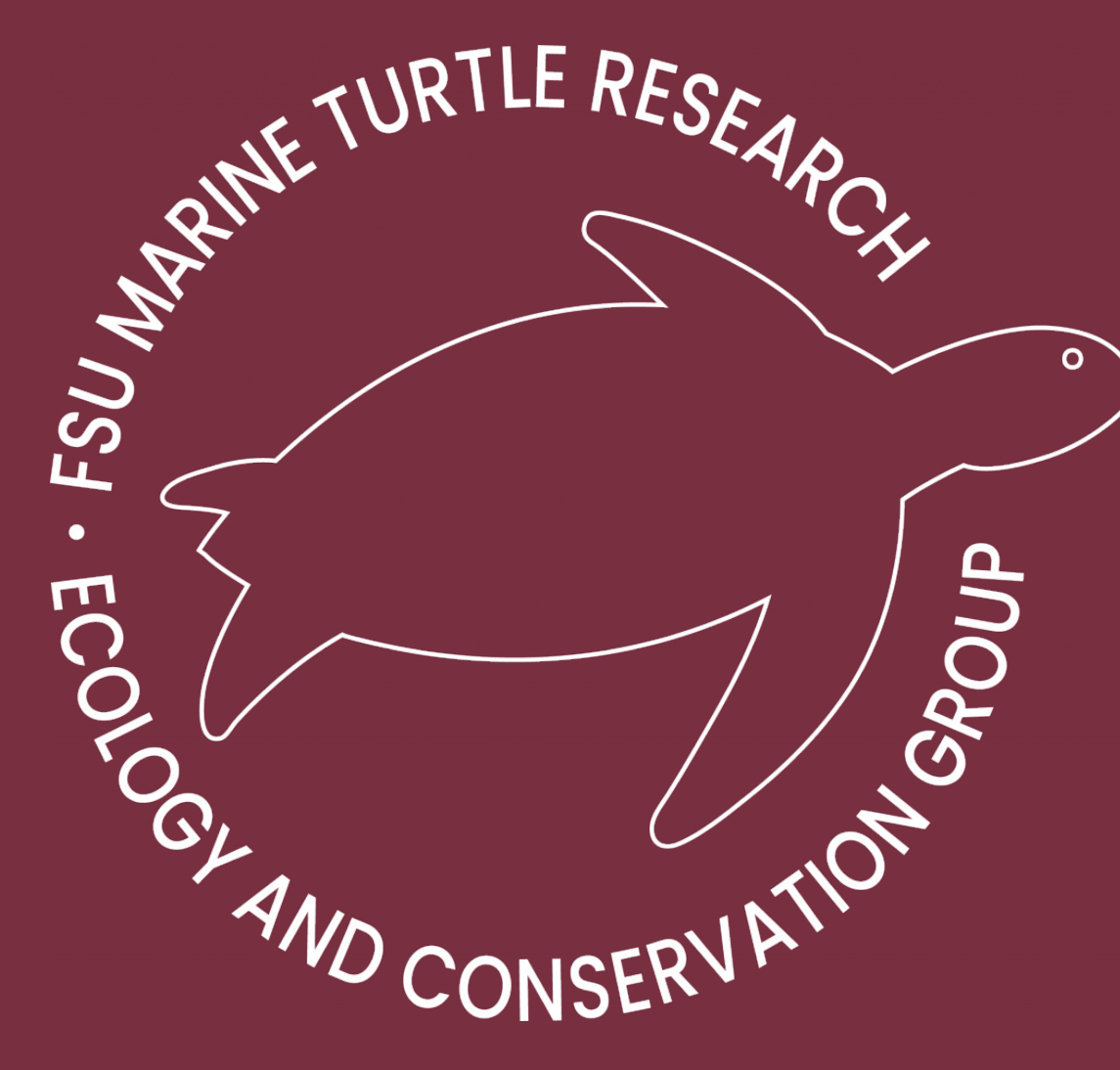




# Fibropapillomatosis Presence in Green Sea Turtles (*Chelonia mydas*) at Crystal River, Florida and Bimini, Bahamas

Aidan Perez<sup>1</sup>; Mariana M.P.B. Fuentes, PhD<sup>2</sup>; Joshua Cullen, PhD<sup>2</sup>

