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# The political biogeography of migratory marine predators

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## Supplementary Information for

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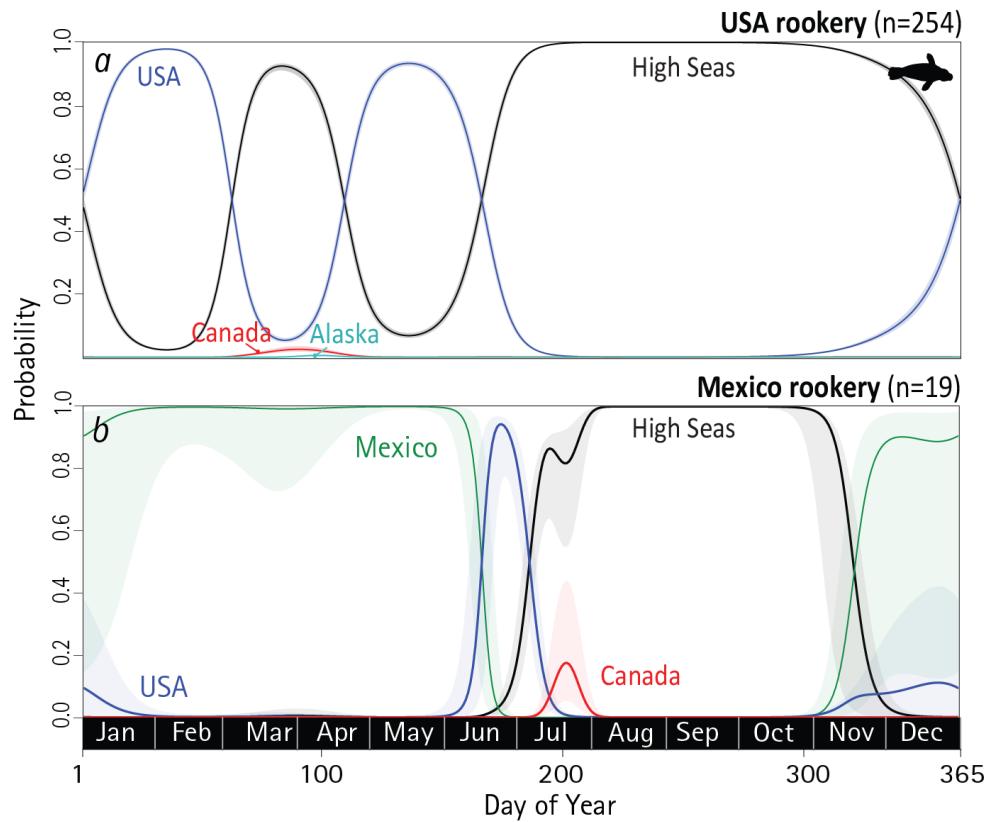
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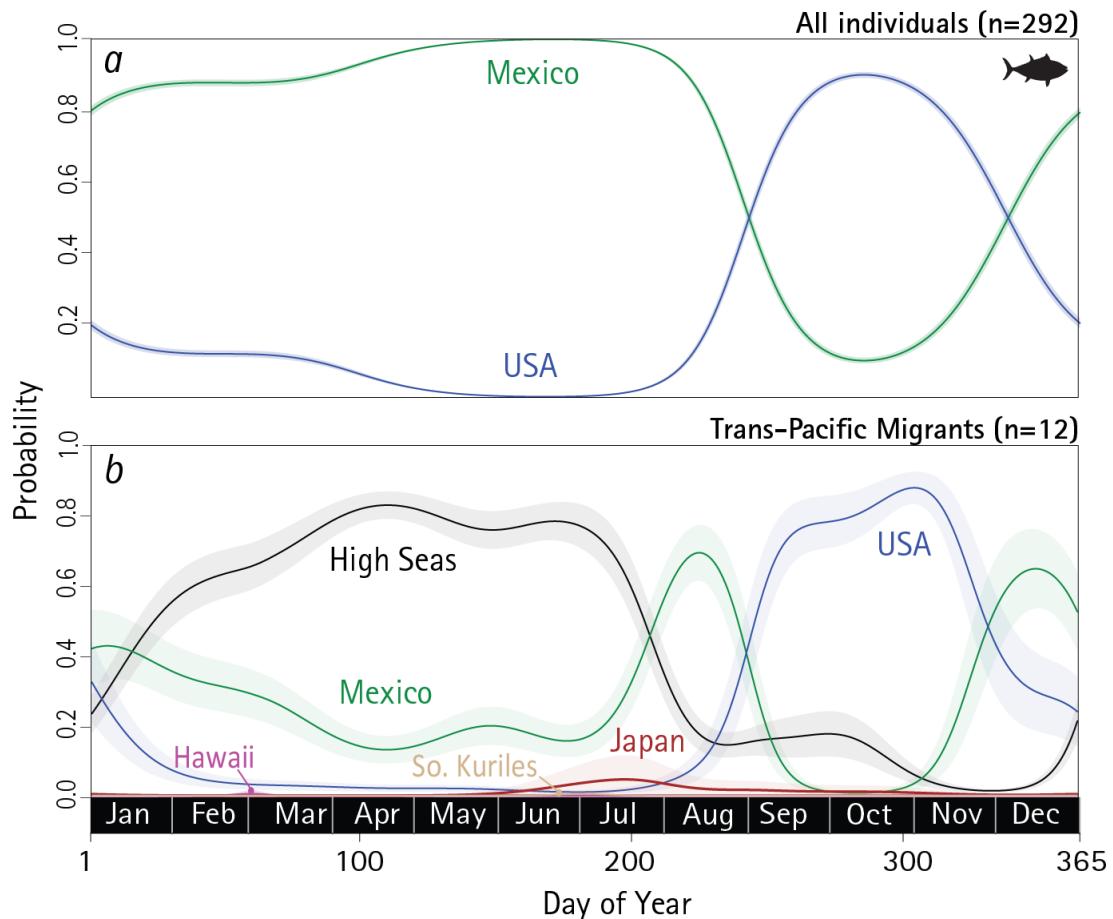
### **This PDF file includes:**

