

Regionally important developmental foraging grounds for green turtles and hawksbills in the Southwest Indian Ocean

Natalie A. dos Santos^{1,*}, Diane Z. M. Le Gouvello¹, Grant D. Smith², Santosh Bachoo³, Ronel Nel¹

¹Institute for Coastal and Marine Research (CMR) and Department of Zoology, Nelson Mandela University, Gqeberha, South Africa

²Sharklife Conservation Group, Sodwana Bay, KwaZulu-Natal, South Africa

³Ezemvelo KwaZulu-Natal Wildlife, Durban, KwaZulu-Natal, South Africa

*Correspondence: Natalie A. dos Santos. Email: natsdossantos22@gmail.com

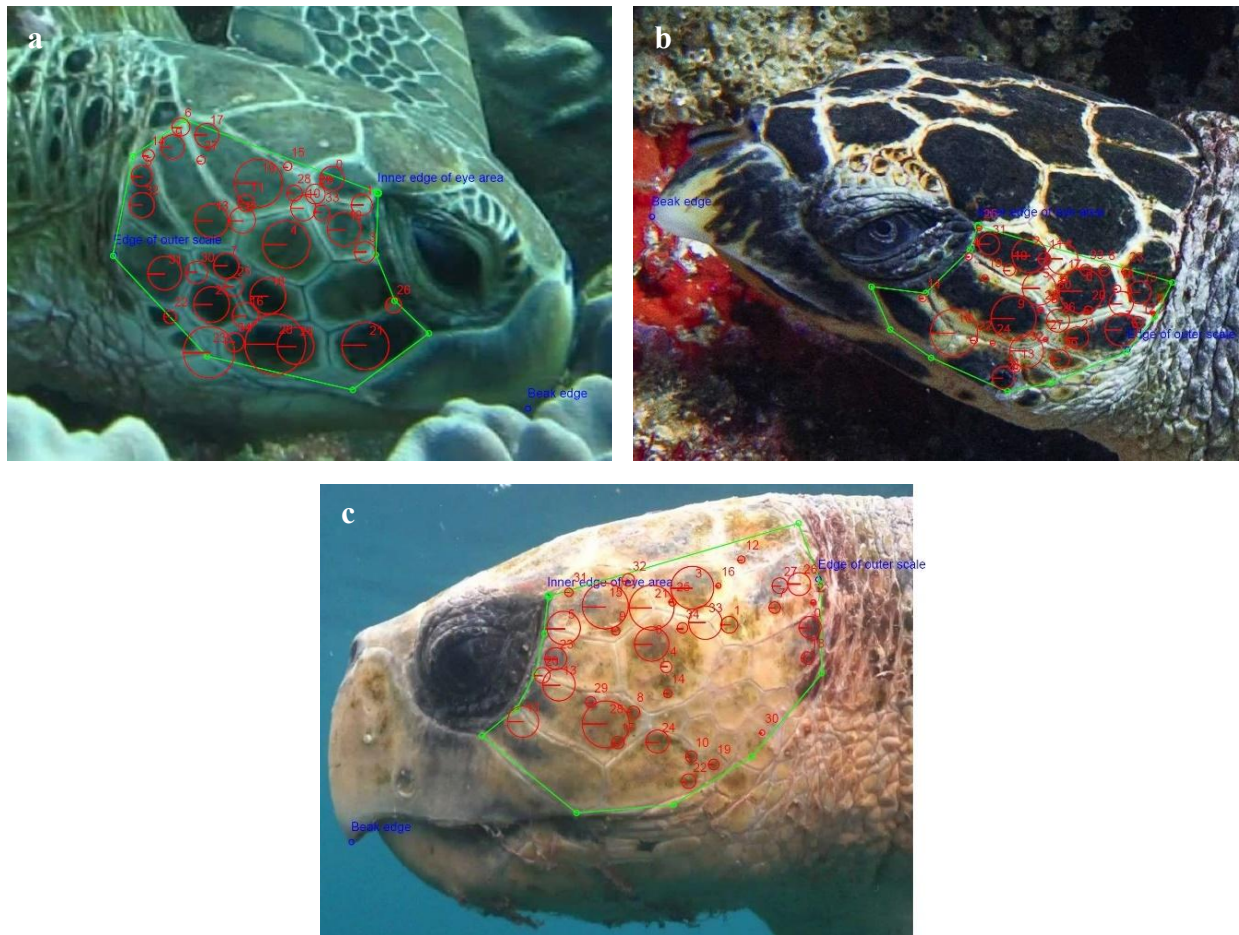
Supplementary Material