Department of Biological Sciences<sup>1</sup>; Department of Earth, Ocean, and Atmospheric Science<sup>2</sup>



## Abstract

The virally transmitted neoplastic disease, Fibropapillomatosis (FP), is a considerable research priority in global green sea turtle (*Chelonia mydas*) conservation and management (Hamann, et al.). FP typically presents as external tumor growths, typically on soft-skin areas such as the neck, eyes, and flipper bases. In advanced cases, these tumors may inhibit biomechanical functions, and in severe cases lead to mortality due to impairment, reduced foraging ability, or reduced threat evasion. FP was first reported in the early 20<sup>th</sup> century in the Florida Keys, and since has been observed in all major oceans. This study evaluated FP visibility rates among green sea turtles captured from 2016 to 2022 in two distinct capture sites: Crystal River, Florida, USA (N=120) and Bimini, Bahamas (N=128). The relationship between FP presence and standard carapace length (SCL) was explored to compare visibility of FP tumors and turtle size. FP was present in all capture years across both sites, although FP was notably more present overall in the Crystal River, despite its relatively pristine environment. When comparing FP presence and SCL between the two sites, a greater proportion of smaller turtles were found with FP in Crystal River than in Bimini. Overall, the results of this study aim to characterize and document the extent of FP in these two regions to create a data baseline and promote conservation efforts.

