Table S1: Tagging, tracking, and physiological calculations for each leatherback foraging in the northeastern Gulf of Mexico (NEGOM), Mid-Atlantic Bight (MAB), and southern New England (SNE). Leatherbacks were either tagged in the northeastern Gulf of Mexico (NEGOM), Massachusetts (MA), or North Carolina (NC). The capture location corresponds to the letters in the ID name.

ID	Capture year	Sex	CCL (cm)	CCW (cm)	Foraging area	Days in foraging area	Days at liberty
GOM18.01	2018	F	170.5		NEGOM	9	14
GOM18.02	2018	F	148.0	120.1	NEGOM	11	18
GOM18.03	2018	F	152.7	124.0	NEGOM	68	149
GOM18.04	2018	F	130.2	120.5	NEGOM	16	76
GOM18.05	2018	F	147.5	125.5	NEGOM	8	151
GOM18.06	2018	F	155.4	146.5	NEGOM	76	122
GOM18.07	2018	F	150.4	136.0	NEGOM	44	168
GOM19.01	2019	F	154.2		NEGOM	7	104
GOM19.02	2019	F	156.7	145.9	NEGOM	19	49
GOM19.03	2019	F	150.2	105.2	NEGOM	46	142
GOM19.04	2019	F	150.6	111.3	NEGOM	14	71
GOM19.05	2019	F	159.4	113.4	NEGOM	26	154
GOM21.01	2021	F	155.7	113.8	NEGOM	11	65
GOM21.02	2021	F	171.8	122.1	NEGOM	20	62
MA18.01	2018	F	152.0	112.0	MAB, SNE	30, 24	161
MA19.01	2019	F	140.1	120.1	SNE	21	38
MA19.02	2019	M	152.8	111.0	SNE	49	162
MA19.03	2019	F	143.6	127.0	MAB	12	198
MA19.04	2019	M	148.2	105.6	SNE	11	276
MA19.05	2019	F	130.5	95.10	SNE	33	220
MA19.06	2019	F	140.6	101.6	SNE	29	89
MA19.07	2019	M	153.2	111.2	SNE	29	205
MA19.08	2019	M	144.6	107.2	MAB	3	244
MA22.01	2022	F	150.3	110.0	SNE	11	170
MA22.02	2022	F	148.6	114.5	SNE	13	32
MA22.05	2022	F	158.8	114.8	SNE	29	175
MA22.06	2022	F	165.1	116.0	SNE	2	31
MA22.09	2022	M	158.6	113.1	SNE	10	164
MA22.10	2022	F	149.7	107.5	SNE	29	184
MA22.11	2022	F	158.2	111.0	SNE	14	61
NC18.01	2018	F	165.0	99.0	MAB	55	129

ID	Capture year	Sex	CCL (cm)	CCW (cm)	Foraging area	Days in foraging area	Days at liberty
NC18.02	2018	F	158.8	108.2	MAB	62	112
NC18.03	2018	F	141.8	106.8	MAB, SNE	18, 3	162
NC18.04	2018	F	133.2	89.1	MAB	44	202
NC18.05	2018	M	155.2	104.6	MAB, SNE	5, 40	242
NC18.06	2018	F	149.8	104.7	MAB	26	170
NC18.07	2018	M	155.4	118.7	MAB, SNE	55, 12	154
NC19.01	2019	F	140.1	104.1	MAB	18	60
NC19.03	2019	F	168.1	119.1	MAB	57	126
NC19.04	2019	F	158.8	117.7	MAB	46	141
NC19.06	2019	F	159.4	129.7	MAB	46	185
NC19.07	2019	F	139.2	104.4	MAB	103	133
NC19.08	2019	M	151.2	117.7	MAB	28	92
NC19.09	2019	F	167.2	120.5	MAB	100	129
NC19.10	2019	F	144.6	106.1	MAB	86	176
NC19.11	2019	F	139.6	114.9	MAB	66	224
NC21.01	2021	F	161.1	118.1	MAB	50	177
NC22.03	2022	M	157.2	115.0	MAB	10	211
NC22.05	2022	F	145.8	110.5	MAB	34	230
NC22.09	2022	F	133.5	90.5	MAB	58	200
NC22.11	2022	F	153.0	106.0	MAB	38	168

Table S2: The top 10 models, based on the Bayesian information criterion (BIC), for each dive metric. All models include the random effect of individual leatherback to account for repeated measurements.