Supplementary Figures 1-10

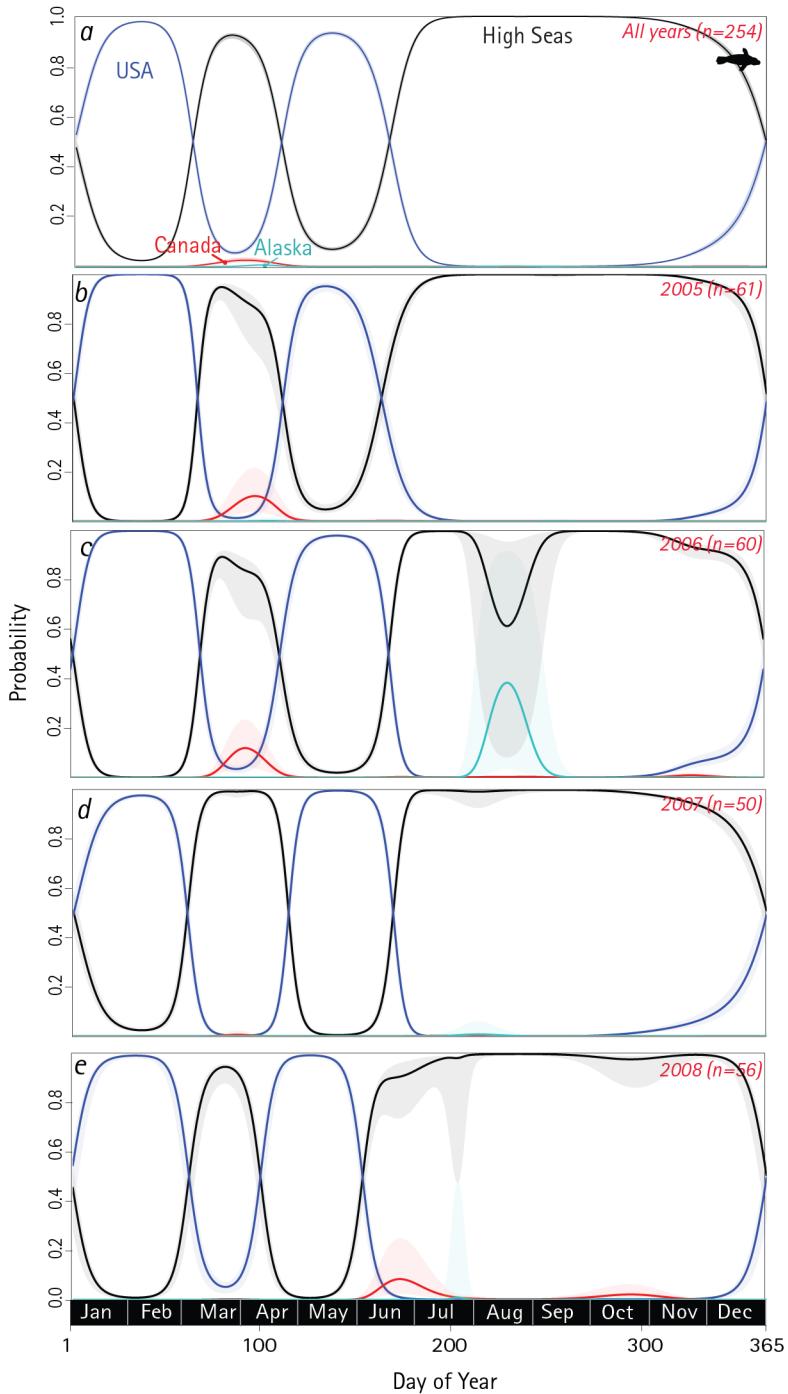
Supplementary Tables 1-5



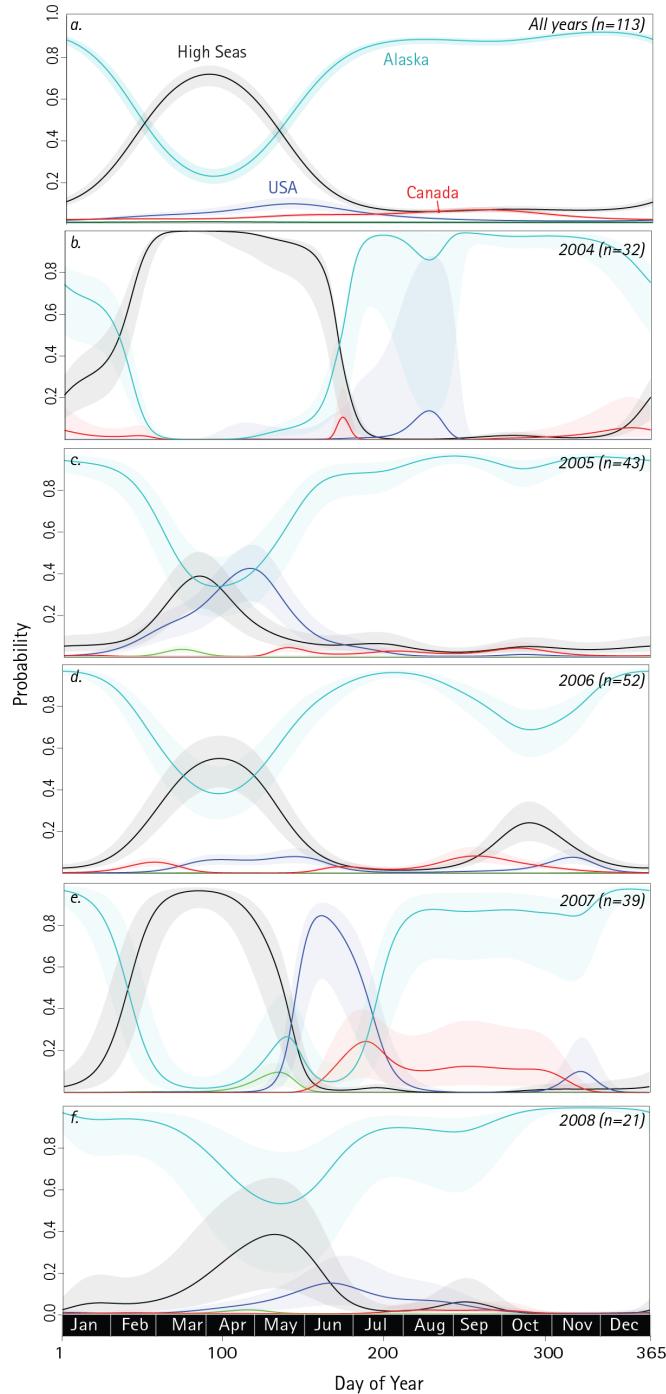
**Supplementary Figure 1. Seasonal probability of occurrence of female Northern elephant seals from two breeding populations (Mexico and USA) in Pacific Ocean EEZs and high seas from electronic tracking.** a) females from rookery at Año Nuevo State Reserve, California, USA. b) females from rookery at Islas San Benito, Baja California, Mexico. Lines represent the estimated effect of day of the year on the probability of a randomly selected individual from the tracked population occurring in each region. Shading represents the inter-quartile range of estimates simulated from the posterior distribution of the model parameters. Total sample size for each population is represented by n; typically, unique sets of individuals were tracked during the post-breeding and post-moult migrations (see Methods). Model details: Methods and Supplementary Table 4.



