Ultrasound Study of Reproductive Structures in Nesting Australian Flatback Sea Turtles, *Natator depressus*

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ABSTRACT

The Flatback sea turtle, *Natator depressus*, is the least studied of all the sea turtles. It is found only in the waters of Australia and is considered phylogenetically one of the older extant sea turtles. We studied the reproductive structures using non-invasive ultrasound to determine ovarian follicle size and oviductal egg size and overall reproductive condition. Fifteen turtles were examined between Nov. 18th and 22nd, 2017 on Thevenard Island, Western Australia. In turtles that false crawled, we were able to identify oviductal eggs and collect egg size prior to nesting. During this period, 12 nesters displayed mature ovaries while 3 displayed partially depleted ovaries. Atretic follicles of various sizes were observed in several females. This was a pilot study to determine efficacy of the procedure as well as to collect data to compare with other sea turtle species. The Flatback sea turtle produces the largest ovulatory follicles of any Chelonidae.

OBJECTIVES

1. Collect data on follicle size and oviductal egg size
2. Determine reproductive state of nesting female
   a) Mature ovary
   b) Partially depleted ovary
   c) Depleted ovary
3. Determine population reproductive state for time period of study
4. Compare reproductive investment to other sea turtles species studied

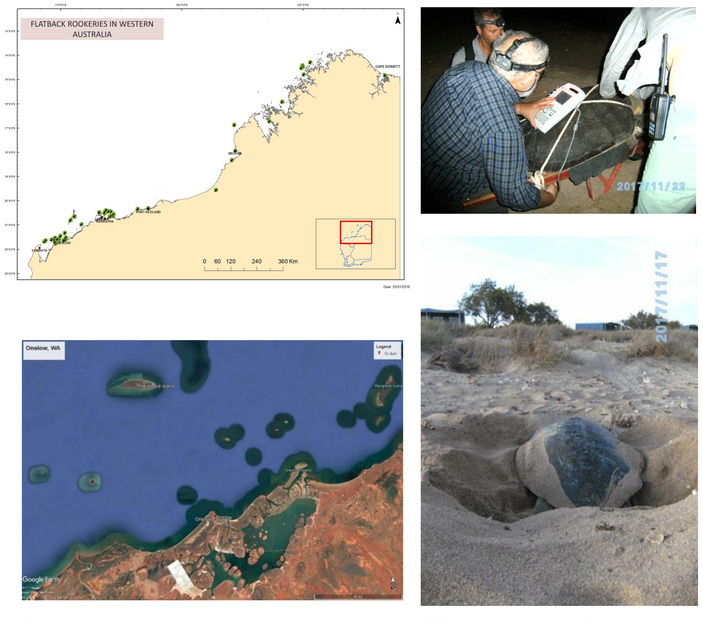

Figure 1. Range of the flatback sea turtle (TL), location of Thevenard Island (BL), ultrasound procedure (TR) and nesting turtle in front of lodges (BR).

METHODS

Nesting beach was monitored from approximately one hour prior to dusk until sunrise. Female turtles were allowed to emerge from the ocean undisturbed and were allowed to attempt to nest. Nesting attempts was monitored to determine if the female nested or false crawled. Female turtles were physically restrained on their return to the ocean so they could be tagged and measured. A subset of females was also chosen for ultrasound exams (n=15). A portable battery powered Sonosite VET 180 Plus ultrasound with variable C11/7-4 MHz transducer was used. Follicle diameter and egg diameter including yolk size were measured using the integrated electronic calipers.