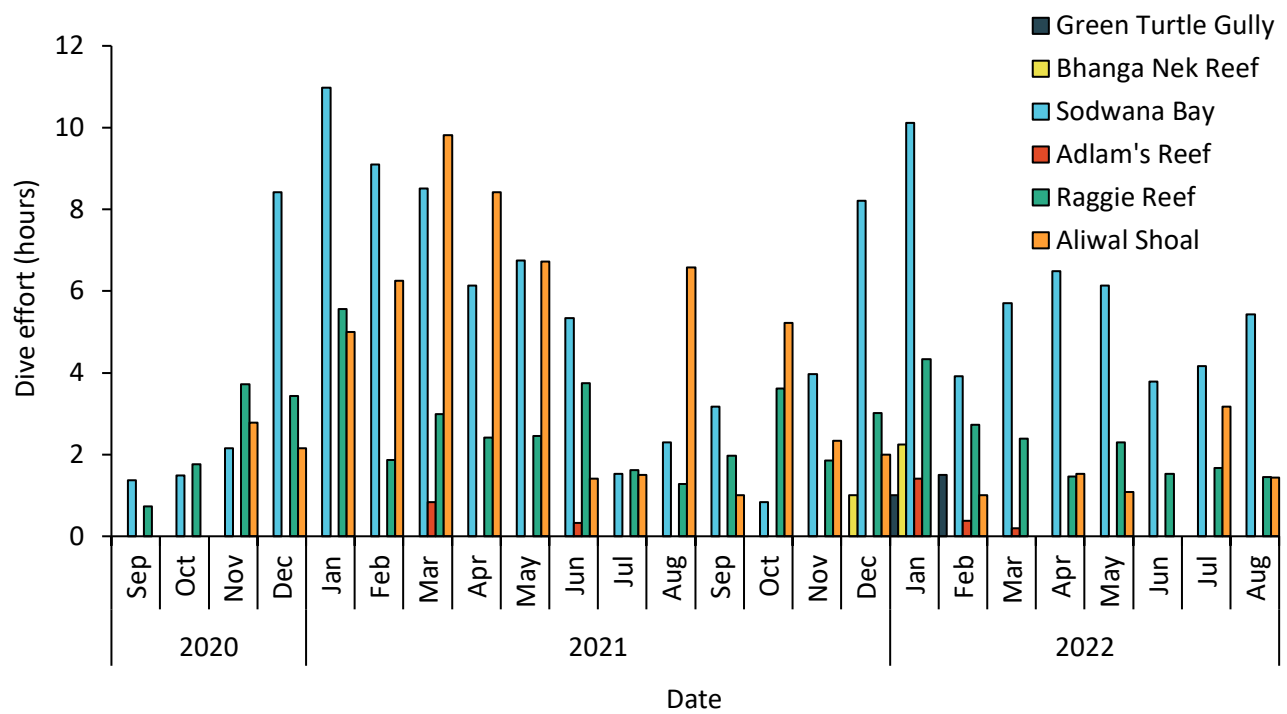
Supplementary Figure 1 Custom-made paired-laser photogrammetry rig consisting of a steel bracket mounting two green lasers (OceanCo Shark Lasers) 50 cm apart, aligned in parallel with an underwater camera (Olympus Tough TG-6 in Sea Frogs waterproof housing)



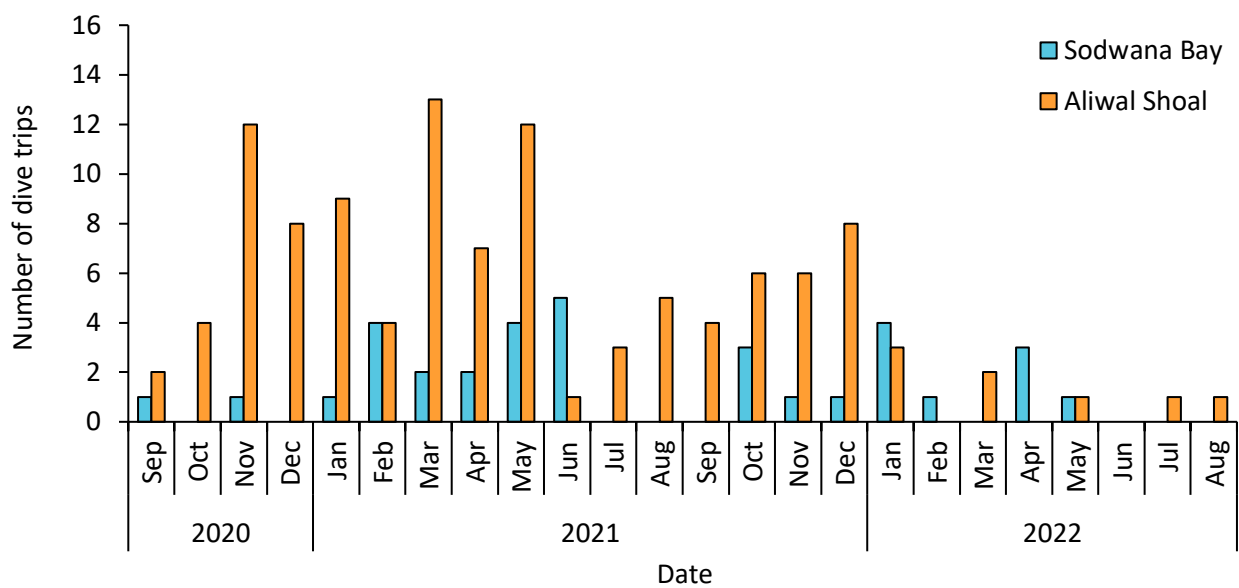
Supplementary Figure 2 Example of a loggerhead turtle photographed using the paired-laser photogrammetry rig (laser points 50 cm apart circled), from which straight carapace length (notch to tip; arrow) was measured as 67 cm using ImageJ software. Photographer: Michael Tarr