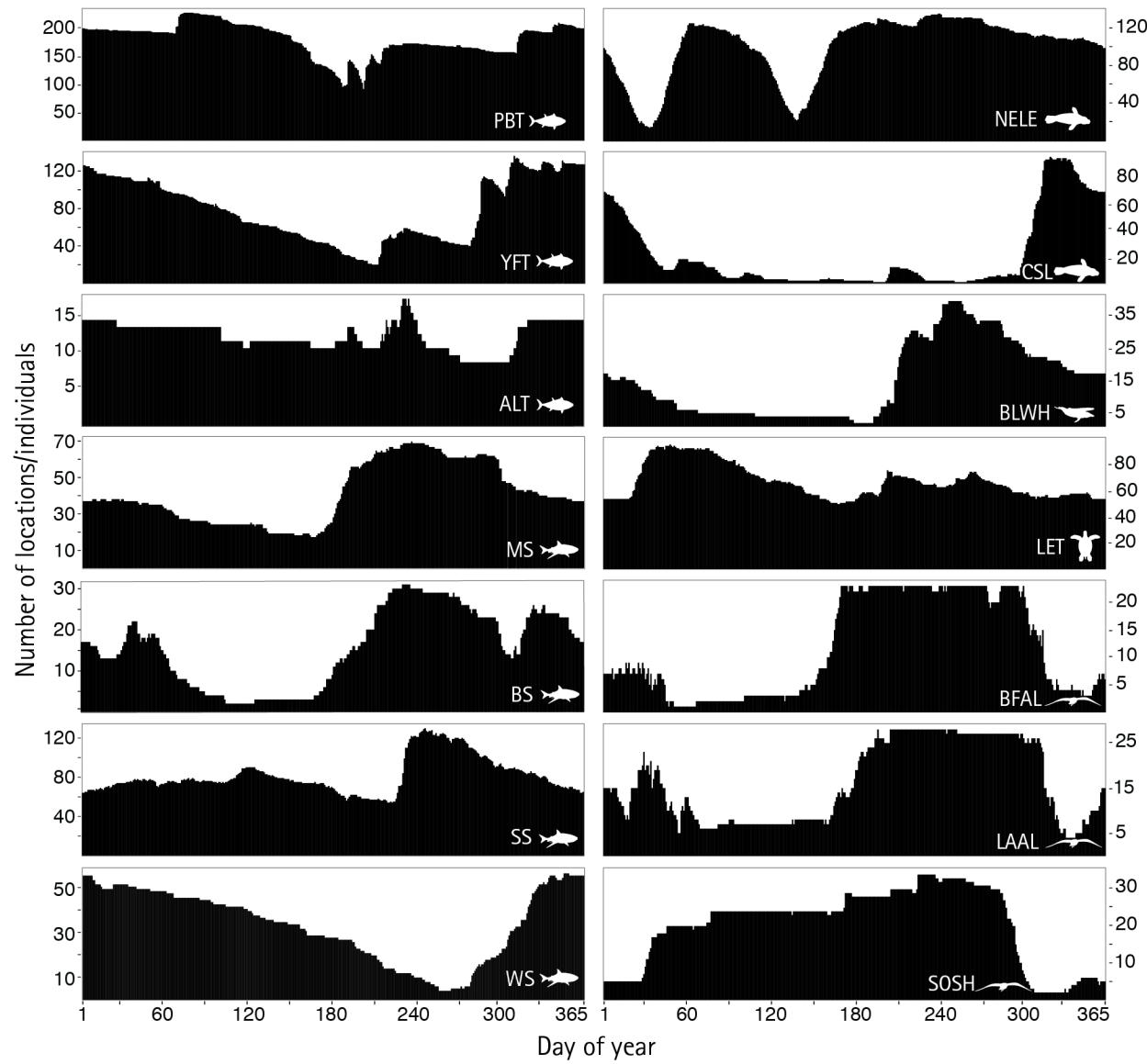
**Supplementary Figure 2. Differences in probability of occurrence of two life history stages of Pacific Bluefin tuna in Pacific Ocean EEZs and high seas on each day of year from electronic tracking.** a) all individuals b) those individuals that undertook a trans-Pacific migration (n=12). Lines represent the estimated effect of day of the year on the probability of a randomly selected individual from the tracked population occurring in each region. Shading represents the inter-quartile range of estimates simulated from the posterior distribution of the model parameters. Total sample size for each life history stage is represented by n; tracking duration varied among individuals (see Methods). Model details: Methods and Supplementary Table 4.



**Supplementary Figure 3. Seasonal probability of occurrence of female Northern elephant seals (tagged in USA) in Pacific Ocean EEZs and high seas from electronic tracking.** a) all years combined (2002-2009) and b-e) 2005-2008. Lines represent the estimated effect of day of the year on the probability of a randomly selected individual from the tracked population occurring in each region. Shading represents the inter-quartile range of estimates simulated from the posterior distribution of the model parameters. Total sample size for each year is represented by n; typically, unique sets of individuals were tracked during the post-breeding and post-moult migrations (see Methods). Model details: Methods and Supplementary Table 4.