Time-at-surface

Variables	BIC	ΔBIC	Weight
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, SST x FA	14682.86	0.00	0.591
DP, FA, MP, SST, DP x FA, MP x FA, SST x FA	14683.60	0.74	0.408
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, chl-*a* x FA, SST x FA	14695.65	Dez 79	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, Chl-a x FA, SST x FA	14710.75	27.89	<0.001
DP, FA, MP, SST, MP x FA, Chl-a x FA, SST x FA	14711.72	28.86	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, Chl-a x FA, SST x FA	14723.88	41.02	<0.001
DP, FA, MP, chl-*a*, SST, DP x FA, Chl-a x FA, SST x FA	14733.04	50.18	<0.001
DP, FA, MP, SST, DP x FA, chl-*a* x FA, SST x FA	14733.98	51.12	<0.001
DP, FA, MP, chl-*a*, SST, DP x FA, Chl-a x FA, SST x FA	14744.90	62.04	<0.001
FA, MP, chl-*a*, SST, MP x FA, chl-*a* x FA, SST x FA	14760.14	77.28	<0.001

Shallow dives (2 – 10 m)

Variables	BIC	ΔBIC	Weight
DP, FA, MP, SST, DP x FA, MP x FA	27083.18	0.00	0.723
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA	27087.48	Apr 29	0.084
DP, FA, MP, SST, DP x FA, SST x FA	27087.79	Apr 61	0.072
DP, FA, MP, SST, DP x FA	27088.99	Mai 81	0.040
DP, FA, SST, DP x FA	27089.49	Jun 30	0.031
DP, FA, SST, DP x FA, SST x FA	27089.78	Jun 60	0.027
DP, FA, SST, DP x FA, MP x FA, SST x FA	27092.05	Aug 86	0.008
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, SST x FA	27093.37	Okt 19	0.004
DP, FA, MP, chl-*a*, SST, DP x FA	27094.23	Okt 85	0.003
DP, FA, chl-*a*, SST, DP x FA	27094.23	11. Mai	0.002

Intermediate dives (10 – 50 m)

Variables	BIC	ΔBIC	Weight
DP, FA, MP, chl-*a*, SST, MP x FA	25947.79	0.00	0.570
DP, FA, MP, chl-*a*, SST	25949.55	Jan 76	0.236
DP, FA, MP, SST, MP x FA	25950.78	Feb 99	0.128
DP, FA, MP, SST	25952.08	Apr 29	0.067
DP, FA, chl-*a*, SST	25964.20	16.41	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, chl-*a* x FA	25964.95	17.16	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, SST x FA	25965.60	17.81	<0.001
DP, FA, MP, chl-*a*, SST, chl-*a* x FA	25966.66	18.87	<0.001
DP, FA, SST	25967.88	20. Okt	<0.001
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA	25968.12	20.33	<0.001

Deep dives (> 50 m)

Variables	BIC	ΔBIC	Weight
DP, FA, chl-*a*, SST, chl-*a* x FA, SST x FA	5547.97	0.00	0.849
DP, FA, chl-*a*, SST, DP x FA, Chl-a x FA, SST x FA	5551.56	Mär 58	0.141
DP, FA, MP, chl-*a*, SST, chl-*a* x FA, SST x FA	5557.27	Sep 30	0.008
DP, FA, MP, chl-*a*, SST, DP x FA, chl-*a* x FA, SST x FA	5560.23	Dez 25	0.002
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, Chl-a x FA, SST x FA	5569.69	21.72	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, chl-*a* x FA, SST x FA	5570.74	22.76	<0.001
FA, chl-*a*, SST, chl-*a* x FA, SST x FA	5595.21	47.23	<0.001
FA, MP, chl-*a*, SST, chl-*a* x FA, SST x FA	5605.43	57.46	<0.001
FA, MP, chl-*a*, SST, MP x FA, chl-*a* x FA, SST x FA	5616.02	68.05	<0.001
DP, FA, chl-*a*, DP x FA, chl-*a* x FA	5639.88	91.91	<0.001

