



Long-Term Growth Trends of Hawaiian Green Turtles (*Chelonia mydas*): Insights from Tagging Data at Punalu'u Beach, Hawai'i Island (1976–2018)



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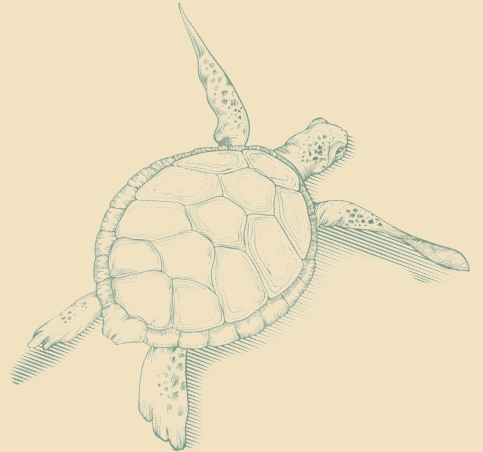
HILO

Madisen Coelho

Marine Science Department

University of Hawai'i at Hilo

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Growth Rate of Green Turtles

- Reflect demographic patterns (Labrada-Martagón et al. 2017)
- Influenced by region (Balazs 1982)
- Growth declined in Hawai'i (Balazs & Chaloupka 2004)
- Population density may affect growth (Wabnitz et al. 2010)



Study Objectives



- To calculate annual growth rate
- To assess trends in straight carapace length and mass
- To create a size at maturity model

Punalu'u Beach, HI, USA



Tagging Data Set

- Recorded data
 - Turtle identification, tag number, site, species, sex, straight carapace length (SCL), curved carapace length (CCL), mass (kg), and tumor presence
- Capture methods
 - Entanglement nets and hand captures

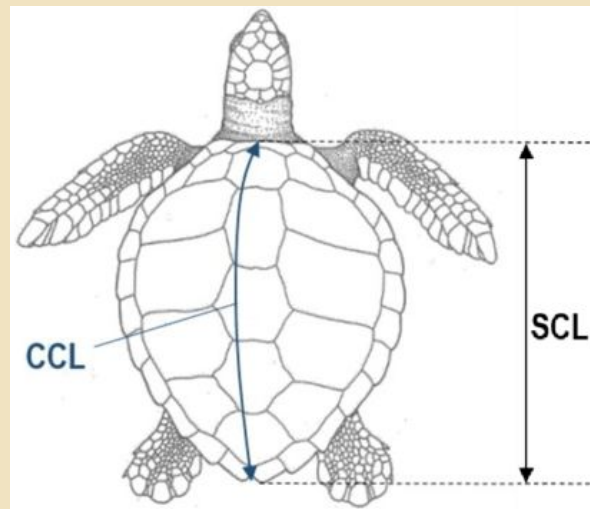
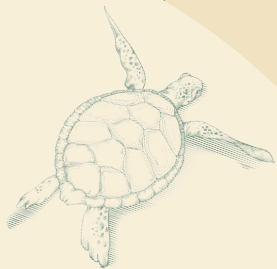


Photo credit: Mark De Boer



Data Analysis

- Linear regression equation (Chaloupka et al. 2008)
$$\text{SCL} = 1.245 + 0.913 * \text{CCL}, R^2 = 0.996$$
- Growth Rate
$$\text{GR} = (\text{SCL final} - \text{SCL initial}) / \text{Years}$$
- Statistical software
RStudio (version 4.2.2), $\alpha = 0.05$

Capture and Recapture Summary

- 319 total green turtles captured
- 186 green turtles recaptured
- 98 green turtles recaptured 3 or more times