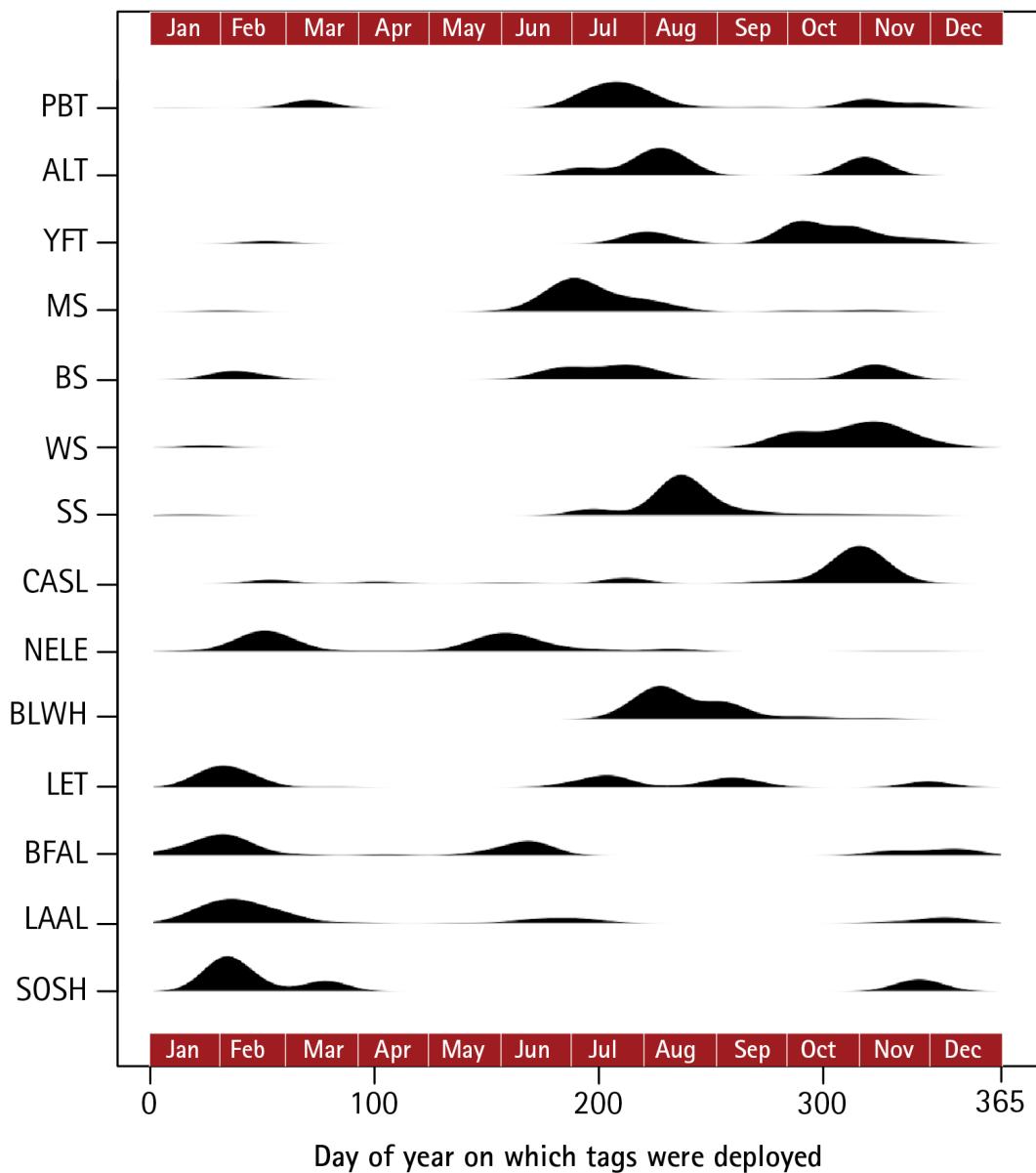


**Supplementary Figure 4. Seasonal probability of occurrence of female salmon shark in Pacific Ocean EEZs and high seas from electronic tracking.** a) all years combined (2002-2008) and b-f) 2004-2008. Lines represent the estimated effect of day of the year on the probability of a randomly selected individual from the tracked population occurring in each region. Shading represents the inter-quartile range of estimates simulated from the posterior distribution of the model parameters. Total sample size for each life history stage is represented by n; tracking duration varied among individuals (see Methods). Model details: Methods and Supplementary Table 4.