Average dive duration

Variables	BIC	ΔBIC	Weight
FA, MP, SST, MP x FA, SST x FA	1.331.108	0.00	0.795
DP, FA, MP, SST, MP x FA, SST x FA	1.334.208	03. Okt	0.169
FA, MP, chl-*a*, SST, MP x FA, SST x FA	1.337.690	Jun 58	0.003
DP, FA, MP, chl-*a* a, SST, MP x FA, SST x FA	1.340.707	Sep 60	0.006
DP, FA, MP, SST, DP x FA, MP x FA, SST x FA	1.345.991	14.88	<0.001
FA, MP, chl-*a*, SST, MP x FA, chl-*a* x FA, SST x FA	1.348.172	17. Jun	<0.001
DP, FA, MP, chl-*a*, SST, MP x FA, Chl-a x FA, SST x FA	1.351.294	20.19	<0.001
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, SST x FA	1.352.444	21.33	<0.001
FA, MP, SST, SST x FA	1.361.692	30.58	<0.001
DP, FA, MP, chl-*a*, SST, DP x FA, MP x FA, chl-*a* x FA, SST x FA	1.363.332	32.22	<0.001

DP = Diel period, FA = Foraging area, MP = Move persistence, chl-*a* = Chlorophyll-*a*, SST = Sea surface temperature

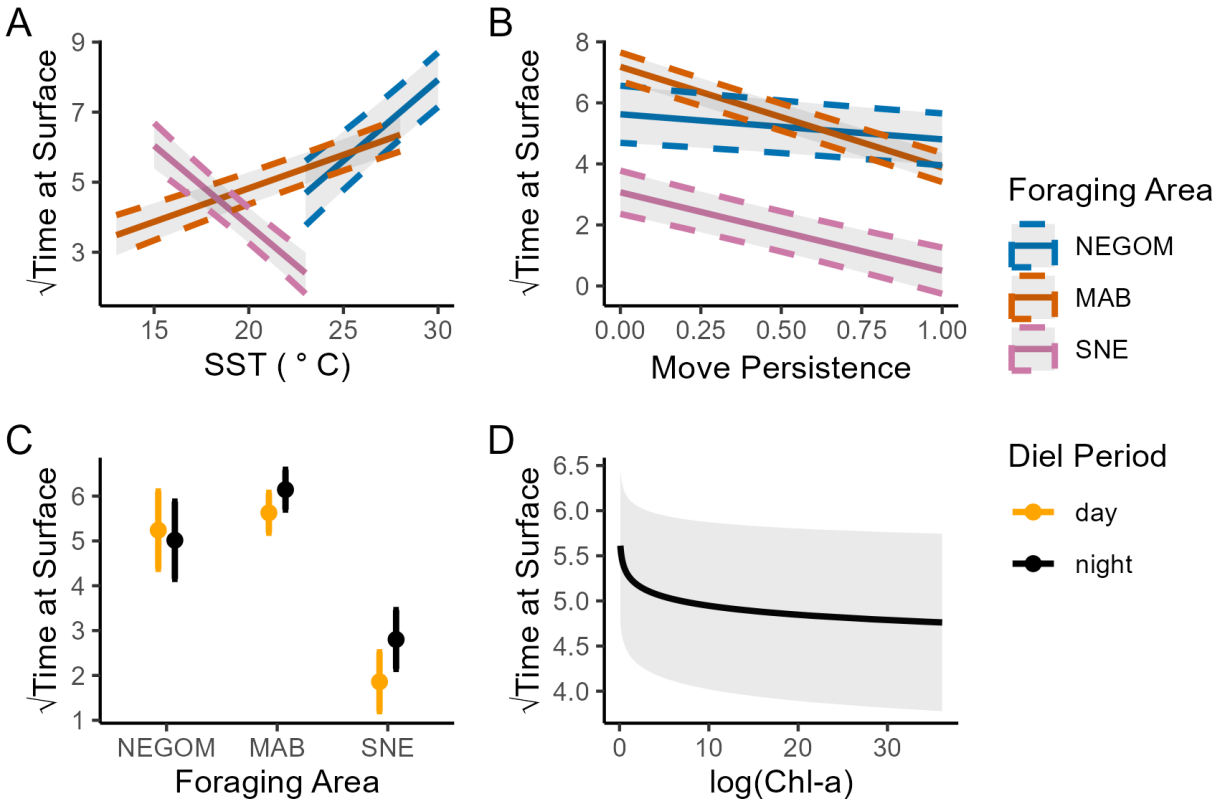

Figure S1: Prediction plots for the total time that leatherbacks spent at the surface (square root transformation). Percentages at the surface were recorded within a 6-hr interval in relation to the interaction between foraging area and sea surface temperature (SST; A), move persistence (B), and diel period (C) as well as to the relation with chlorophyll-*a* (Chl-*a*; D). Shaded regions in A, B, and D, and error bars in C represent the 95% confidence interval.