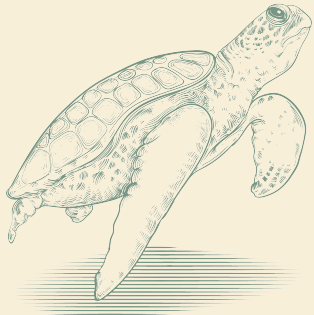
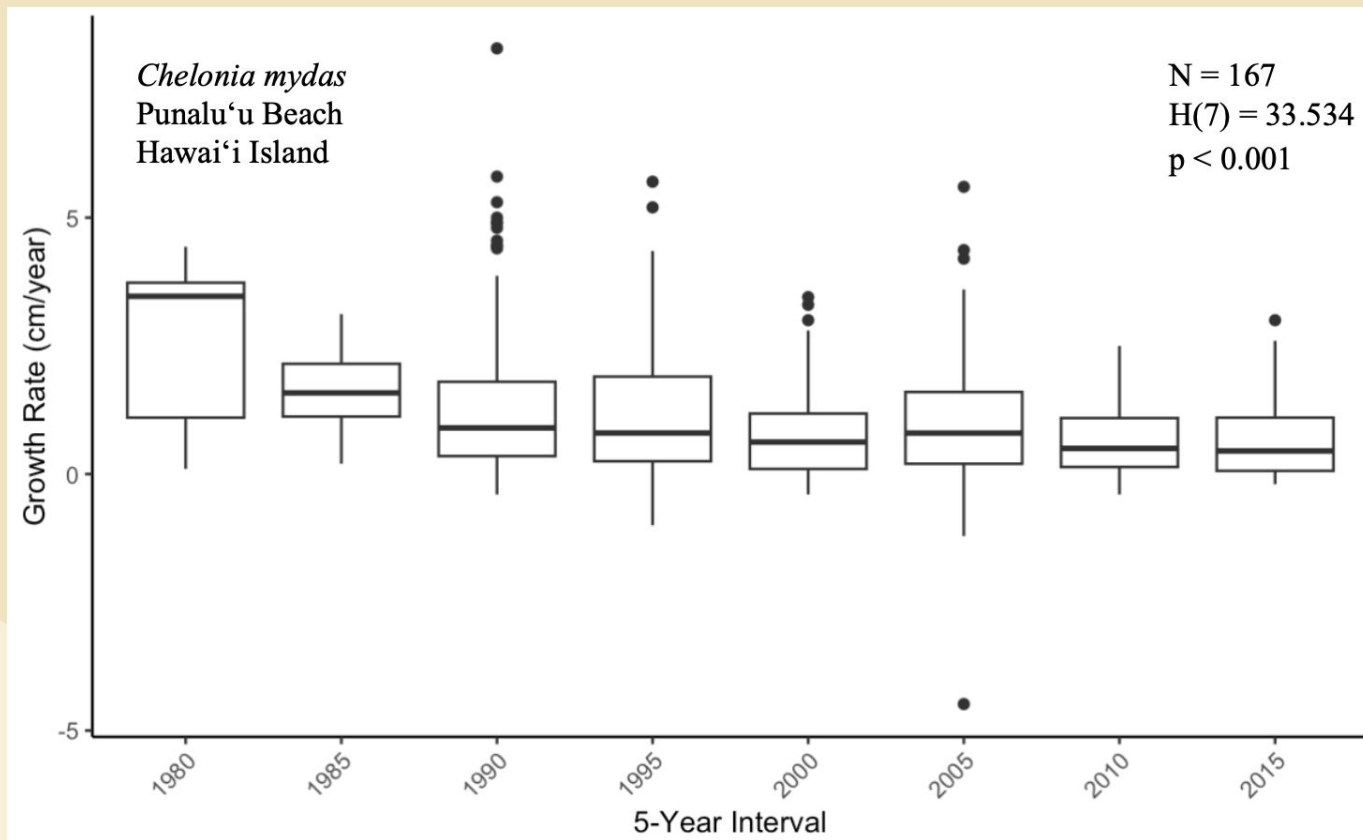