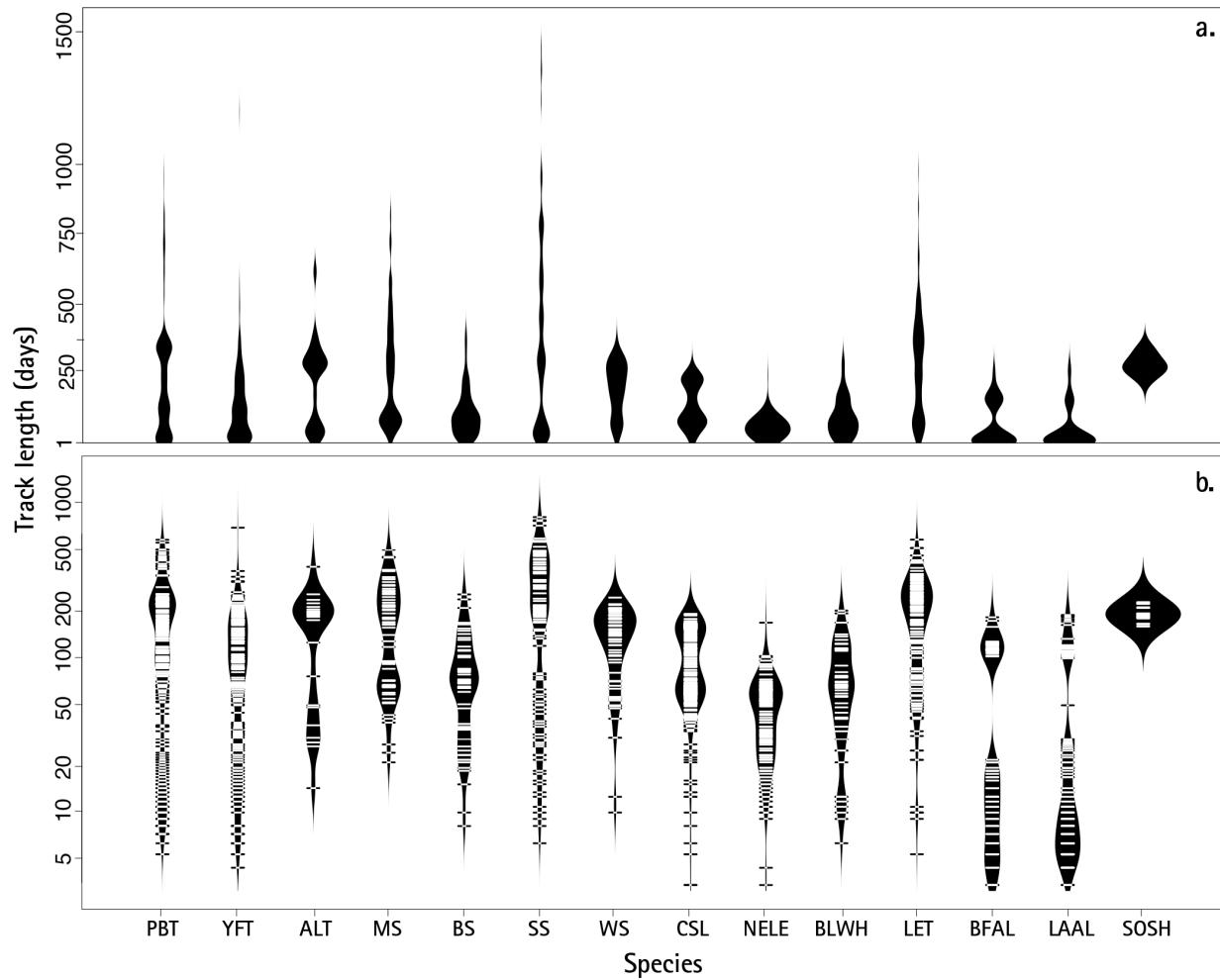


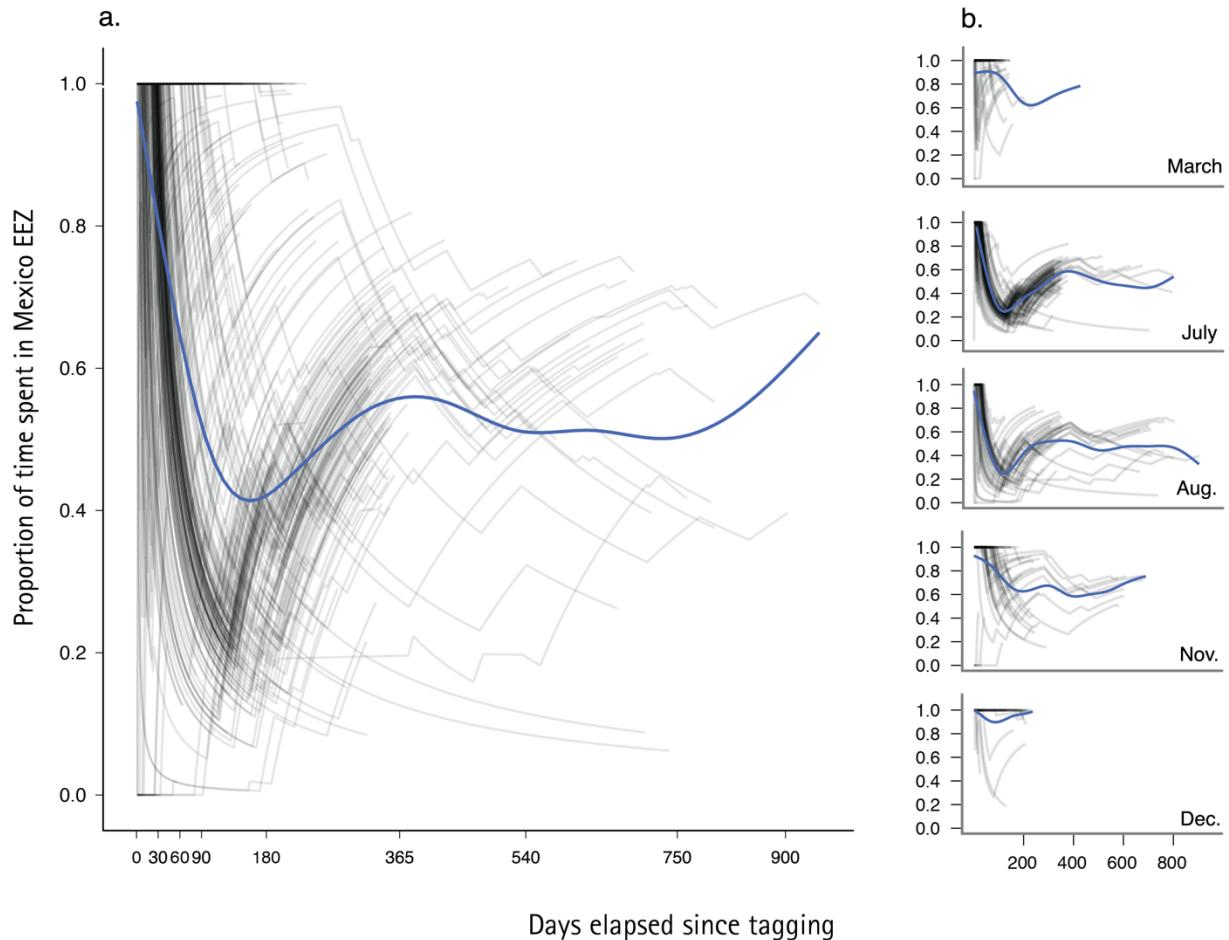
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3 **Supplementary Figure 5. Frequency histograms of electronic tagging locations available for every day**  
4 **of the year during the tagging period 2000-2009.** Species codes: PBT, Pacific bluefin tuna; YFT, yellowfin  
5 tuna; ALT, albacore tuna; MS, shortfin mako shark; BS, blue shark; SS, salmon shark; WS, white shark; NELE,  
6 northern elephant seal; CASL, California sea lion; BLWH, blue whale; LET (CR/WP/CA), leatherback turtle,  
7 Costa Rica/western Pacific/California; BFAL, black-footed albatross; LAAL, Laysan albatross; SOSH, sooty  
8 shearwater.

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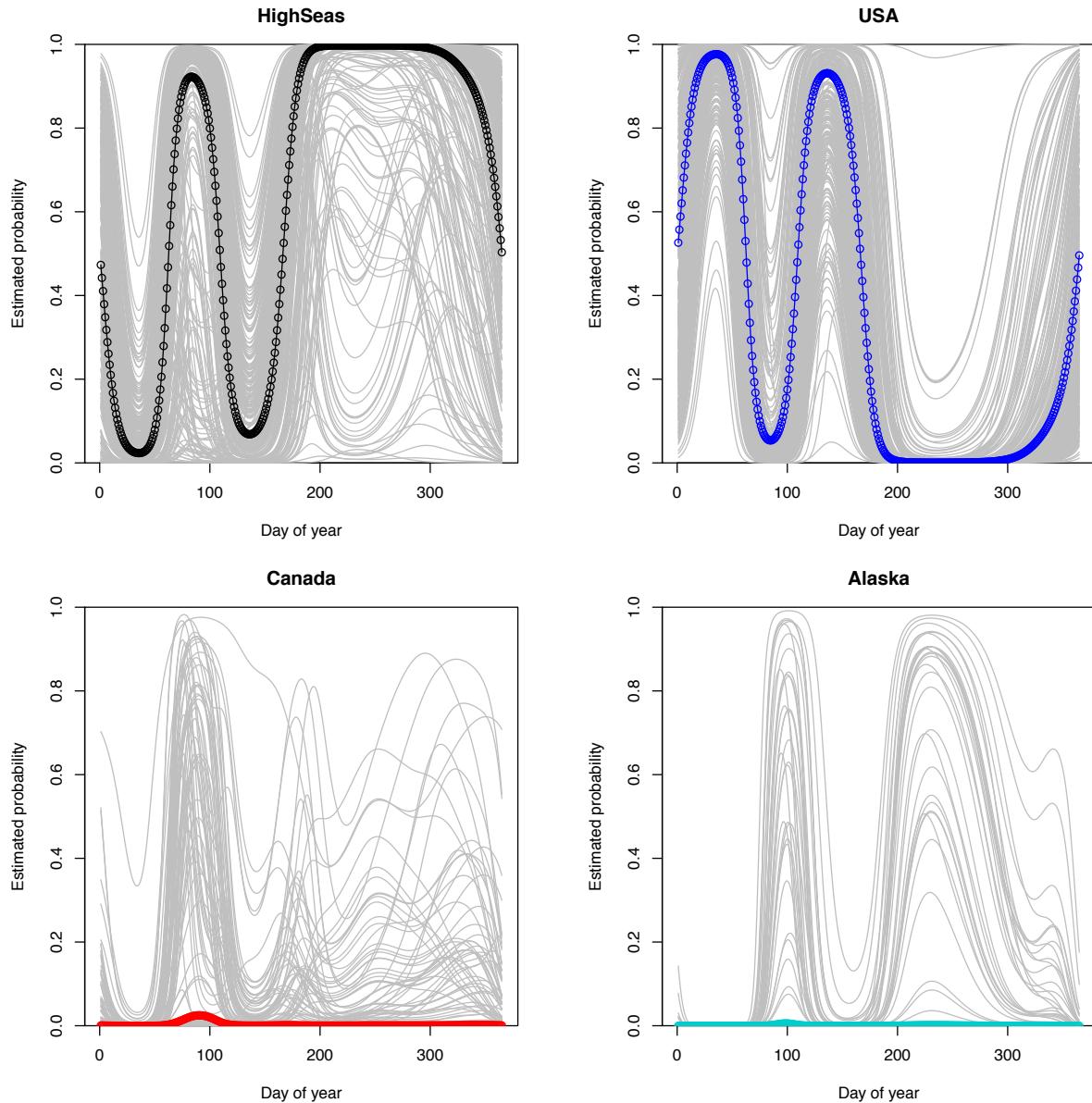
10  
 11 **Supplementary Figure 6. Distribution of tag deployment dates by species.** Species codes: PBT, Pacific  
 12 bluefin tuna; ALT, albacore tuna; YFT, yellowfin tuna; MS, shortfin mako shark; BS, blue shark; WS, white  
 13 shark; SS, salmon shark; CASL, California sea lion; NELE, northern elephant seal; BLWH, blue whale; LET  
 14 leatherback turtle; BFAL, black-footed albatross; LAAL, Laysan albatross; SOSH, sooty shearwater.  
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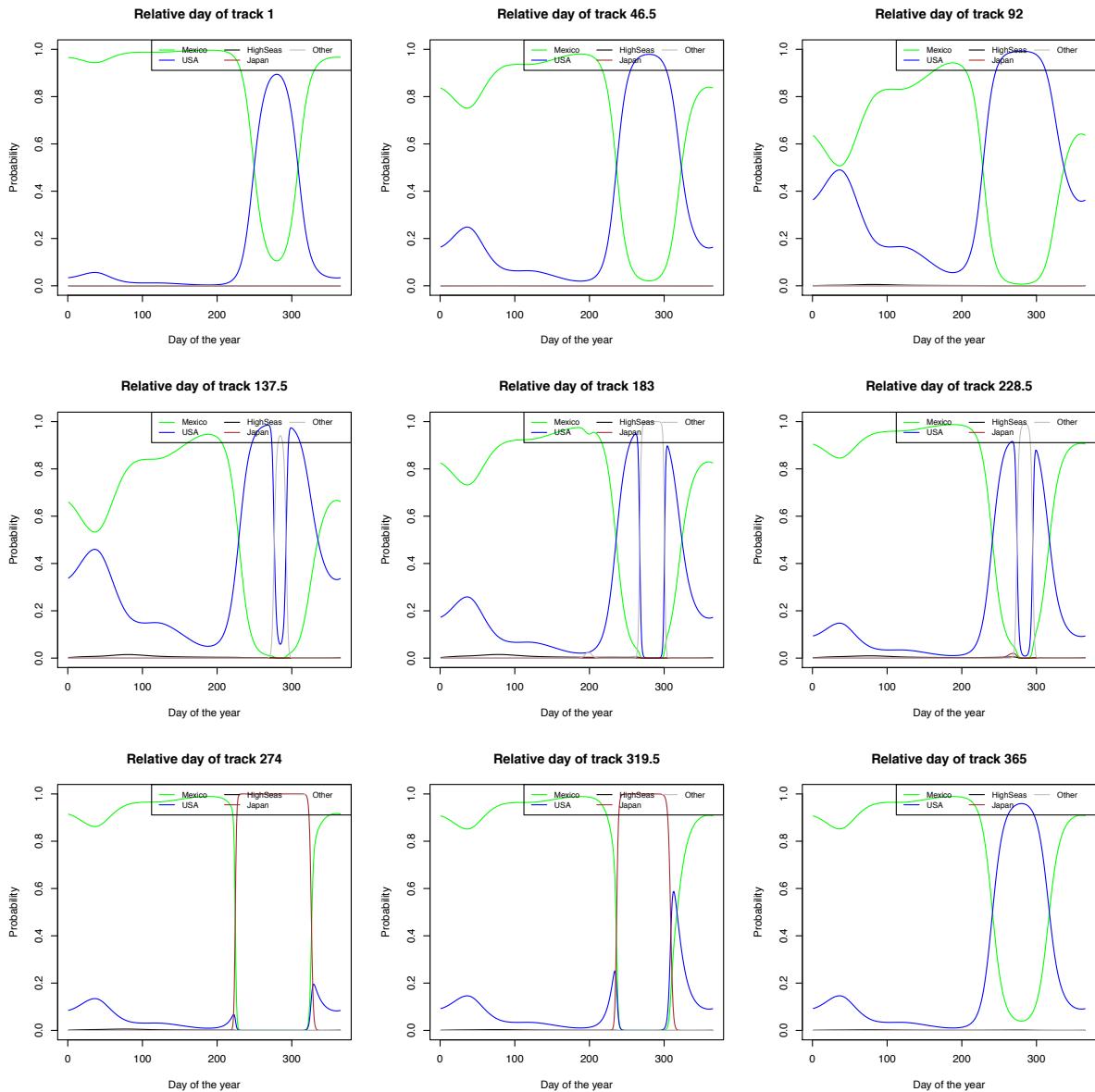