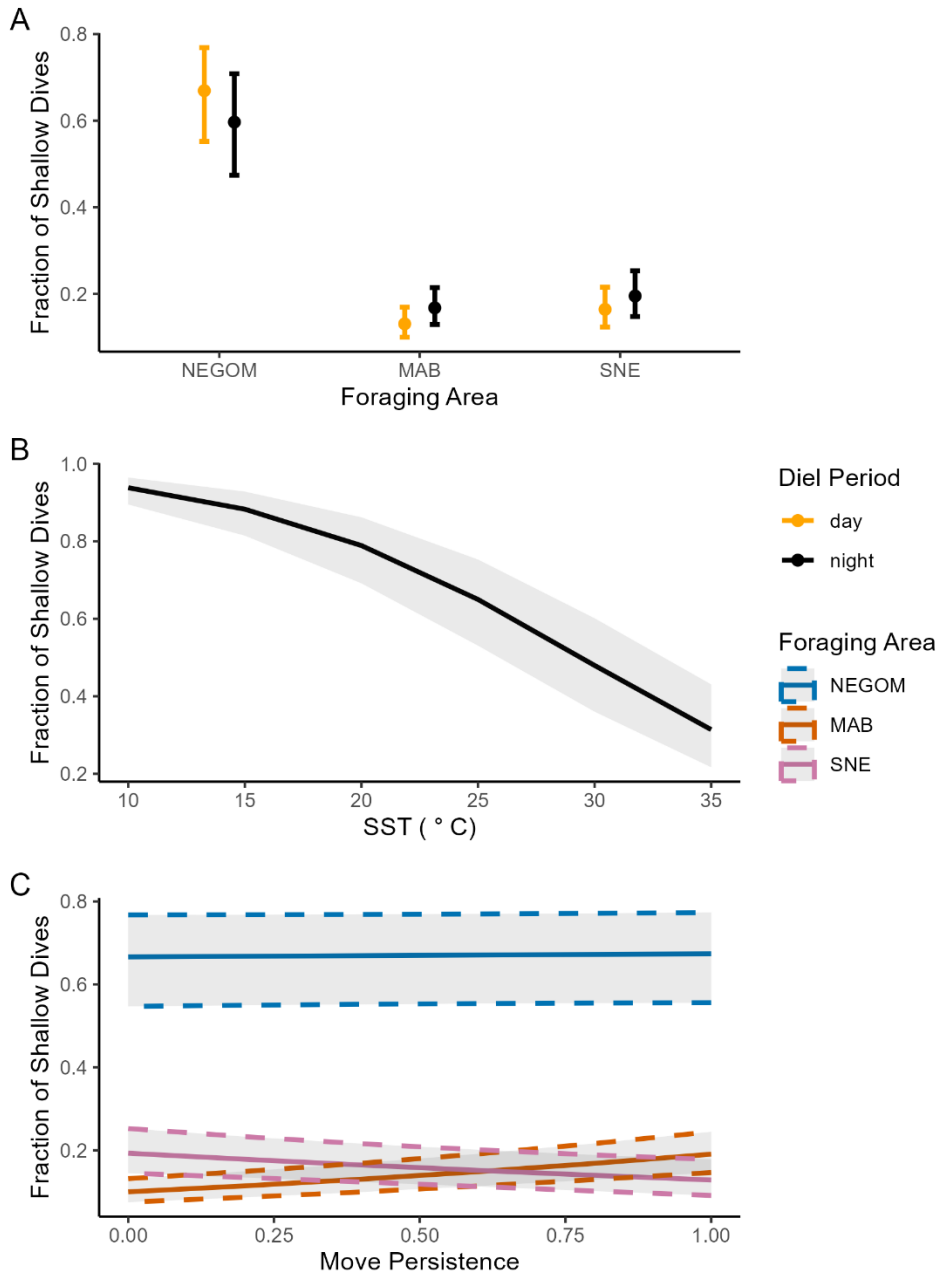

Figure S2: Prediction plots for the percent of shallow dives (2 – 10 m) leatherbacks performed. Frequency of dives were recorded within a 6-hr interval in relation to the interaction between foraging area and diel period (A) sea surface temperature (SST; B), and the interaction between foraging area and move persistence (C). Error bars in A, and shaded regions in B and C represent the 95% confidence interval.

