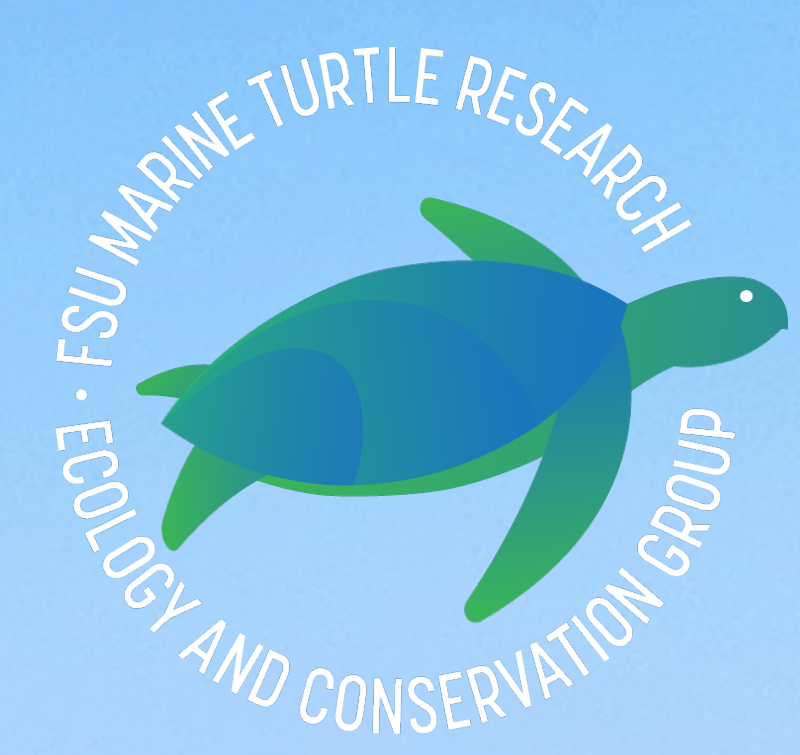




# Capture and Handling Causes Short-Term Effects on the Movement and Behavior of Loggerhead Sea Turtles (*Caretta caretta*)



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## Introduction

- Capture and handling negatively affect wildlife physiology and behavior.
- Understanding these effects is crucial to inform handling guidelines and accurately interpret collected data.
- Capture and handling increase sea turtle corticosterone levels and alter their blood chemistry.<sup>1-3</sup>
- We know less about these effects on sea turtle physiology and behavior post-release.

We asked:

How do capture and handling affect behavior and energetics after release, particularly for loggerhead sea turtles (*Caretta caretta*)?

## Methodology

- We deployed CATS (Customized Animal Tracking Solutions) cameras on 10 loggerhead sea turtles in Crystal River, FL (Figs. 2, 3).
- CATS are equipped with HD cameras and a suite of sensors, including tri-axial accelerometers.



Fig. 3. CATS attachment from the (a) side and the (b) front.