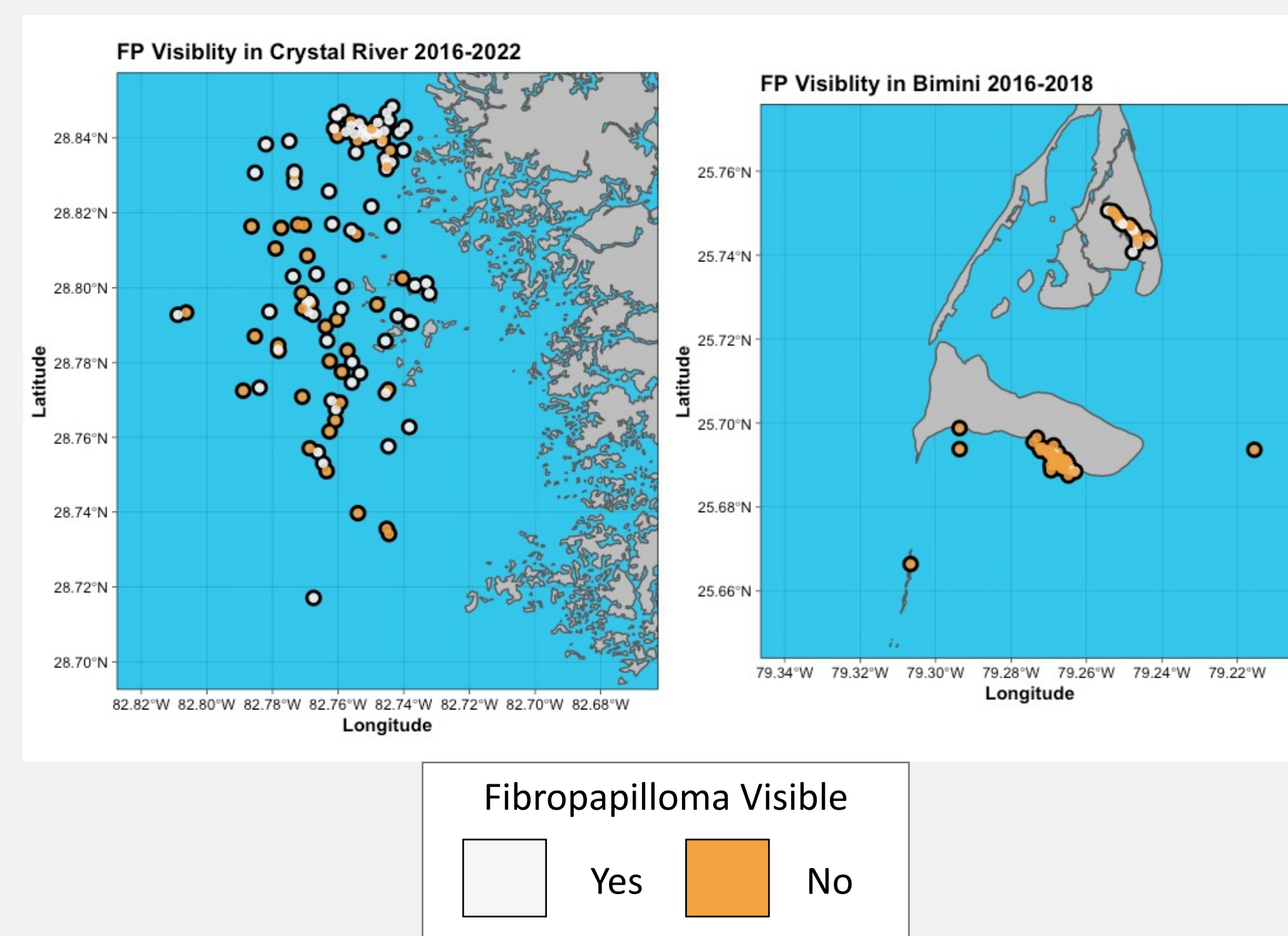
## Objectives

- Compare and contrast counts of FP visibility between the sampling regions, as well as note differences in turtle size and visibility.
- Create a baseline overview of data on FP presence and extent in both sites that may supplement future ecological research and conservation goals in the regions.