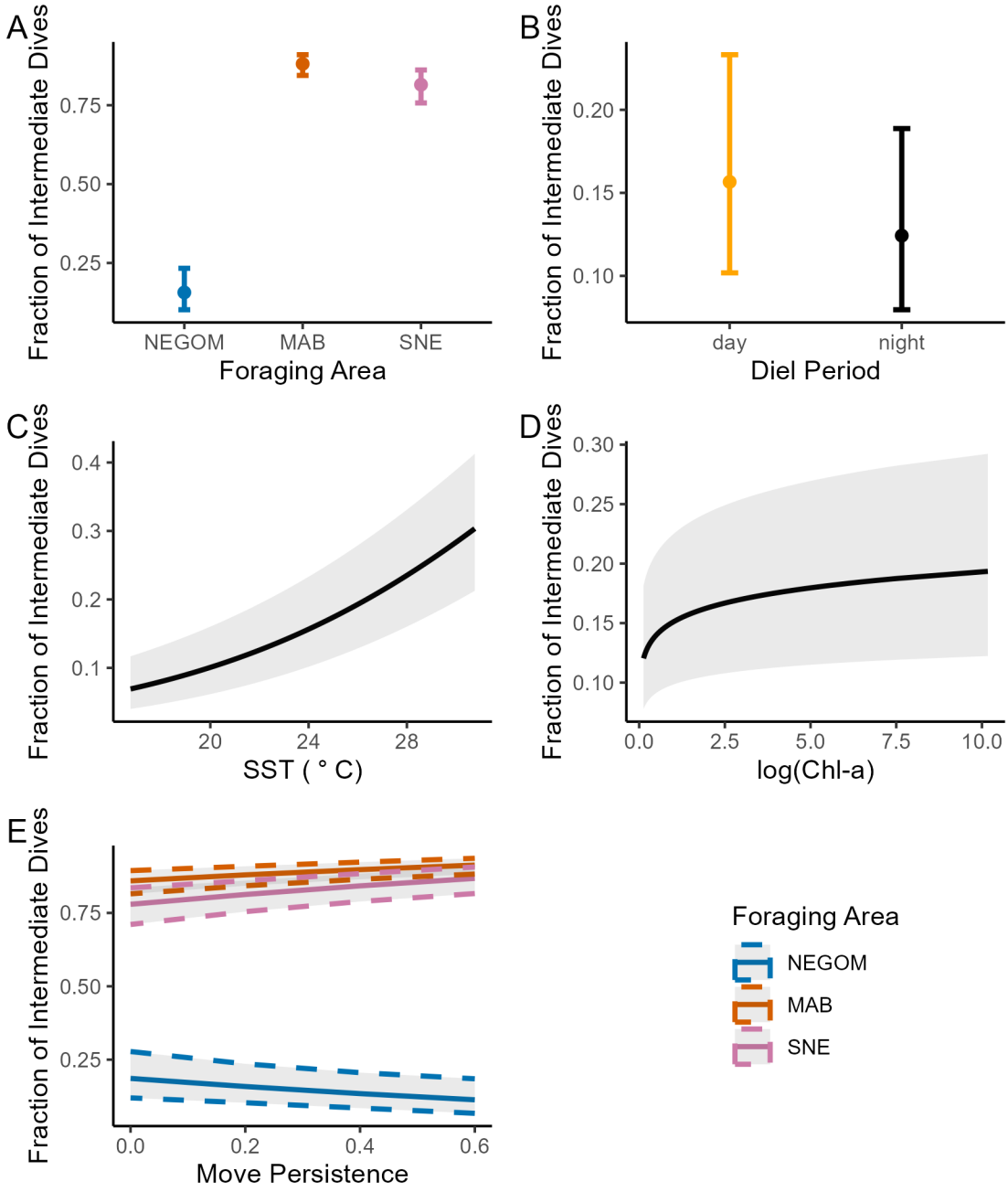

Figure S3: Prediction plots for the percent of intermediate dives (10 – 50 m) leatherbacks performed. Frequency of dives were recorded within a 6-hr interval in relation to the foraging area (A), diel period (B), sea surface temperature (SST; C), chlorophyll-*a* (Chl-*a*; D), and the interaction between foraging area and move persistence (E). Error bars in A and B and shaded regions in C-E represent the 95% confidence interval.