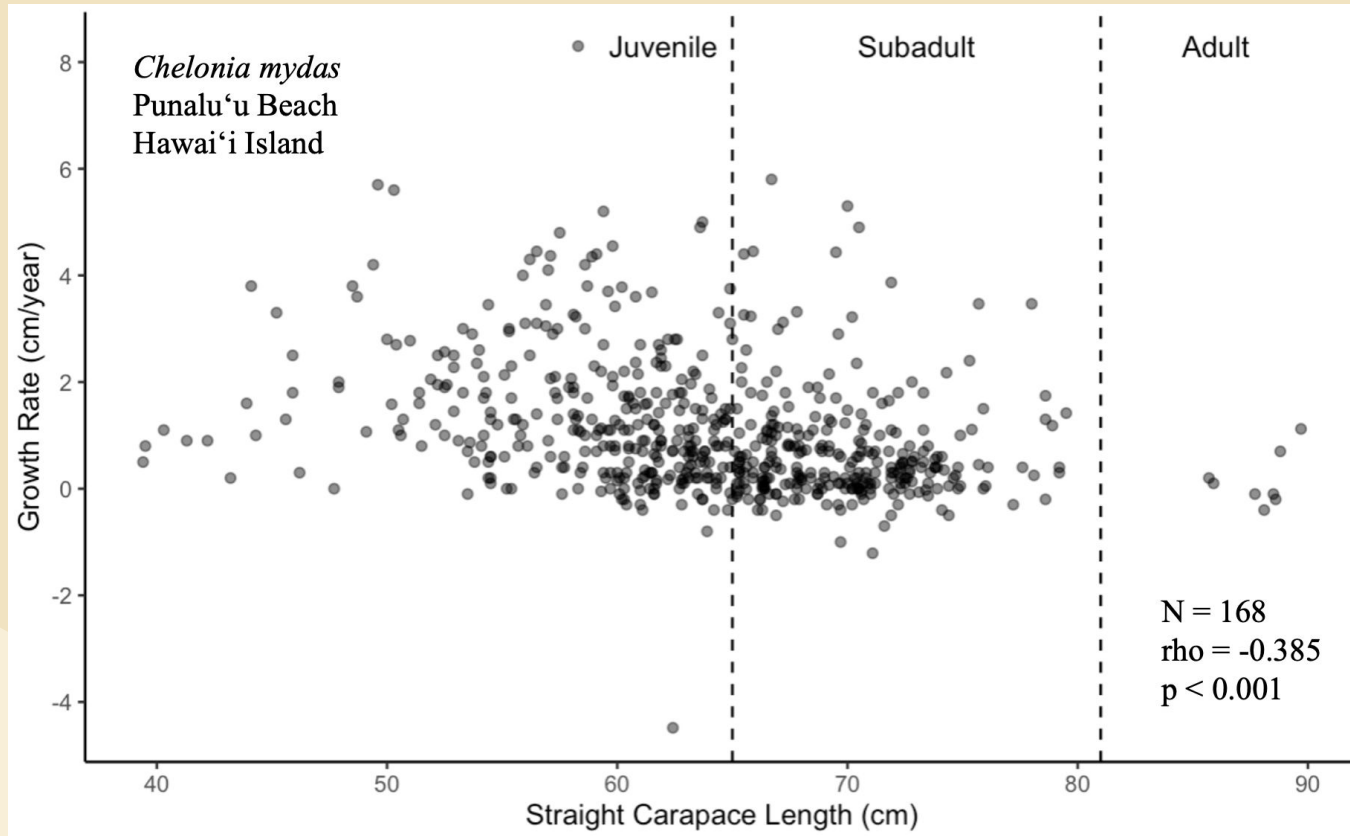


