

### **Protocol S1. Deployment of tracking devices on adult female green turtles in Poilão Island, Bijagós Archipelago, Guinea-Bissau**

We deployed the tracking devices during the egg-laying process. We waited at a safe distance for female turtles to start laying eggs, and then approached to attach the tags. Handling time was reduced to the strictly necessary to minimize disturbance to the turtles and all females maintained their nesting activity during and after tag deployment and returned safely to the sea. The second anterior central carapace scute of each turtle was sanded with sandpaper and degreased with acetone, before being fitted with a fixative made of fiberglass and fast-dry epoxy (Devcon 5 Minute® Epoxy). This fixative was left to dry for five minutes. Then, a layer of two-part steel resin (magic metal, ®Loctite) was applied at the base of the tag, which was then centred in the fixative, and left to dry for ten minutes. Lastly, more fixative was applied around the base of the tag to secure it and left to dry for five minutes. The tracking device attachment procedure took approximately 20 minutes.

The protocols were approved by the ethical committee of the Órgão Responsável pelo Bem-Estar Animal of Ispa - Instituto Universitário, Lisbon, Portugal (ORBEA-Ispa), which ensures the compliance of ethical standards and animal welfare rules.



Green turtle with Wildlife Computers ® SPOT-375B tag

**Table S1.** Summary information from 44 female green turtles tracked during the 2018, 2019 and 2020 breeding periods within the João Vieira-Poilão Marine National Park (JVPMNP), Bijagós Archipelago, Guinea-Bissau. Missing data are denoted by ‘-’. KUD: kernel utilization distribution. CCL: curved carapace length.

Year	Turtle ID	CCL (cm)	Tag type	Location type	Recording duration (d)	Locations within JVPMNP (%)	Locations within no-take zone (%)	Core area: 50% KUD (km <sup>2</sup> )	Home range: 95% KUD (km <sup>2</sup> )
2018	PTT60865	113.5	SPOT-375B	Argos	24.67	99.66	94.28	9.36	47.74
2018	PTT60868	91.0	SPOT-375B	Argos	21.42	99.61	87.98	7.65	52.13
2018	PTT60886	-	SPOT-375B	Argos	14.33	100.00	97.69	6.98	34.96
2018	PTT60887	105.0	SPOT-375B	Argos	82.33	97.98	75.33	10.90	74.11
2018	PTT60888	109.0	SPOT-375B	Argos	21.67	98.08	80.84	7.79	47.92
2018	PTT60889	104.0	SPOT-375B	Argos	12.58	98.03	87.50	9.31	42.58
2018	PTT60890	98.5	SPOT-375B	Argos	4.08	100.00	100.00	6.47	32.31
2018	PTT60891	92.5	SPOT-375B	Argos	11.42	67.39	52.90	11.04	331.24
2018	PTT60892	106.0	SPOT-375B	Argos	10.92	93.18	69.70	10.61	59.71
2018	PTT60893	-	SPOT-375B	Argos	34.58	99.76	96.63	7.32	40.43
2018	PTT60894	87.0	SPOT-375B	Argos	43.50	90.63	69.60	17.84	170.49
2018	PTT60897	78.0	SPOT-375B	Argos	23.75	40.91	29.37	54.06	495.56
2018	PTT60898	95.0	SPOT-375B	Argos	9.67	98.29	91.45	8.25	61.89
2018	PTT60899	103.0	SPOT-375B	Argos	10.33	96.80	70.40	8.94	45.66
2018	PTT60900	102.0	SPOT-375B	Argos	48.75	96.93	83.11	17.16	138.70
2019	0049-P	104.0	Arribada	GPS	5.33	100.00	100.00	5.30	22.85
2019	0056-P	90.0	Arribada	GPS	5.75	100.00	84.29	15.56	103.38
2019	0057-P	109.0	Arribada	GPS	9.08	100.00	100.00	4.50	19.48
2019	0058-P	100.0	Arribada	GPS	8.50	100.00	100.00	4.58	19.89
2019	0059-P	104.0	Arribada	GPS	5.00	100.00	95.08	6.53	28.38
2019	0060-P	101.0	Arribada	GPS	5.58	100.00	100.00	5.05	21.80
2019	0061-P	87.0	Arribada	GPS	5.50	100.00	100.00	4.77	20.55