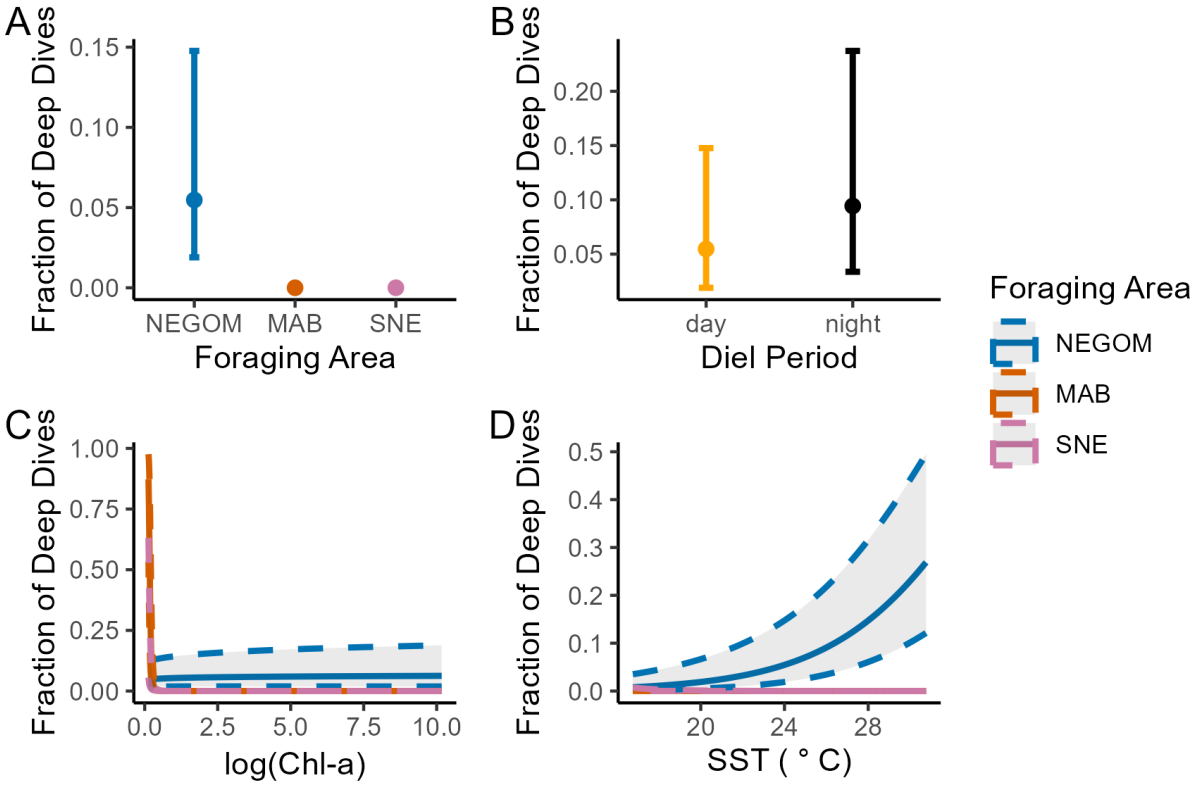

Figure S4: Prediction plots for the fraction of deep dives (> 50 m) leatherbacks performed. Frequency of dives were recorded within a 6-hr interval in relation to the foraging area (A), diel period (B), the interaction between foraging area and chlorophyll-*a* (Chl-*a*; C), and the interaction between foraging area and sea surface temperature (SST; D), and the interaction between foraging area and move persistence (E). The error bars in A and B as well as the shaded regions in C and D represent the 95% confidence interval.

