a bird that was banded years ago has re-sighted or re-captured–alive and well. This is a rare event, made more remarkable since this bird was banded as a nestling, whose early history was well known. Marae sent a picture of Apollo and shared measurements of her weight, wing chord, and bill length. Apollo was apparently thriving on her wintering grounds.

Just how rare is this recapture? Based upon the historical records of banded birds acquired from the federal Bird Banding Laboratory, a total of 20,211 Saltmarsh Sparrows have been banded since 1960. How many of these were banded as nestlings and recaptured as adults hundreds of miles south on their wintering grounds? Exactly 3 out of 20,211.

It seems as if we have won the lottery twice at Jacob's Point. In 2016, while down-loading photos taken to document breeding birds for the RI Bird Atlas 2.0, I was surprised to find this image of a Saltmarsh Sparrow with the banding code **GR XO** (Green over Red on the right leg; Aluminum over Orange on the left leg).

I called Steve Reinert who grabbed his banding kit and mist nets and met me at Jacob's Point to sleuth out the story of this bird.

We waited for her to feed her two nestlings before capturing her and reading her USGS band number as 2511-39150, which gave us access to her history: she was captured on the west coast of FL on Halloween of 2015, returning to Jacob's Point to breed the following summer. She holds the distance record for the longest migration of her species, having flown between Warren, RI to Pinellas County FL, a distance of 1,170 miles. This one bird was all the motivation that we needed to commit to a five-year project to research the status of Saltmarsh Sparrows breeding at Jacob's Point.

Maps of our study site 41.7123° N, 71.2909° W in Warren, RI. The yellow horizontal line on the left map depicts the foot path over a road-bed. The black arrow on the right map designates three consecutive years of nests from the same female who brooded Apollo. Saltmarsh Sparrows demonstrate high fidelity to their breeding marsh and return from their wintering grounds to construct nests that are usually quite close to nest locations from previous years.

Typical of most saltmarshes, Jacob's Point has experienced many disruptions over the centuries, degrading the health of the marsh. During colonial times, Jacob's Point was used for harvesting and storing salt hay. In 1915, a road-bed was constructed to provide access to a private seaplane that was moored in the Warren River, impounding the southern section and causing tidal restriction and significant invasion by *Phragmites australis*. Tidal flow has been partially restored under the dedicated stewardship of the Warren Land Conservation Trust, who collaborated with other stake-holders, spear-headed by Wenley Ferguson, Director of Habitat Restoration at Save the Bay. The integrity of the northern section of this saltmarsh was rated as 2nd out of 31 marshes surveyed by Tom Kutcher, Wetland Scientist for the RI Natural History Survey. He notes that it is among the least degraded marshes in the state, worthy of protection from further disturbances.

Scholars may debate whether hope is a virtue or a crutch. I view it not as a luxury, but as a necessity. Will citizens vote for funding to protect habitat in the absence of hope? Will younger generations make the sacrifices necessary to gain the skills that they will need to cope with the challenges of the Anthropocene?

Learning that Apollo is now a healthy third year bird, we enter our 5th–and final– year of research with optimism, which can be a rare commodity especially for young people living through a pandemic and facing the existential climate crisis that they inherited from previous generations. While it is important to be honest about environmental challenges, we must not extinguish their hopes of making a positive difference in this world. I close with Emily Dickinson's poem "Hope is the Thing with Feathers" written two centuries after RI adopted hope as our state motto in 1664.

"Hope" is the thing with feathers -
That perches in the soul
And sings the tune without the words -
And never stops - at all -

And sweetest - in the Gale - is heard -
And sore must be the storm -
That could abash the little Bird
That kept so many warm -

I've heard it in the chillest land -
And on the strangest Sea -
Yet - never - in Extremity,
It asked a crumb - of me.

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