**Table S1.** (continued)

Year	Turtle ID	CCL (cm)	Tag type	Location type	Recording duration (d)	Locations within JVPMPN (%)	Locations within no-take zone (%)	Core area: 50% KUD (km <sup>2</sup> )	Home range: 95% KUD (km <sup>2</sup> )
2019	0064-P	99.0	Arribada	GPS	10.50	100.00	100.00	4.36	18.83
2019	0066-P	86.0	Arribada	GPS	5.92	100.00	100.00	4.91	21.15
2019	0067-P	102.0	Arribada	GPS	5.50	100.00	100.00	4.56	19.76
2019	PTT182450	104.3	FastGPS	Argos + GPS	59.00	100.00	94.64	6.39	35.30
2019	PTT182451	96.0	FastGPS	Argos + GPS	58.75	99.72	93.34	6.78	36.43
2019	PTT182452	98.5	FastGPS	Argos + GPS	56.00	98.37	87.07	9.10	86.02
2019	PTT182455	105.5	FastGPS	Argos + GPS	54.17	93.86	79.26	7.41	111.21
2019	PTT182456	102.0	FastGPS	Argos + GPS	72.00	98.96	95.03	6.78	35.61
2019	PTT182457	99.5	FastGPS	Argos + GPS	47.67	95.64	75.04	17.07	130.50
2019	PTT182458	84.0	FastGPS	Argos + GPS	41.67	98.40	81.04	10.59	91.79
2019	PTT182459	106.5	FastGPS	Argos + GPS	24.67	95.96	73.40	14.17	133.20
2019	PTT182461	99.0	FastGPS	Argos + GPS	53.17	100.00	99.22	5.62	27.23
2020	PTT197137	105.0	FastGPS	Argos + GPS	15.42	100.00	100.00	5.72	27.67
2020	PTT197138	96.5	FastGPS	Argos + GPS	39.58	98.53	89.29	11.49	76.32
2020	PTT205277	111.2	FastGPS	Argos + GPS	32.08	97.41	78.50	11.97	103.16
2020	PTT205279	92.0	FastGPS	Argos + GPS	13.42	100.00	96.30	9.99	89.87
2020	PTT205281	97.0	FastGPS	Argos + GPS	39.83	96.03	81.21	7.03	31.25
2020	PTT205282	97.0	FastGPS	Argos + GPS	22.08	96.24	80.45	16.72	110.58
2020	PTT205284	103.5	FastGPS	Argos + GPS	71.50	92.90	71.25	16.09	167.37
2020	PTT205285	110.0	FastGPS	Argos + GPS	30.00	93.07	78.95	16.46	97.37
2020	PTT205287	85.0	FastGPS	Argos + GPS	24.25	99.32	84.25	17.63	114.59
2020	PTT205288	121.5	FastGPS	Argos + GPS	14.58	100.00	99.43	5.53	26.92
Mean ± SD		99.5 ± 8.8			27.50 ± 21.50	96.17 ± 10.00	86.45 ± 14.49	10.37 ± 7.96	79.63 ± 86.92

**Table S2.** Estimates for the general multiple linear models used to investigate the influence of the curved carapace length (CCL), nesting beach sector, date of tag deployment (day-of-year), recording duration and year on the extent of the 50 and 95% kernel utilization distribution (KUDs). **Bold** indicates significant values ( $p < 0.05$ ).

Response variable	Explanatory variable	Estimate	SE	<i>t</i>	<i>p</i>
50% KUD	CCL	0.82	0.57	-1.44	0.16
	Nesting beach sector FAR	1.41	2.20	0.64	0.53
	Nesting beach sector AO	-2.03	2.06	0.99	0.33
	Nesting beach sector CAB	0.90	2.11	-0.42	0.67
	Date of tag deployment	-2.27	1.19	-1.92	0.06
	Recording duration	1.05	0.63	1.66	0.11
	Year 2019	-6.98	2.57	-2.72	<b>&lt;0.05</b>
	Year 2020	0.47	1.90	0.25	0.81
95% KUD	Nesting beach sector FAR	-4.82	22.06	0.22	0.83
	Nesting beach sector AO	-32.99	20.96	-1.57	0.12
	Nesting beach sector CAB	-22.72	20.40	-1.11	0.27
	Date of tag deployment	-12.10	10.02	-1.21	0.24
	Recording duration	15.91	6.30	2.53	<b>&lt;0.05</b>
	Year 2019	-29.67	22.32	-1.33	0.19
	Year 2020	18.40	18.18	1.01	0.32

**Table S3.** ANOVA table from the multiple linear models predicting the effect of the tag type on the extent of the 50 and 95% kernel utilization distributions (KUDs). **Bold** indicates significant values ( $p < 0.05$ ).

Response variable	Explanatory variable	df	SS	MS	<i>F</i>	p
50% KUD	CCL	1	17.71	17.71	1.73	0.21
	Date of tag deployment	1	94.22	94.22	9.22	<b>&lt;0.01</b>
	Recording duration	1	15.59	15.59	1.53	0.24
	Residuals	15	153.29	10.22	–	–
95% KUD	CCL	1	922.30	922.30	1.30	0.28
	Nesting beach sector	3	2931.80	977.30	1.37	0.30
	Date of tag deployment	1	14399.10	14399.10	20.25	<b>&lt;0.001</b>
	Recording duration	1	3982.40	3982.40	5.60	<b>&lt;0.05</b>
	Tag type	1	1477.10	1477.10	2.08	0.18
	Residuals	11	7820.40	710.90	–	–

**Table S4.** Estimates for the multiple linear models to test the tag type effect on the extent of the 50 and 95% kernel utilization distribution (KUDs). **Bold** indicates significant values ( $p < 0.05$ ).

