Long-term and seasonal patterns of sea turtle home ranges in warm coastal foraging habitats: implications for conservation

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Table S1 Metadata for adult green and loggerhead turtles tracked by satellite-linked tags at their foraging habitat. Prior to obtaining the metadata, satellite location data were filtered as described in main text (see main text, Materials and methods – Data acquisition & preparation). Fixes acquired prior to turtles' arrival at their foraging habitats were also excluded. Curved carapace length (CCL) was measured for each turtle prior to deployment of a satellite tracking device. Site is the foraging habitat where each turtle was tracked (see main text, Fig. 1). All turtles were tracked once with a highly accurate Argos-linked FGPS. Three loggerhead turtles were tracked twice: T14914 (PTT and FGPS), T53800 (PTT and FGPS), T93038 (FGPS in both occasions). Mark-recapture data presented here only includes capture records at the foraging sites. Minimum years of residency were inferred for each turtle using satellite telemetry and/or mark-recapture records.

				Satellite telemetry					Mark-recapture			
Turtle ID	Site	Sex	CCL (cm)	Argos ID	Tag type	First fix (year/month)	Tracking days	Number of Fixes	First record (year/month)	Last record (year/month)	Number of capture	Residency (years)
Chelonia mydas												
K25713	MB	F	114.6	88073	GPS	2008/11	22	305	1999/02	2008/11	2	9.8
K36347	MB	F	115.7	88076	GPS	2008/10	63	146	2001/11	2008/10	2	7.1
K63374	MB	F	105.3	88077	GPS	2008/10	115	112	2004/05	2014/04	3	9.9
K86116	MB	F	112	88074	GPS	2008/10	39	269	2008/10	2008/10	1	0.1
K92598	MB	F	110.5	88075	GPS	2008/10	69	127	2008/10	2010/11	3	2.1
QA11722	MB	F	113	48855	GPS	2010/05	86	492	2010/05	2010/05	1	0.2
QA11747	MB	F	101.6	48861	GPS	2010/05	350	324	2010/05	2010/05	1	1.0
QA18333	MB	F	106.5	96776	GPS	2011/08	130	975	2011/08	2011/08	1	0.4
QA23607	MB	F	108.5	72448	GPS	2011/09	155	1110	2011/09	2011/09	1	0.4
QA23646	MB	F	119.9	48840	GPS	2011/09	157	1356	2011/09	2011/09	1	0.4
QA3228	MB	F	107	48862	GPS	2011/05	261	978	2011/05	2011/05	1	0.7

QA4279	MB	F	107.3	88075	GPS	2011/02	328	1722	2011/02	2011/02	1	0.9
QA4969	MB	F	112.5	48845	GPS	2011/04	347	1059	2009/05	2011/04	2	2.8
T13734	MB	F	109.4	48852	GPS	2011/05	249	1703	2011/05	2011/06	4	0.7
T5561	MB	F	110.6	48841	GPS	2011/04	311	2131	2011/04	2011/04	1	0.9
T84474	MB	F	111.7	48855	GPS	2011/05	294	1169	1998/09	2015/10	4	17.0
K24369	MB	M	96.1	54553	GPS	2013/06	132	1740	2013/06	2013/06	1	0.4
QA34298	MB	M	94	54529	GPS	2013/06	107	849	2013/06	2014/05	2	0.9
QA23117	SS	F	121.2	48884	GPS	2011/07	564	2678	2011/07	2011/07	1	1.6
QA23188	SS	F	106.1	88077	GPS	2011/08	483	2020	2011/07	2011/07	1	1.4
QA23196	SS	F	107.8	96775	GPS	2011/07	353	1696	2011/07	2011/07	1	1.0
QA23200	SS	F	106.1	96774	GPS	2011/07	241	712	2011/07	2011/07	1	0.7
T54322	SS	F	108.8	88072	GPS	2011/07	249	989	2011/07	2011/07	1	0.7
T69943	SS	F	113.2	88074	GPS	2011/07	179	1235	2011/07	2011/07	1	0.5
K70229	PC	F	105.7	133767	GPS	2013/11	241	258	2013/11	2013/12	1	0.7
QA33335	PC	F	89	134180	GPS	2014/05	77	130	2013/11	2014/05	2	0.7
QA33342	PC	F	111	133764	GPS	2013/11	105	506	2013/11	2013/11	1	0.3
QA33348	PC	F	107.3	133769	GPS	2013/11	55	237	2013/11	2013/11	1	0.2
QA43023	PC	F	102.7	133770	GPS	2013/11	68	569	2013/11	2013/11	1	0.2
QA43066	PC	F	105.7	133766	GPS	2013/11	62	390	2013/11	2013/11	1	0.2
QA45524	PC	F	101.7	134183	GPS	2014/05	165	253	2014/05	2014/05	1	0.5
QA45554	PC	F	116.6	134184	GPS	2014/05	170	723	2014/05	2014/05	1	0.5
QA45566	PC	F	110.9	134188	GPS	2014/05	91	188	2014/05	2014/05	1	0.3
T83097	PC	F	104.4	96780	GPS	2010/07	154	591	2010/06	2010/06	1	0.4
K93086	PC	M	85.6	96781	GPS	2010/07	172	556	2010/06	2010/06	1	0.5
K93087	PC	M	104.3	96777	GPS	2010/07	240	519	2010/06	2010/06	1	0.7
K93088	PC	M	92.2	96778	GPS	2010/07	213	656	2010/06	2010/06	1	0.6
QA13938	PC	M	95.4	134182	GPS	2014/05	174	1378	2013/05	2014/05	2	1.5
QA33327	PC	M	96.5	133765	GPS	2013/11	66	417	2013/11	2013/11	1	0.2
QA36875	PC	M	97.6	134178	GPS	2014/05	158	637	2014/05	2014/05	1	0.4
QA43063	PC	M	93.5	133768	GPS	2013/11	70	840	2013/11	2013/11	1	0.2
QA45689	PC	M	102.5	134187	GPS	2014/05	119	752	2014/05	2014/05	1	0.3
K55740	SB	F	97.3	96780	GPS	2012/07	778	14295	2003/06	2012/07	2	11.2
QA27532	SB	F	95.5	120641	GPS	2012/07	140	296	2012/06	2012/06	1	0.4
QA28798	SB	F	102.1	120640	GPS	2012/07	264	1123	2012/06	2012/06	1	0.7
QA30008	SB	F	100.5	108472	GPS	2012/06	403	974	2012/06	2012/06	1	1.1
QA30012	SB	F	96.1	96777	GPS	2012/07	579	1130	2012/06	2012/06	1	1.6