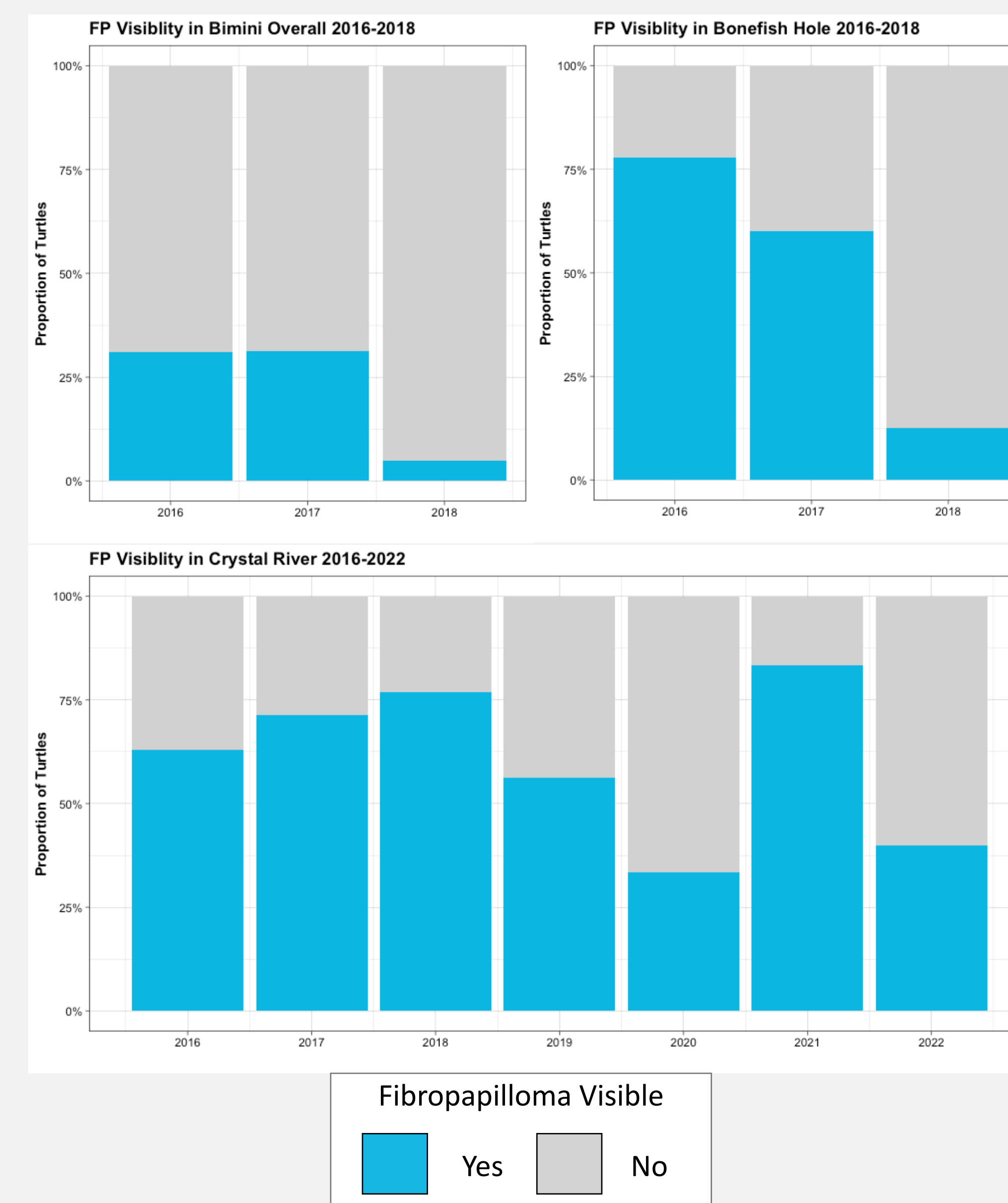
## Methods

- Green turtles were captured via rodeo method in both sites from 2016-2022 in Crystal River (N=120) and 2016-2018 in Bimini (N=128), where they were examined for FP.
- This dataset was explored using RStudio and GGPlot2 stacked bar graphs and mapping arguments.

## Results



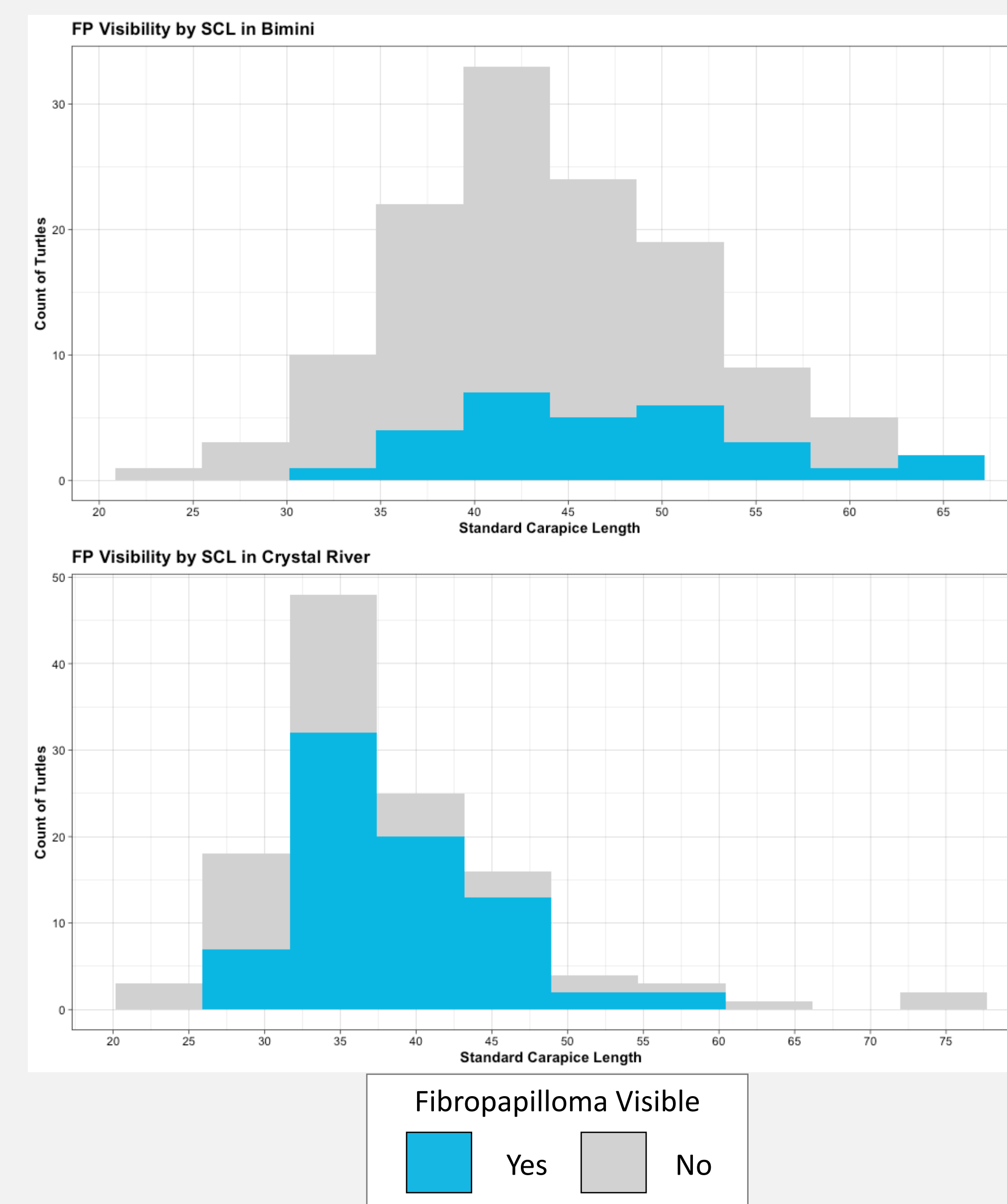
**Figure 1.** Green turtles were captured off the coast of Crystal River, Florida and Bimini, Bahamas. Turtles in Bimini notably presented higher incidence of FP in the Bonefish Hole area of north-east Bimini than in South Bimini Island.