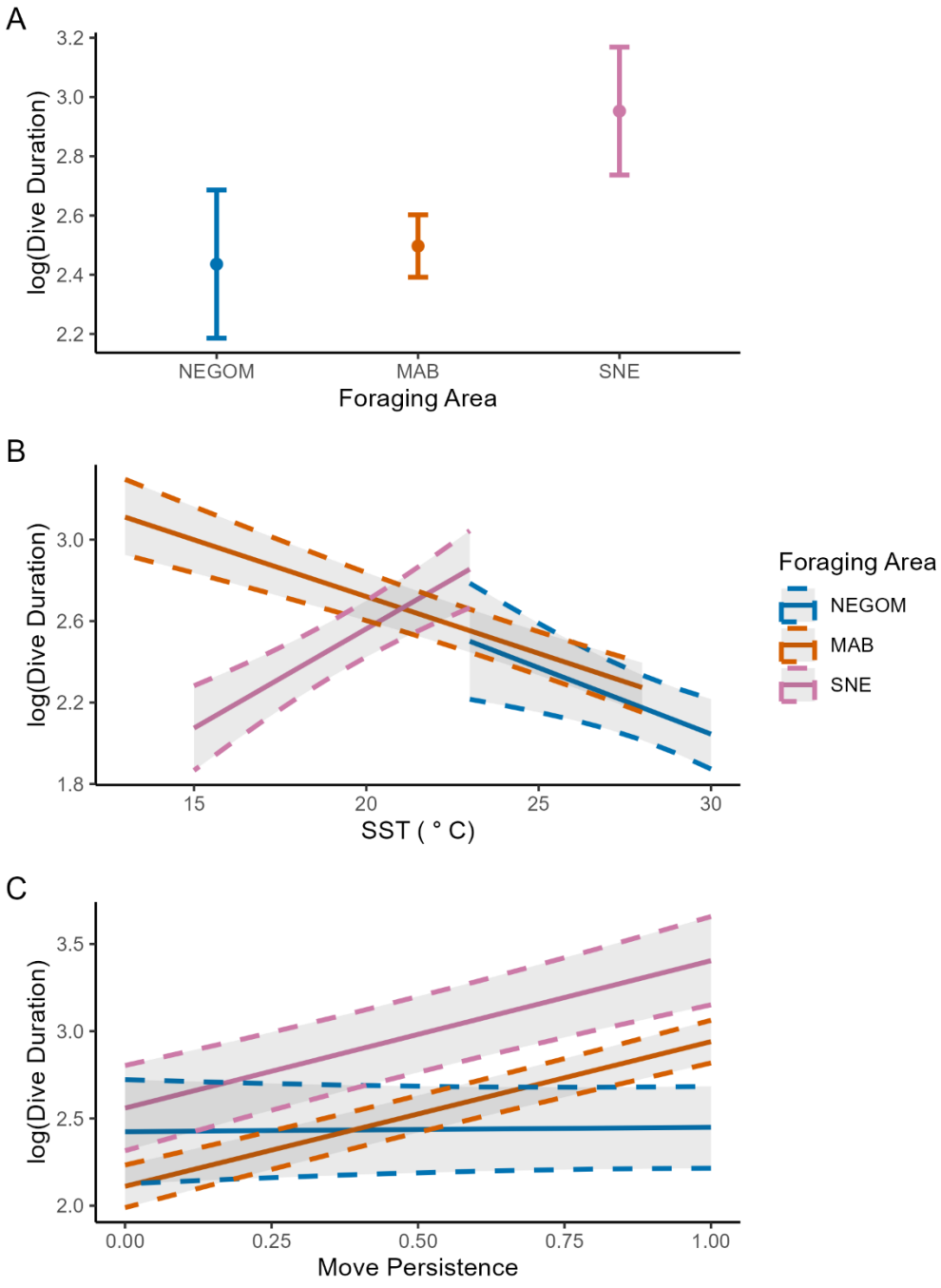

Figure S5: Prediction plots for the average dive duration (log transformation). Dive durations were averaged across 6-hr intervals in relation to the foraging area (A) and the interaction between foraging area and sea surface temperature (SST; B), and the interaction between foraging area and move persistence (C). Error bars in A and shaded regions in B and C represent the 95% confidence interval.