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**Supplementary Figure 8. Effect of track duration and timing of tag deployment on proportion of time spent by Pacific bluefin tuna in the Mexican EEZ.** a) Running cumulative proportion of time spent in Mexican EEZ by individuals (light grey lines) and b) grouped by tag deployment month. Blue lines are loess smooths of the data representing the population mean.



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34  
35 **Supplementary Figure 9. Individual differences in seasonal probability of female northern elephant**  
36 **seal (tagged in USA) occurrence in Pacific Ocean EEZs and the high seas from electronic tagging.**  
37 Grey lines represent the predicted probability for each unique individual. Colored solid lines represent  
38 population-level predictions derived by setting the random intercept effect of individual in the model to zero  
39 (presented in Fig. 2), and circles represent the predicted probability on each day averaged across individuals  
40 (averaged on the link scale and transformed to probabilities).



43 **Supplementary Figure 10. Effect of including a relative-day-of-track term in models predicting**  
 44 **probability of occurrence of Pacific bluefin tuna in Pacific Ocean EEZs and the high seas on each**  
 45 **day of the year.** An expected decrease in the predicted probability of being in the Mexico EEZ (the  
 46 tagging EEZ) occurred during the early part of a track, but the predicted probability increased later in the  
 47 track and exhibited non-intuitive patterns for some days of the year.

49 **Supplementary Table 1. Number of tags deployed, number of individuals with active tags, and number of daily location estimates by year and**  
 50 **species for the subset of the TOPP dataset analyzed and additional data for leatherback turtles from the western Pacific population.** Species codes:  
 51 PBT, Pacific bluefin tuna; YFT, yellowfin tuna; ALT, albacore tuna; MS, shortfin mako shark; BS, blue shark; SS, salmon shark; WS, white shark; NELE,  
 52 northern elephant seal; CASL, California sea lion; BLWH, blue whale; LET (CR/WP/CA), leatherback turtle, Costa Rica/western Pacific/California; BFAL,  
 53 black-footed albatross; LAAL, Laysan albatross; SOSH, sooty shearwater. Geographic coordinates for deployment locations provided in <sup>1,2</sup>.

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	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CASL	BLWH	LET (CR)	LET (WP)	LET (CA)	BFAL	LAAL	SOSH	TOTAL
<b>Tags deployed</b>																	
2000							1						1				
2001							5					7	2				14
2002	45	13			4	10	1	4					8	4	5		94
2003	80	22	7	4	3	14	2	6	32			18	6	16	16		226
2004	6	40	8	15	19	20	7	36	14	18	26	2	7	4	9		231
2005	78	62	5	6	1	26	21	61	43	14	7	23	5	33	37	24	446
2006	16	53		13	12	24	21	56	21	7		18		13	11		265
2007	8	17		12	11	16	7	40	17	11	11	17	7				174
2008	59	17	2	5	1	3		51	8	2					1		149
2009					12	8		27									47
<b>Total</b>	<b>292</b>	<b>224</b>	<b>22</b>	<b>67</b>	<b>59</b>	<b>113</b>	<b>65</b>	<b>281</b>	<b>135</b>	<b>52</b>	<b>44</b>	<b>85</b>	<b>36</b>	<b>70</b>	<b>79</b>	<b>24</b>	<b>1,648</b>
<b>Active tags</b>																	
2001							6					7	3				16
2002	45	13			4	10	5	4				5	7	4	5		102
2003	120	28	7	4	3	24	3	7	32			18	10	18	21		295
2004	96	56	15	17	20	32	9	41	18	18	26	9	13	4	13		387
2005	89	92	10	19	13	43	28	82	47	18	20	25	11	37	42	24	600
2006	47	88	3	16	12	52	42	85	52	10	4	28	4	13	11	5	472
2007	25	33		17	13	39	23	55	29	14	11	35	7				301
2008	65	29	2	17	4	21	4	66	17	8	4	17	6		1		261
2009	4	11		20	9	11		39	8						1		103

Supplementary Table  
1 cont.