**Figure 3.** In Crystal River, in all years except 2020 and 2022, a majority of turtles presented visible FP. In Bimini, FP visibility was lower proportionally overall. Proportion of visibility was higher in the Bonefish Hole region in north-east Bimini.



**Figure 2.** FP typically presents as neoplastic tumors in areas of the body that may prevent biomechanical function. If large enough, these growths can significantly reduce swimming and foraging ability, leading to potential mortality. The turtle pictured above has significant growth in soft tissue areas such as the neck and base of the flippers.



**Figure 4.** In both regions, all turtles that presented with FP were in the juvenile size category between ~20-65cm of SCL. Turtles with FP in Crystal River were generally smaller with higher proportions of visibility compared to those in Bimini.

## Discussion

- Crystal River had a higher observed presence of FP over the course of the sampling years than did Bimini. In Bimini, however, significantly more cases of FP were observed in the Bonefish Hole area of north-eastern Bimini than in south Bimini.
- The reason for this disparity between the two areas in Bimini is a topic of future research. Additionally, the high rate of FP presence in Crystal River is notable due to the regions relatively pristine ecosystem with little notable anthropogenic or general environmental degradation.
- When looking at green turtle size categories of SCL, turtles between ~20-65cm are considered “juvenile” (Bresette, et al.). Existing literature suggest a link between FP presence and turtles in their juvenile life stage (Kelly, et al.).
- All turtles captured between the two regions with visible FP tumors were within this size class and can be described as juvenile, which is consistent with existing literature. Turtles in Crystal River with FP were generally smaller than those in Bimini.

## Future Directions

- Expand upon the comparative components of the study by running statistical models such as t-tests to compare the visibility of FP between the two sites.
- Looking at temporal trends to see how FP visibility and/or severity has changed over time.
- Looking at what factors promote FP presence in smaller turtles in their juvenile life stage compared to larger adult individuals.
- Look at what environmental factors may be promoting or impeding FP prevalence in a region, particularly between north and south Bimini.

## References

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