Response variable	Explanatory variable	Estimate	SE	<i>t</i>	p
50% KUD	CCL	-1.01	0.77	-1.32	0.21
	Date of tag deployment	-5.88	1.83	-3.20	<b>&lt;0.01</b>
	Recording duration	-4.31	1.82	-2.37	<b>&lt;0.05</b>
95% KUD	CCL	-10.58	7.61	-1.39	0.19
	Nesting beach sector FAR	-30.29	30.38	-1.00	0.34
	Nesting beach sector AO	-29.42	37.60	0.78	0.45
	Nesting beach sector CAB	-55.20	31.02	-1.78	0.10
	Date of tag deployment	-44.95	29.41	-1.53	0.15
	Recording duration	-59.54	17.87	-3.33	<b>&lt;0.01</b>
	FastGPS tags	78.39	56.84	1.38	0.20

**Table S5.** 50 and 95% kernel utilization distribution (KUDs) areas and overlap for two randomly selected inter-nesting intervals of 20 female green turtles tracked during the 2018, 2019 and 2020 breeding periods within the João Vieira-Poilão Marine National Park, Bijagós Archipelago, Guinea-Bissau. The overlap represents the proportion of the later randomly selected inter-nesting interval included in the first randomly selected inter-nesting interval.

PTT	First randomly selected inter-nesting interval			Later randomly selected inter-nesting interval			KUDs intersect area and overlap			
	Identifier of the inter-nesting interval	50% KUD area (km <sup>2</sup> )	95% KUD area (km <sup>2</sup> )	Identifier of the inter-nesting interval	50% KUD area (km <sup>2</sup> )	95% KUD area (km <sup>2</sup> )	50% KUDs intersect area (km <sup>2</sup> )	95% KUDs intersect area (km <sup>2</sup> )	50% KUDs overlap (%)	95% KUDs overlap (%)
60865	1	9.15	45.32	2	8.75	48.40	7.21	41.30	82.41	85.32
60887	2	8.65	46.20	3	9.72	44.51	6.50	35.61	66.91	79.99
60893	1	7.41	41.86	2	6.68	32.12	6.06	31.04	90.67	96.63
60894	1	18.13	189.02	2	15.88	91.47	12.48	71.72	78.60	78.41
60900	3	15.35	70.48	4	14.23	151.73	12.54	61.84	88.11	40.75
182450	2	5.20	23.92	3	5.69	28.92	5.20	23.73	91.37	82.06
182451	3	6.51	31.61	4	6.45	30.29	6.00	27.96	93.01	92.31
182452	1	11.14	93.44	2	7.92	41.01	7.61	41.01	96.08	100.00
182455	2	8.67	60.84	3	8.19	58.31	7.08	49.48	86.49	84.86
182456	3	5.35	23.11	6	6.24	27.70	4.87	22.72	78.02	82.02
182457	3	17.52	98.77	4	15.62	109.38	9.95	63.63	63.68	58.17