	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CASL	BLWH	LET (CR)	LET (WP)	LET (CA)	BFA	LAAL	SOSH	TOTAL
<b><i>Daily locations</i></b>																	
2001											98	505					<b>603</b>
2002	4,916	548			479	1,121	543	321			335	744	35	75			<b>9,117</b>
2003	22,369	2,833	338	613	452	2,455	168	1,034	1,096		2,019	1,737	247	294			<b>35,655</b>
2004	18,735	4,696	2,357	2,285	843	3,439	464	5,312	542	1,289	5,958	836	1,746	22	565		<b>49,089</b>
2005	8,685	8,977	1,653	2,900	1,142	5,836	1,696	9,110	1,910	1,130	2,208	4,006	1,676	1,927	2,426	5,104	<b>60,386</b>
2006	4,787	5,271	243	1,667	538	7,412	6,037	7,155	2,073	766	413	3,147	346	2,006	2,033	1,493	<b>45,387</b>
2007	2,411	3,288		2,741	1,222	4,748	2,489	4,836	1,023	1,085	2,296	6,896	755				<b>33,790</b>
2008	2,782	2,341	73	3,172	356	3,392	574	6,150	658	419	458	1,954	1,472		20		<b>23,821</b>
2009	774	1,035		1,612	724	1,399		2,275	203						11		<b>8,033</b>
<b>Total</b>	<b>65,459</b>	<b>28,989</b>	<b>4,664</b>	<b>14,990</b>	<b>5,756</b>	<b>29,802</b>	<b>11,971</b>	<b>36,193</b>	<b>7,505</b>	<b>4,689</b>	<b>11,333</b>	<b>19,291</b>	<b>8,981</b>	<b>4,237</b>	<b>5,424</b>	<b>6,597</b>	<b>265,881</b>

57 **Supplementary Table 2: Percentage of tagged individuals tracked within EEZs and the high seas.** Species codes: PBT, Pacific bluefin tuna;  
 58 YFT, yellowfin tuna; ALT, albacore tuna; MS, shortfin mako shark; BS, blue shark; SS, salmon shark; WS, white shark; NELE, northern elephant seal;  
 59 CASL, California sea lion; BLWH, blue whale; LET (CR/WP/CA), leatherback turtle, Costa Rica/western Pacific/California; BFAL, black-footed  
 60 albatross; LAAL, Laysan albatross; SOSH, sooty shearwater. Grey shading represents deployment EEZs. Last two columns correspond to the percent  
 61 of total individuals tracked within each EEZ and number of species recorded within each EEZ.

EEZ*	Country†	% of individuals													% Tot.	Spp.	
		PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH		
Alaska	United States of America	0	0	0	0	0	100	0	15	0	0	0	17	35	38	12	5
American Samoa	United States of America	0	0	0	0	0	0	0	0	0	0	0	0	0	17	<1	1
Australia	Australia	0	0	0	0	0	0	0	0	0	0	7	0	0	21	1	2
Brunei	Brunei	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1	1
Canada	Canada	<1	0	0	0	8	58	0	27	0	6	0	23	6	25	11	8
Chile	Chile	0	0	0	0	0	0	0	0	0	0	1	0	0	17	<1	2
China	China	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1
Clipperton Island	France	0	<1	0	0	5	0	0	0	0	0	0	0	0	4	<1	3
Cook Islands	New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	58	1	1
Costa Rica	Costa Rica	0	0	0	0	0	0	0	0	0	2	27	0	0	0	3	2
Desventuradas	Chile	0	0	0	0	0	0	0	0	0	0	<1	0	0	4	<1	2
Easter Island	Chile	0	0	0	0	0	0	0	0	0	0	1	0	0	4	<1	2
El Salvador	El Salvador	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1	1
Fiji	Fiji	0	0	0	0	0	0	0	0	0	0	3	0	0	8	<1	2
French Polynesia	France	0	0	0	0	0	0	0	0	0	0	0	0	0	58	1	1
Galapagos Islands	Ecuador	0	0	0	0	0	0	0	0	0	0	24	0	0	0	2	1
Guatemala	Guatemala	0	<1	0	0	0	0	0	0	0	2	0	0	0	0	<1	3
Hawaii	United States of America	<1	0	5	1	0	0	19	<1	0	0	10	100	100	79	12	9
Howland Island and Baker Island	United States of America	0	0	0	0	0	0	0	0	0	0	2	0	0	13	<1	2
Indonesia	Indonesia	0	0	0	0	0	0	0	0	0	0	36	0	0	0	3	1
Japan	Japan	2	0	0	0	0	0	0	0	0	0	4	0	5	58	2	4
Japan-South Korea Joint Development Zone	Japan / South Korea	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1
Jarvis Island	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	8	<1	2

Supplementary  
Table 2 cont.

EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Tot.	Spp.	
	United States of America	0	0	0	0	0	0	0	0	0	0	3	4	4	17	1	4	
Johnston Atoll	Kiribati	0	0	0	0	0	0	0	0	0	0	4	0	1	8	1	3	
	Line Group	Kiribati	0	0	0	0	0	0	0	0	0	3	0	0	42	1	2	
	Macquarie Island	Australia	0	0	0	0	0	0	0	0	0	0	0	0	29	<1	1	
	Malaysia	Malaysia	0	0	0	0	0	0	0	0	0	6	0	0	0	1	1	
	Marshall Islands	Marshall Islands	0	0	0	0	0	0	0	0	0	8	0	0	4	1	2	
	Mexico	Mexico	99	99	91	88	76	11	3	12	17	46	4	1	0	17	47	14
	Micronesia	Micronesia	0	0	0	0	0	0	0	0	0	0	16	0	0	0	2	1
	Nauru	Nauru	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1	1
	New Caledonia	France	0	0	0	0	0	0	0	0	0	0	8	0	0	0	1	1
	New Zealand	New Zealand	0	0	0	0	0	0	0	0	0	0	3	0	0	100	2	2
	Nicaragua	Nicaragua	0	0	0	0	0	0	0	0	0	2	10	0	0	4	1	3
	Niue	New Zealand	0	0	0	0	0	0	0	0	0	0	<1	0	0	17	<1	2
	Norfolk Island	Australia	0	0	0	0	0	0	0	0	0	0	2	0	0	38	1	2
	Northern Mariana Islands and Guam	United States of America	0	0	0	0	0	0	0	0	0	4	0	0	0	<1	1	
	Palau	Palau	0	0	0	0	0	0	0	0	0	22	0	0	0	0	2	1
	Palmyra Atoll	America	0	0	0	0	0	0	0	0	0	5	0	0	8	1	2	
	Panama	Panama	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1	
	Papua New Guinea	Papua New Guinea	0	0	0	0	0	0	0	0	0	17	0	0	0	2	1	
		Disputed: China/Taiwan/ Viet																
	Paracel Islands	Nam	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1	
	Peru	Peru	0	0	0	0	0	0	0	0	0	<1	0	0	4	<1	2	
	Philippines	Philippines	0	0	0	0	0	0	0	0	0	8	0	0	0	1	1	
	Phoenix Group	Kiribati	0	0	0	0	0	0	0	0	0	1	0	1	25	1	3	
	Pitcairn	United Kingdom	0	0	0	0	0	0	0	0	0	<1	0	0	13	<1	2	
	Russia	Russia	0	0	0	0	0	0	0	0	0	0	1	24	63	2	4	
	Samoa	Samoa	0	0	0	0	0	0	0	0	0	0	0	0	8	<1	1	
	Solomon Islands	Solomon Islands	0	0	0	0	0	0	0	0	0	12	0	0	0	1	1	
	South Korea	South Korea	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1	
		Disputed: Russia / Japan	<1	0	0	0	0	0	0	0	0	0	0	4	38	1	3	