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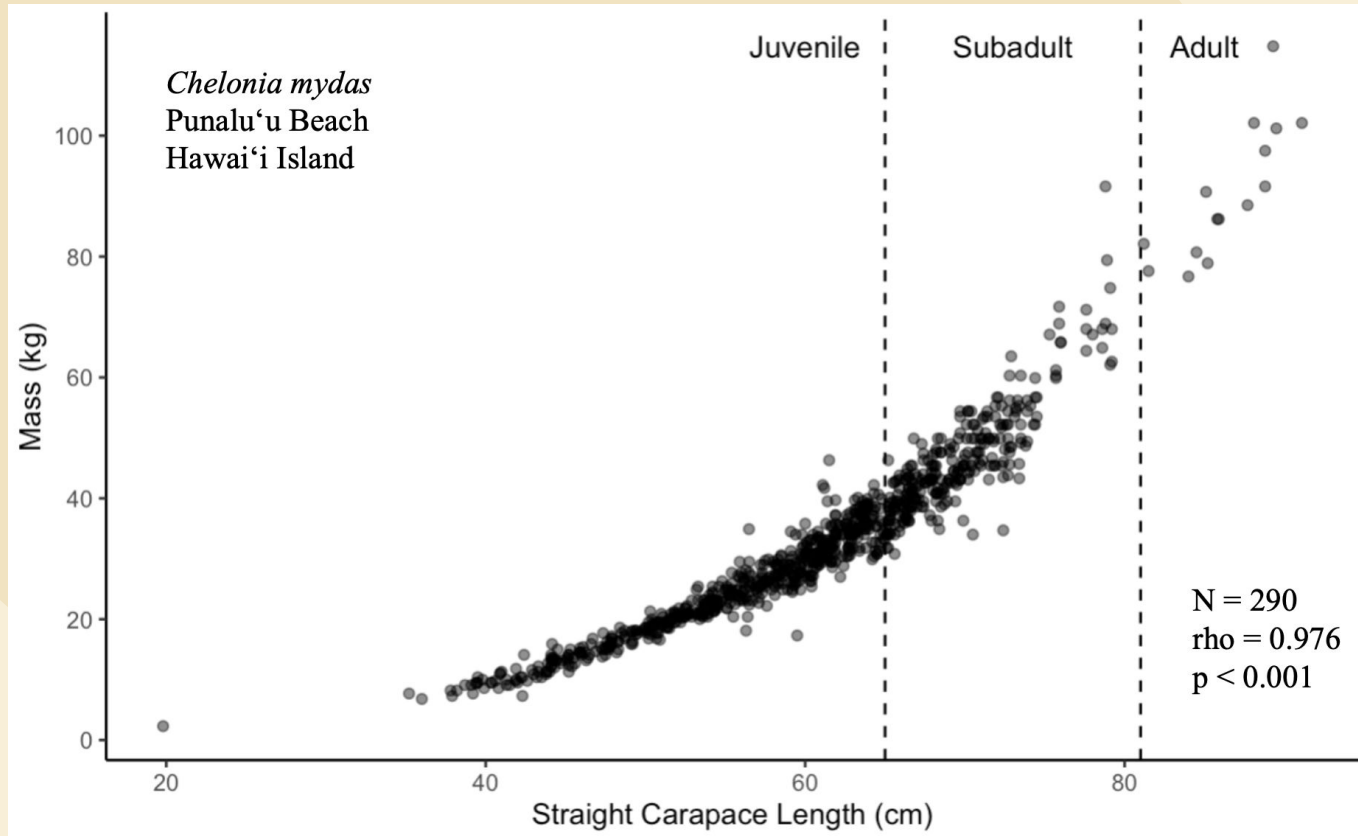
Median Annual Growth Rate over 5-Year Intervals