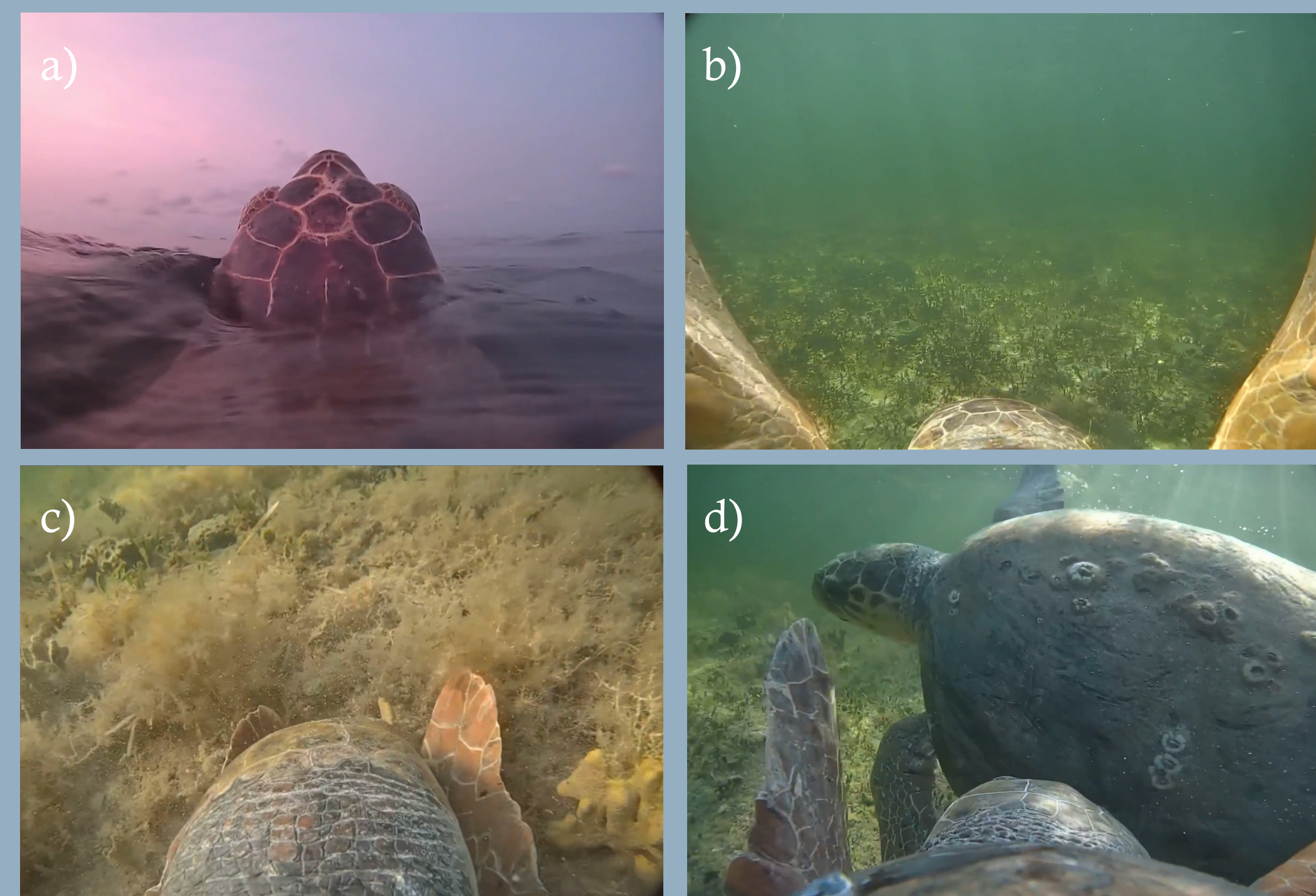


Fig. 4. Examples of annotated turtle behaviors: a) breathing, b) swimming, c) foraging, and d) species interaction.

- HD videos were analyzed in BORIS<sup>6</sup> to observe behavior changes and corroborate findings from the sensor data (Fig. 4).
- Tri-axial accelerometer data were used to compute dynamic body acceleration, a proxy for energy expenditure.<sup>9</sup>
- Pressure data were used to identify dives (depths greater than 1m for more than 30 s<sup>7</sup>).
- Data analysis and visualization was done in R.

## Post-Release Effects on Movement

- After close to 3 hours, turtles dove less often and for longer, expending less energy. Increased swimming (Figs. 5, 6) means greater energy expenditure. This requires more frequent breathing.
- The results from the behavioral analyses (Fig. 7) validate those of the movement data; turtles prioritize active behaviors post-release.