Supplementary Figure 3 Example of I³S Pattern image analysis for an (a) green turtle, (b) hawksbill, and (c) loggerhead, showing manually placed reference points (blue; beak edge, inner edge of eye area, and edge of outer scute), manually outlined region of interest (green; postocular scutes), and automatically extracted key points (red) used to generate a unique fingerprint. Photographers: Chris Johnston (a), Leila Scheltema (b) and Andy Coetzee (c)



Supplementary Figure 4 Dive effort (hours) for timed research surveys at six study sites between September 2020 and August 2022



Supplementary Figure 5 Dive effort (number of dive trips) reported by citizen scientists at two frequently dived study sites between September 2020 and August 2022

Supplementary Table 1 Paired-laser photogrammetry and calliper measurements of straight carapace length (SCL, notch to tip) of individual turtles following initial visual size class estimation underwater. Some individuals were measured and identified outside the study period (September 2020-August 2022). Cm: green turtle; Ei: hawksbill; Cc: loggerhead

Species	Turtle ID	Visual size class estimate	Paired-laser photogrammetry (cm)	Calliper (cm)	Measurement within visual size class estimate (Yes/No)
Cm	SBCm_Deano	Juvenile	-	44.9	Yes
Cm	BNCm_Travis	Juvenile	-	47.6	Yes
Cm	BNCm_FrankyFourFingers	Juvenile	-	46.8	Yes
Cm	ASCm_Linda	Juvenile	52.1	-	Yes
Cm	BNCm_Ngubane	Juvenile	-	55.6	Yes
Cm	BNCm_Joel	Subadult	-	63.8	Yes
Cm	SBCm_Tali	Subadult	-	68.8	Yes
Cm	BNCm_Steve	Subadult	-	69.9	Yes
Cm	ASCm_Kei	Subadult	76.2	-	Yes
Cm	ASCm_Pan	Subadult	82	-	Yes
Cm	ASCm_CaptainHook	Subadult	85.1	-	Yes
Cm	ASCm_Michy	Subadult	87.3	-	Yes
Cm	ASCm_EliudKipchoge	Adult-sized	79.8	-	No (subadult)
Cm	ASCm_Bentley	Adult-sized	83	-	No (subadult)
Cm	ASCm_Ozzy	Adult-sized	86.1	-	No (subadult)
Cm	SBCm_Ntombi	Adult-sized	-	92.3	Yes
Cm	ASCm_Louise	Adult-sized	92.4	-	Yes
Cm	SBCm_Alex	Adult-sized	-	94.6	Yes
Cm	ASCm_Jeff	Adult-sized	97.2	-	Yes
Cm	ASCm_Ncami	Adult-sized	99.2	-	Yes
Ei	ASEi_Hawky	Juvenile	37.4	-	Yes
Ei	ASEi_Christopher	Juvenile	43	-	Yes
Ei	SBEi_Steph	Juvenile	-	44.7	Yes
Ei	SBEi_BarnacleBrad	Juvenile	-	45	Yes
Ei	ASEi_Ron	Juvenile	49.1	-	Yes
Ei	ASEi_Redmar	Subadult	54.3	-	No (juvenile)
Ei	SBEi_Pierre	Subadult	-	56.5	No (juvenile)
Ei	ASEi_Khandalinyoni	Subadult	57.5	-	No (juvenile)
Ei	ASEi_Charlie	Subadult	62.7	-	Yes
Ei	ASEi_Myrtle	Subadult	63.7	-	Yes
Ei	SBEi_KFC	Subadult	-	68.3	Yes
Ei	SBEi_Samantha	Subadult	-	73.4	Yes
Cc	ASCc_Geremy	Subadult	66.9	-	Yes
Cc	ASCc_4	Adult-sized	-	69	No (subadult)
Cc	ASCc_1	Adult-sized	-	69.2	No (subadult)
Cc	ASCc_6	Adult-sized	-	72.9	No (subadult)
Cc	ASCc_3	Adult-sized	-	74.8	No (subadult)
Cc	ASCc_5	Adult-sized	-	76.4	No (subadult)
Cc	ASCc_2	Adult-sized	-	78.3	No (subadult)
Cc	ASCc_Shelly	Adult-sized	81	-	Yes

SCL guides used for visual estimates of size classes:

Juvenile: <60 cm (green turtles, hawksbills and loggerheads)

Subadult: 60–80 cm (hawksbills and loggerheads), 60–90 cm (green turtles)

Adult-sized: >80 cm (hawksbills and loggerheads), >90 cm (green turtles)