

## Introduction

- Maternal investment is a critical component of a sea turtle's generational survival.
- Many factors (e.g., incubation temp, nest-site selection and maternal length) influence the productivity of a nest.
- Optimal egg size explains that egg size will vary with maternal age, size and reproductive patterns.<sup>1</sup>



- Historically at Bald Head Island, remigrating turtles were larger and had larger annual clutch frequencies than neophyte turtles.<sup>2</sup>
- This study assessed the influence of loggerhead (*Caretta caretta*) nesting experience on reproductive output on Bald Head Island, NC.



## Hypothesis

- We hypothesized that Remigrant nesters have higher reproductive output.

## Methods

- We utilized one egg from each nest that were already being collected for a collaborative study.



- Mom measurements were recorded following BHC protocol.
- Eggs were collected over the 2020 and 2021 season and stored in a chest freezer. After removing sand with a soft bristle toothbrush, the mass (**F**) and width (**G**) was recorded.



- Nesting experience was categorized by two groups:

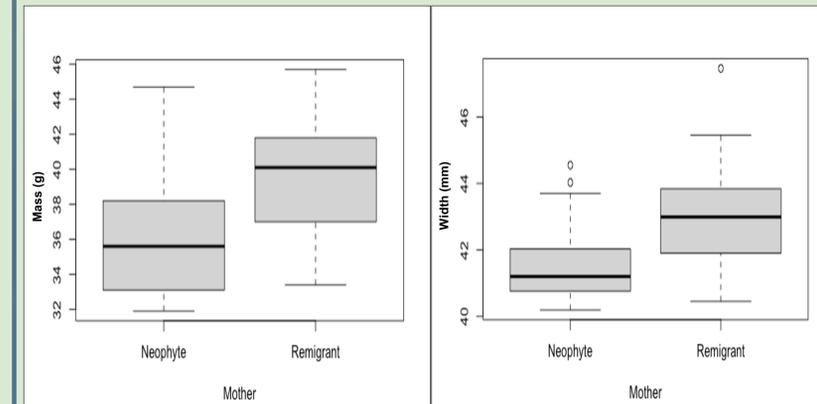
**Remigrants:** have documentation of nesting  
**Neophytes:** recorded nesting for the first time

- We compared egg width to mom experience and size across both nesting seasons. We also compared egg mass to mom experience for the 2021 season.

## Results

### Maternal Nesting Experience

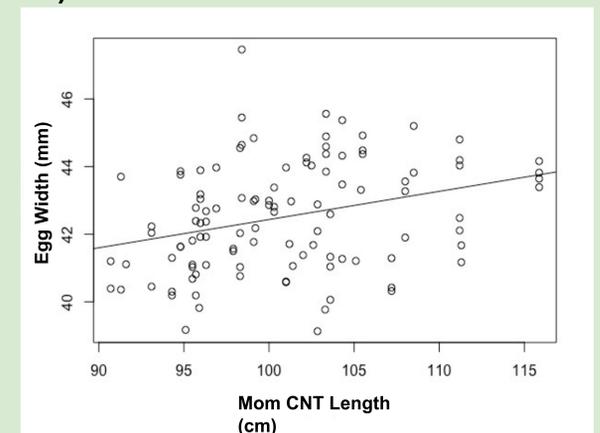
- Remigrants laid significantly larger eggs by both mass ( $t_{56}=3.347$  and  $P<0.001$ ) and width ( $t_{141}=5.652$  and  $P<0.001$ ) (**Figure 1 and 2**).



**Figure 1.** Regression plot for mother type on egg mass (g) **Figure 2.** Regression plot for mother type on egg width (mm)

### Maternal Size

- There was a significant positive relationship between maternal size and egg size ( $t_{106}=3.221$  and  $P=0.001$ ) (**Figure 3**).



**Figure 3.** Linear regression plot for mother CNT (cm) and egg width (mm)

- For every 1 cm increase in maternal CNT size, egg width increased by 0.08 mm
- Consistent with previous literature, there is a positive relationship for maternal body size and egg size.

## Discussion

- The linear regression demonstrated a positive relationship between maternal experience and egg width as well as a positive relationship with egg mass. Maternal experience alone explained 19% of the variation in egg width and 15% of the variation in egg mass.
- To try to understand reproductive allocation on hatchlings, using linear mixed effect models, we determine that remigrant mothers did not produce significantly larger hatchlings ( $t_{25}= -0.109$  and  $P=0.914$ ). Furthermore, the inclusion of maternal experience as a random effect demonstrated that individual variation between mothers was largely responsible for variation in hatchling size.
- Determining the reproductive output of both maternal age classes has implications for understanding offspring fitness and population recovery.

## Acknowledgments

We are grateful for the Bald Head Island Conservancy and the 2020 and 2021 turtle team.