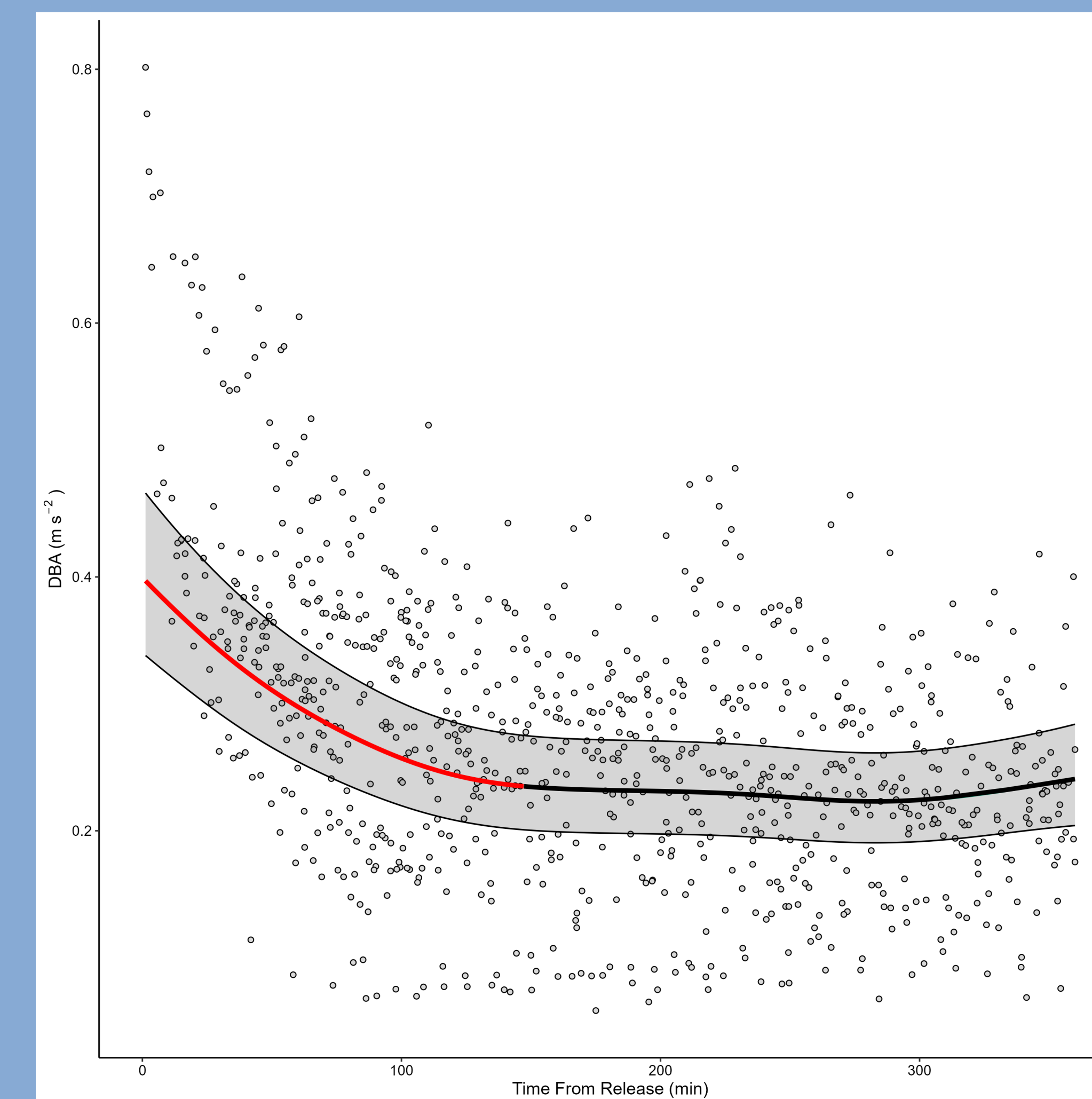


Fig. 5. Mean dynamic body acceleration (DBA) (m s<sup>-2</sup>) for 10 loggerheads as a function of time from release.