RESULTS

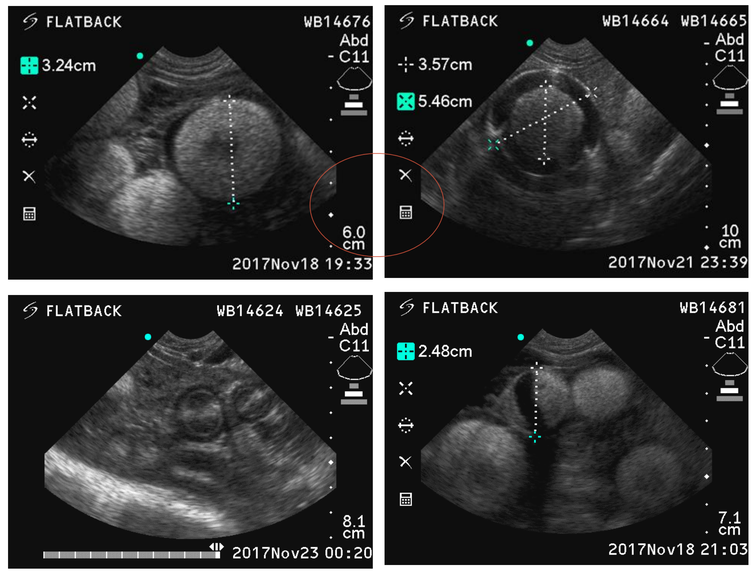

Figure 2. Ultrasound images of preovulatory ovarian follicle (TL), oviductal egg (TR), partially depleted ovary with intestine visible (BL) and an atretic follicle (BR).

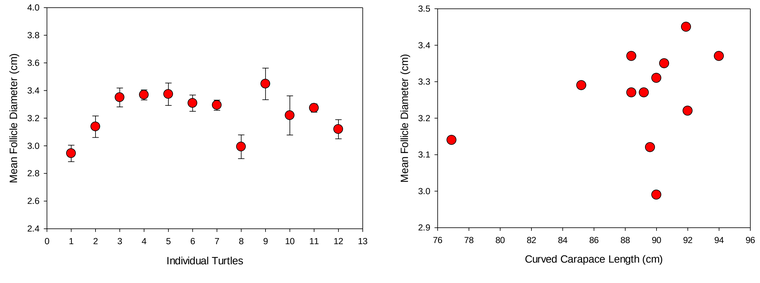

Figure 3. Mean follicle size per nesting female was significantly different between some females: df=11, DF=3.793, p<0.001 (L). No relationship was observed between CCL and Follicle diameter (R).

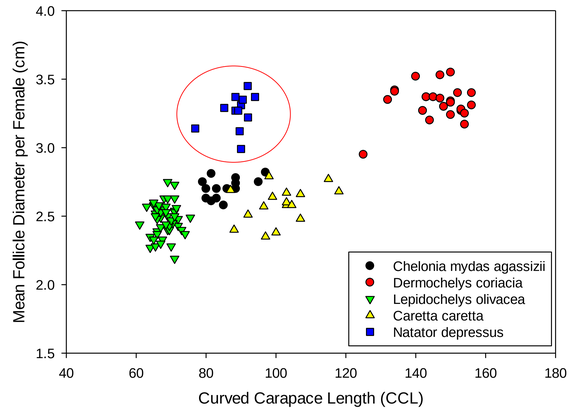

Figure 4. Comparison of mean follicle diameter relative to female size for 5 species of sea turtles. (Rostal – unpubl. data)

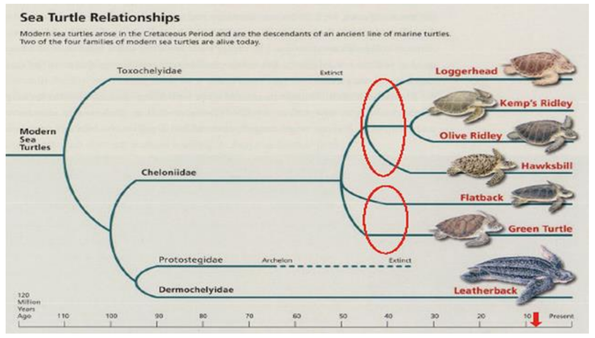

Figure 5. Phylogeny of living sea turtles (Spotila 2004).

CONCLUSIONS

1. Ultrasound is an efficient tool for use with Flatback sea turtles.
2. During this study period, females displayed mature to partially-depleted ovaries. Multiple females had atretic follicles as well, supporting the conclusion that they had previously nested this season.
3. Follicle size ranged from a mean of 2.95 to 3.45 cm in diameter.
4. Flatback sea turtles produce the largest ovarian follicle for a hard shelled sea turtle. Only leatherback turtles produce a larger ovarian follicle.

Acknowledgements: Thanks to the nesting beach crew for their assistance.

North West Shelf Flatbacks

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