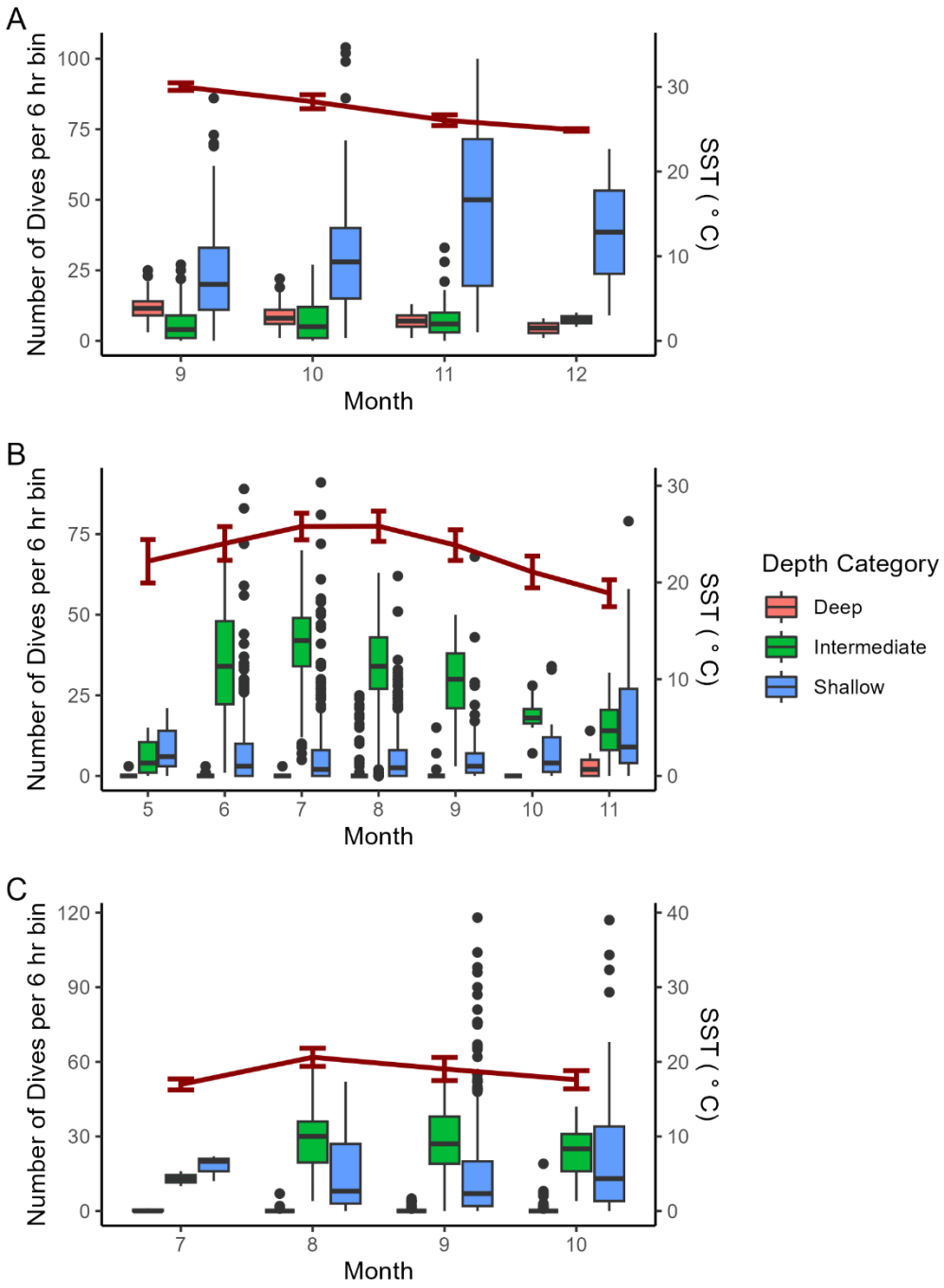

Figure S6: Boxplots of the number of dives per 6-hr time interval on a monthly basis within the three foraging areas: NEGOM (A), MAB (B), and SNE (C). Boxplots are colored by the dive depth category: shallow (2-10 m), intermediate (10-50 m), and deep (>50 m). The dark red line represents the mean (± standard deviation) monthly sea surface temperature (SST) for all locations of leatherbacks in each area.