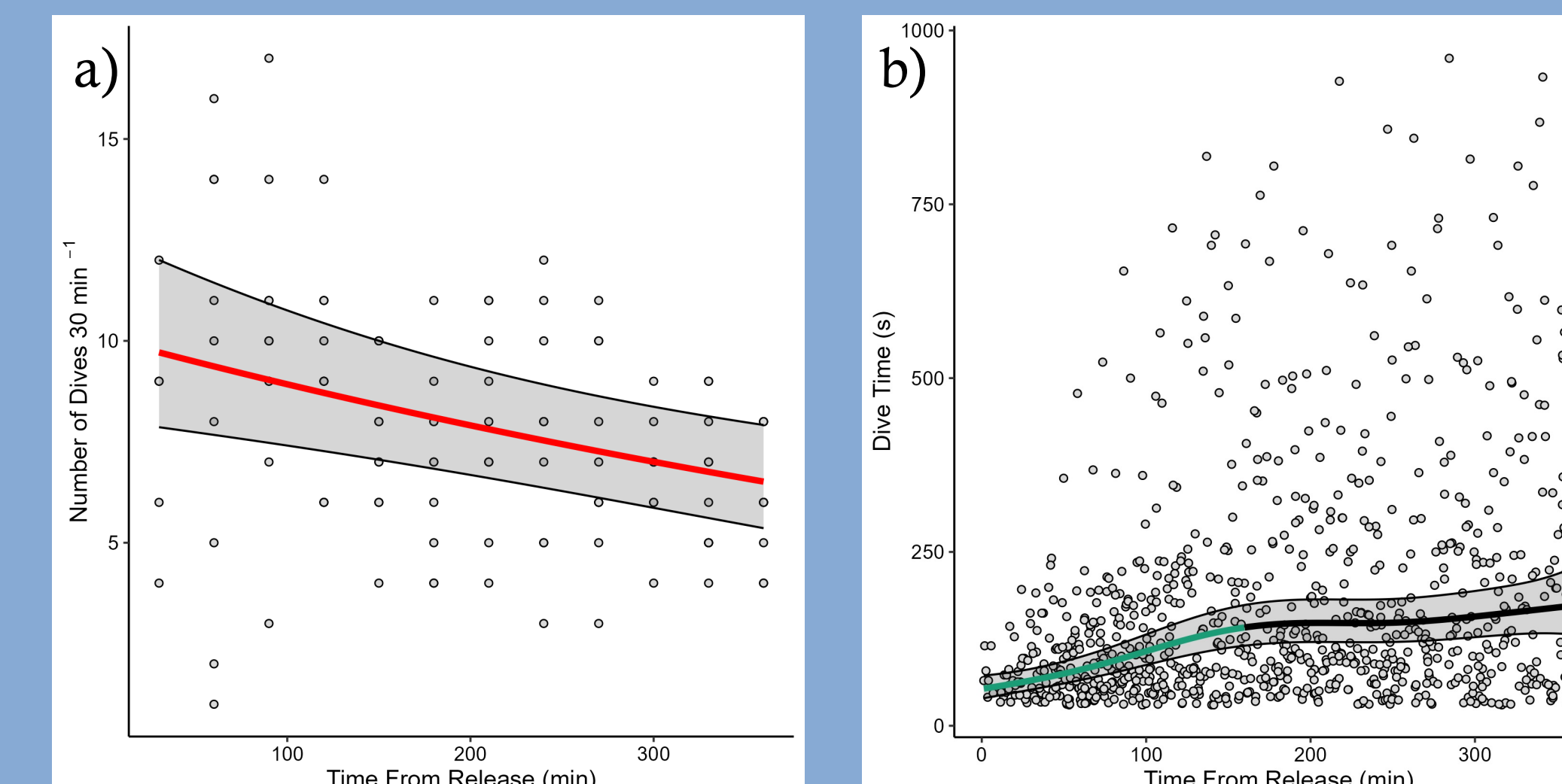


Fig. 6. The mean (a) number of dives and (b) duration of those dives (s) for 10 loggerhead sea turtles as a function of time from release.