QA30108	SB	F	104.5	108469	GPS	2012/07	155	225	2012/06	2012/06	1	0.5
QA7011	TS	F	102.1	95891	GPS	2009/07	202	793	2009/07	2009/07	1	0.6
QA7075	TS	F	98	95889	GPS	2009/08	100	239	2009/07	2009/07	1	0.3
QA7207	TS	F	118	70455	GPS	2010/10	128	854	2010/09	2010/09	1	0.4
QA7435	TS	F	105.6	95892	GPS	2010/09	45	414	2010/09	2010/09	1	0.1
Caretta caretta												
K22217	MB	F	99	95892[#]	GPS	2010/01	56	479	1999/05	2010/05	2	11.0
QA13932	MB	F	95.2	95892	GPS	2013/04	563	1169	2013/04	2013/04	1	1.6
QA34296	MB	F	85.5	95890	GPS	2013/04	212	929	2013/04	2013/04	1	0.6
T14527	MB	F	100.1	134542[#]	GPS	2014/02	84	802	NA	NA	0	0.2
T14914	MB	F	91.1	26040	PTT	1996/09	151	22	1996/09	1996/09	1	17.1
			93.2	48847[#]	GPS	2011/01	999	750				
T23158	MB	F	98.6	48850	GPS	2010/09	409	362	2010/08	2010/08	1	1.1
T29282	MB	F	97.5	88076[#]	GPS	2011/02	427	625	1995/08	2000/04	5	16.7
T462	MB	F	98.9	70455	GPS	2013/03	68	590	2013/03	2014/04	2	1.1
T74362	MB	F	87.4	88075	GPS	2009/07	102	1346	1994/04	2009/06	10	15.5
T81920	MB	F	89.6	48845[#]	GPS	2010/01	230	1234	1995/04	2014/09	3	19.4
T93038	MB	F	95	48841[#]	GPS	2010/01	104	1237	1997/05	1997/05	3	15.5
			95.8	96778[#]	GPS	2012/02	281	587				
K24365	MB	M	97.5	54529	GPS	2010/05	196	657	2004/04	2010/07	3	6.6
K96000	MB	M	92.9	95889	GPS	2013/03	141	818	2013/03	2015/06	2	2.3
QA14215	MB	M	94.4	54527	GPS	2010/06	284	298	2010/06	2011/04	2	0.8
QA2746	MB	M	94.8	108470	GPS	2013/03	154	747	2013/03	2015/09	2	2.5
T53800	MB	M	93.5	7223	PTT	1998/09	104	23	1991/08	2014/05	15	22.7
			93.9	54528	GPS	2010/06	906	431				
T67504	MB	M	87.9	95891	GPS	2013/03	59	246	1993/09	2013/03	6	19.7
T71600	MB	M	92	96781	GPS	2012/05	305	1004	1993/05	2013/03	11	19.9
T74361	MB	M	100.7	95890	GPS	2010/05	130	989	1994/04	2010/10	6	16.5
T89701	MB	M	97	54531	GPS	2010/10	312	816	1996/05	2015/09	7	19.3

[#] The turtles were deployed with an Argos-linked FPGS tag at their nesting beach in Mon Repos and tracked to their foraging habitat in Moreton Bay.

Table S2. Parameters used in the BRB function of the R package adehabitatHR to estimate the utilisation distribution of study turtles. For details of the function and each parameter, see the vignettes of the package (Calenge 2015) and the relevant literature cited in the table.

Parameter	Value	Rationale
D: diffusion coefficient	Estimated using the maximum likelihood method using the BRB.likD function	See Horne et al. (2007).
Tmax: the maximum duration allowed for a step built by successive fixes	14 hours	The 95th percentile of the intervals between successive fixes for 113 tracks used in Shimada et al. (2016). Also see Benhamou and Cornélis (2010) and Benhamou (2011).
Lmin: the minimum distance between successive fixes	50 m	The estimated mean error of the filtered FGPS location data (Shimada et al. 2012). Also see Benhamou (2011).
hmin: the minimum smoothing parameter	100 m	Greater than the standard deviation of the estimated error of the filtered FGPS location data (Shimada et al. 2012) and approximately equal to the resolutions of the bathymetry data used as a boundary for turtle movements. Also see Benhamou and Cornélis (2010) and Benhamou (2011).
type: the type of distribution to return	"UD"	Requesting for utilization distribution.
grid: the size of the grid	A raster layer specifying the areas below high tide line as plausible turtle habitat	See Shimada et al. (2016) - Data preparation. Also see Benhamou and Cornélis (2010).

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