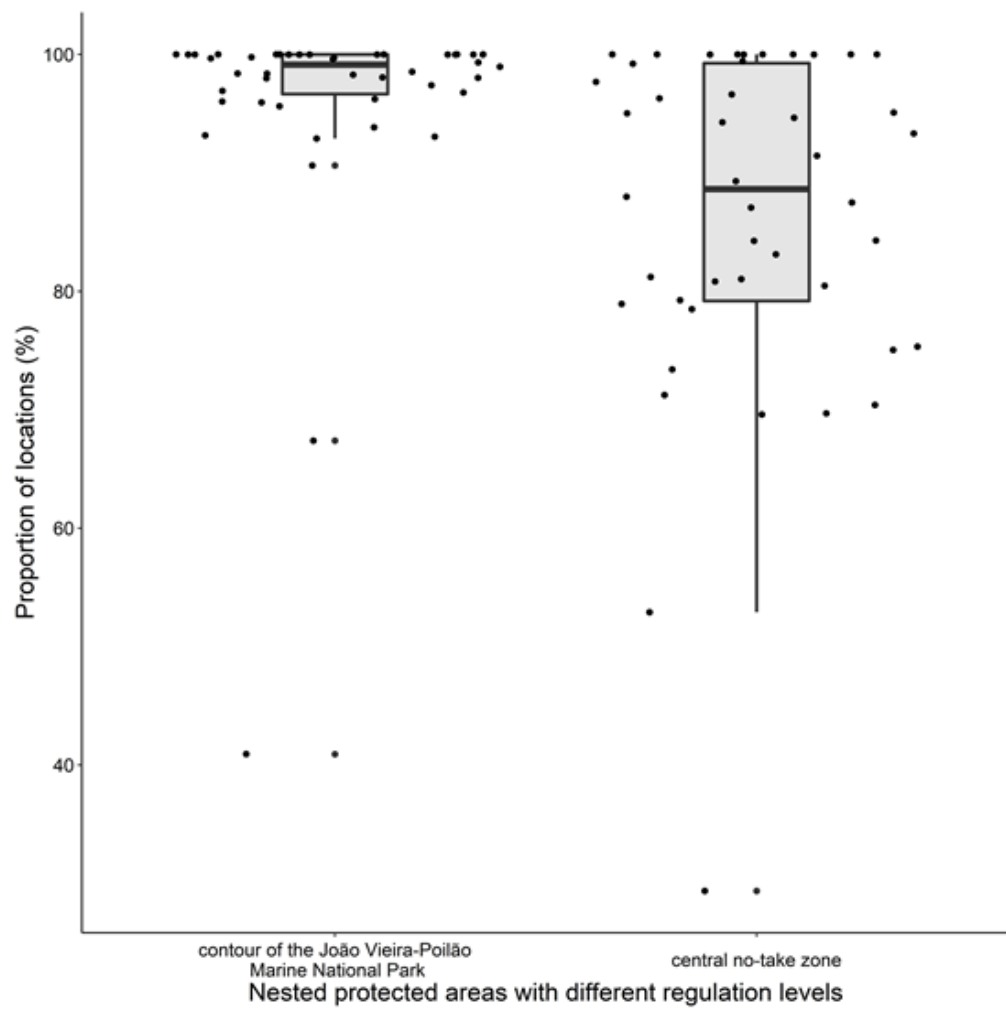
**Table S5.** (continued)

PTT	First randomly selected inter-nesting interval			Later randomly selected inter-nesting interval			KUDs intersect area and overlap			
	Identifier of the inter-nesting interval	50% KUD area (km <sup>2</sup> )	95% KUD area (km <sup>2</sup> )	Identifier of the inter-nesting interval	50% KUD area (km <sup>2</sup> )	95% KUD area (km <sup>2</sup> )	50% KUDs intersect area (km <sup>2</sup> )	95% KUDs intersect area (km <sup>2</sup> )	50% KUDs overlap (%)	95% KUDs overlap (%)
182458	1	15.14	99.45	3	8.54	69.54	8.54	64.39	100.00	92.60
182459	1	11.25	75.64	2	17.22	138.86	10.64	56.41	61.81	40.63
182461	3	5.12	22.32	4	4.98	21.80	4.48	21.02	89.87	96.44
197138	2	9.46	60.07	3	12.24	89.99	9.46	56.66	77.27	62.97
205277	1	9.65	98.70	2	9.45	87.43	8.84	73.33	93.50	83.87
205281	1	19.19	112.72	3	12.71	82.25	10.78	66.77	84.77	81.18
205284	4	11.78	95.15	6	6.88	41.28	6.88	40.80	100.00	98.83
205285	1	19.65	109.31	2	13.76	79.23	10.64	72.40	77.34	91.38
205287	1	11.34	80.47	2	21.86	125.67	8.38	69.32	38.33	55.16
Mean ± SD		11.28 ± 4.72	73.92 ± 40.58		10.65 ± 4.58	69.99 ± 39.20	8.21 ± 2.42	49.56 ± 18.29	81.91 ± 15.11	79.18 ± 18.18



**Table S6.** Number and percentage of locations occurring within the João Vieira-Poilão Marine National Park (JVPMNP), according to the type of bio-logging devices deployed on 44 female green turtles during the 2018, 2019 and 2020 breeding periods.

Year	Tag type	Number of turtles	Number of locations	Number of locations within the JVPMNP	Locations within the JVPMNP (%)	Number of locations within the no-take zone	Locations within the no-take zone (%)
2018	SPOT-375B	15	4503	4176	92.74	3512	84.10
2019	Arribada	10	810	810	100	796	98.27
2019 + 2020	FastGPS	19	9257	9016	97.34	7933	85.70
2019	FastGPS	9	5614	5507	98.09	4942	88.03
2020	FastGPS	10	3643	3509	96.32	2991	82.10



**Fig. S1.** Percentage of locations of 44 female green turtles tracked within the João Vieira-Poilão Marine National Park, during the breeding period. The João Vieira-Poilão Marine National Park includes a central no-take zone (right). Each dot corresponds to one individual.