## Post-Release Effects on Behavior

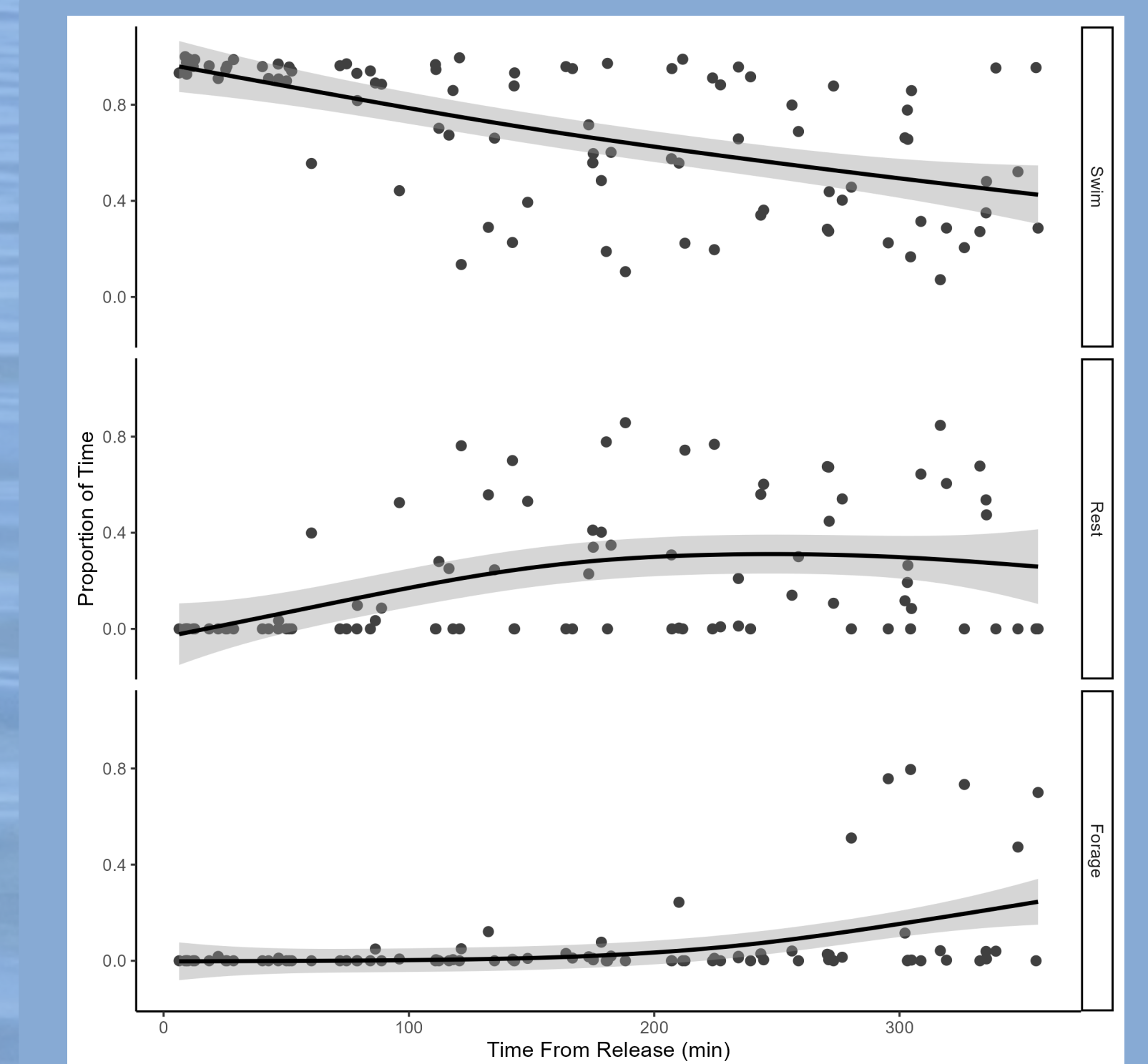


Fig. 7. Proportion of time spent swimming, resting, and foraging for 10 loggerhead sea turtles as a function of time from release.

## Conclusions

- Behavior of loggerhead sea turtles was affected by capture and handling, but behavior returned to normal in a little under 3 hours.
- These results can help inform handling guidelines and data interpretation, keeping turtles' stress in mind.

## Acknowledgements

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Fig. 1. A view of our study site in Crystal River, FL, including St. Martin's Keys.



Fig. 2. Subadult loggerhead turtle with a CATS camera attached to its carapace with epoxy and galvanic timed-releases.