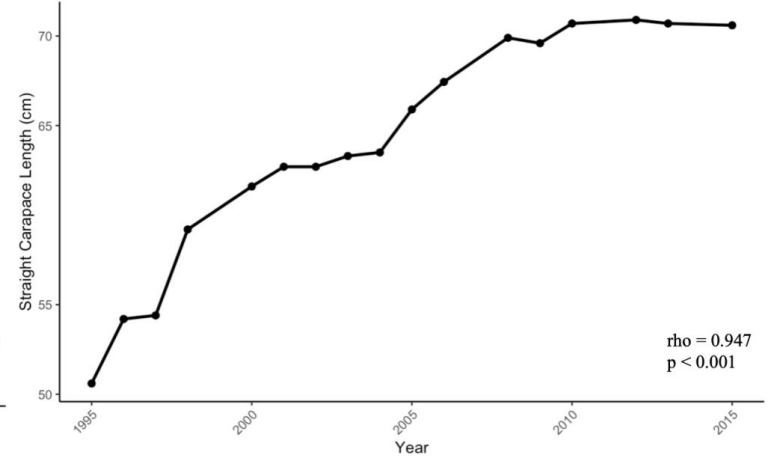
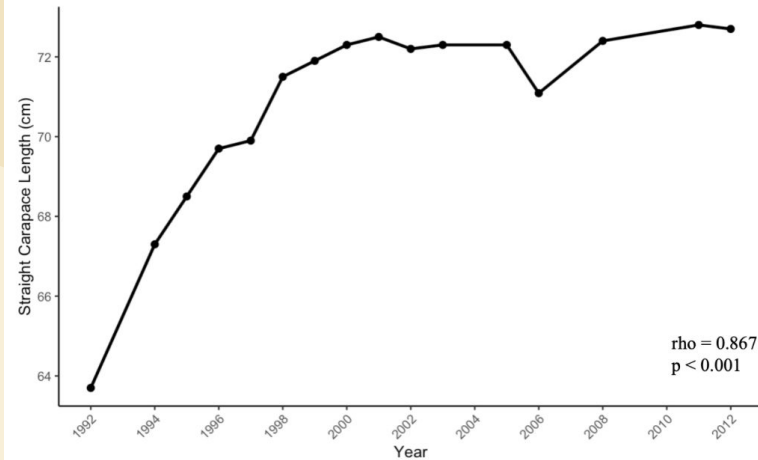
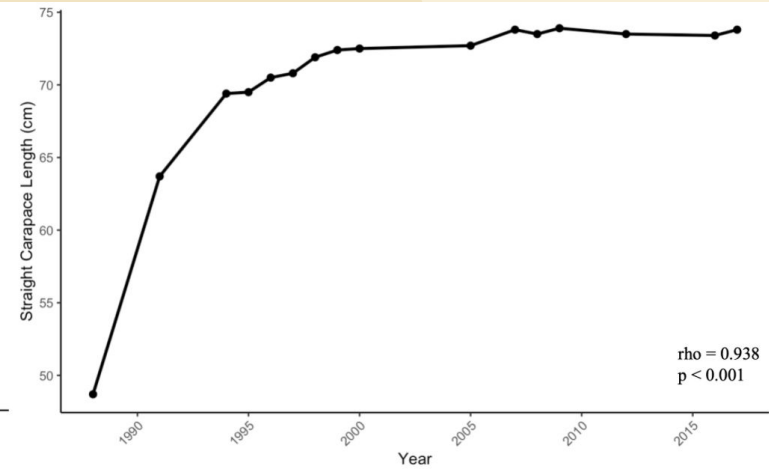
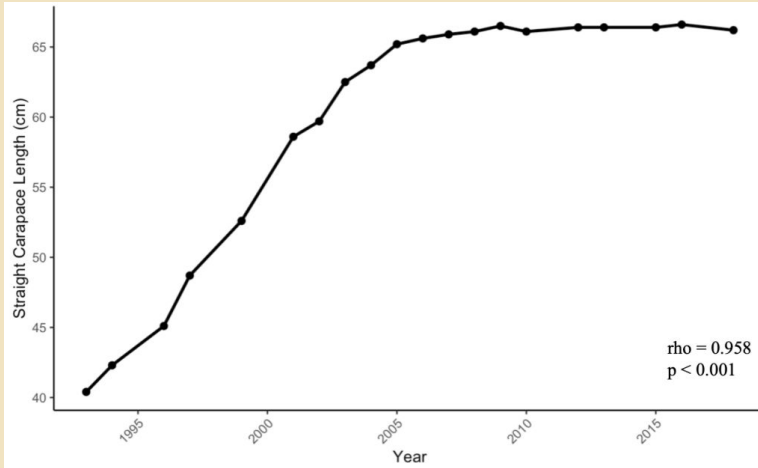
Relationship between Growth Rate and Straight Carapace Length



Relationship between Mass and Straight Carapace Length

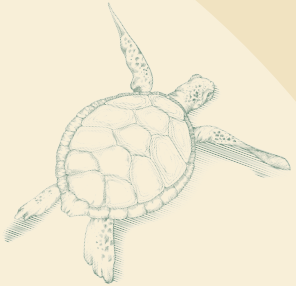


Individual Annual Straight Carapace Length



Conclusions for Punalu'u Green Turtle Population

- Growth rates have declined
- Population is dominated by juveniles
- Growth peaks around 60 to 70 cm



Acknowledgments



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Mahalo!