Supplementary  
Table 2 cont.

EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Tot.	Spp.
Disputed: China / Taiwan / Viet Nam / Philippines / Brunei /																	
Spratly Islands	Malaysia	0	0	0	0	0	0	0	0	0	0	4	0	0	0	<1	1
Taiwan	Taiwan	0	0	0	0	0	0	0	0	0	0	1	0	0	0	<1	1
Tokelau	New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	21	<1	1
Tonga	Tonga	0	0	0	0	0	0	0	0	0	0	<1	0	0	29	<1	2
Tuvalu	Tuvalu	0	0	0	0	0	0	0	0	0	0	<1	0	0	4	<1	2
United States of America	United States of America	71	10	82	100	83	44	100	97	84	100	20	23	0	25	59	14
Vanuatu	Vanuatu	0	0	0	0	0	0	0	0	0	0	2	0	0	4	<1	2
Viet Nam	Viet Nam	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1	1
Wake Island	America	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1	1
Wallis and Futuna	France	0	0	0	0	0	0	0	0	0	0	0	0	0	4	<1	1
High Seas		24	7	55	39	56	67	85	85	2	27	68	70	85	100	48	14
<b>Total individuals of each species (Total individuals = 1,648, n=14 species)</b>		292	224	22	67	59	113	65	281	135	52	165	70	79	24		
<b>EEZs visited by each species (Total EEZs visited by all individuals = 63)‡</b>		6	4	4	3	4	4	3	5	2	6	49	7	9	39		

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63 \* All island territories and EEZs disjunct from a mainland EEZ were considered separately. Islands territories located within a mainland EEZ (for example, 64 Hong Kong and Macau) were considered to be part of the mainland EEZ

65 † Some territorial claims and/or marine boundaries are disputed

66 ‡ Pacific Ocean EEZs not visited by tracked animals during TOPP study: Cambodia, Colombia, North Korea, Singapore, Thailand, Timor-Leste

67 **Supplementary Table 3: Percentage of daily locations within EEZs and the high seas.** Species codes: PBT, Pacific bluefin tuna; YFT, yellowfin  
 68 tuna; ALT, albacore tuna; MS, shortfin mako shark; BS, blue shark; SS, salmon shark; WS, white shark; NELE, northern elephant seal; CASL, California  
 69 sea lion; BLWH, blue whale; LET (CR/WP/CA), leatherback turtle, Costa Rica/western Pacific/California; BFAL, black-footed albatross; LAAL, Laysan  
 70 albatross; SOSH, sooty shearwater. Grey shading represents deployment EEZs. Last column corresponds to the percent of total locations (of all  
 71 species) that occurred within each EEZ.

72

% of daily locations																
EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Total
Alaska	United States of America	0	0	0	0	0	51	0	5	0	0	0	9	12	3	7
American Samoa	United States of America	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
Australia	Australia	0	0	0	0	0	0	0	0	0	0	3	0	0	0	<1
Brunei	Brunei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Canada	Canada	<1	0	0	0	1	7	0	6	0	<1	0	8	1	1	1
Chile	Chile	0	0	0	0	0	0	0	0	0	0	<1	0	0	1	<1
China	China	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Clipperton Island	France	0	<1	0	0	1	0	0	0	0	0	0	0	0	<1	<1
Cook Islands	New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
Costa Rica	Costa Rica	0	0	0	0	0	0	0	0	0	<1	5	0	0	0	1
Desventuradas	Chile	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Easter Island	Chile	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
El Salvador	El Salvador	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Fiji	Fiji	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
French Polynesia	France	0	0	0	0	0	0	0	0	0	0	0	0	0	1	<1
Galapagos Islands	Ecuador	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1
Guatemala	Guatemala	0	<1	0	0	0	0	0	0	0	<1	0	0	0	0	<1
Hawaii	United States of America	<1	0	<1	<1	0	0	6	<1	0	0	1	9	6	1	1

*Supplementary*  
*Table 3 cont.*

EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Total
Howland Island and Baker Island	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Indonesia	Indonesia	0	0	0	0	0	0	0	0	0	0	13	0	0	0	2
Japan	Japan	1	0	0	0	0	0	0	0	0	0	1	0	1	11	1
Japan-South Korea Joint Development Zone	Japan / South Korea	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Jarvis Island	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Johnston Atoll	United States of America	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	<1
Kiribati	Kiribati	0	0	0	0	0	0	0	0	0	0	<1	0	<1	<1	<1
Line Group	Kiribati	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Macquarie Island	Australia	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
Malaysia	Malaysia	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1
Marshall Islands	Marshall Islands	0	0	0	0	0	0	0	0	0	0	1	0	0	<1	<1
Mexico	Mexico	61	94	51	34	33	1	<1	5	8	28	2	<1	0	2	31
Micronesia	Micronesia	0	0	0	0	0	0	0	0	0	0	3	0	0	0	<1
Nauru	Nauru	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
New Caledonia	France	0	0	0	0	0	0	0	0	0	0	1	0	0	0	<1
New Zealand	New Zealand	0	0	0	0	0	0	0	0	0	0	1	0	0	12	<1
Nicaragua	Nicaragua	0	0	0	0	0	0	0	0	0	<1	<1	0	0	<1	<1
Niue	New Zealand	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Norfolk Island	Australia	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1

Supplementary  
Table 3 cont.

EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Total
Northern Mariana Islands and Guam	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Palau	Palau	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1
Palmyra Atoll	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Panama	Panama	0	0	0	0	0	0	0	0	0	0	1	0	0	0	<1
Papua New Guinea	Papua New Guinea	0	0	0	0	0	0	0	0	0	0	3	0	0	0	<1
Paracel Islands	Disputed: China/Taiwan/Viet Nam	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Peru	Peru	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Philippines	Philippines	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1
Phoenix Group	Kiribati	0	0	0	0	0	0	0	0	0	0	<1	0	<1	<1	<1
Pitcairn	United Kingdom	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Russia	Russia	0	0	0	0	0	0	0	0	0	0	0	<1	9	8	<1
Samoa	Samoa	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
Solomon Islands	Solomon Islands	0	0	0	0	0	0	0	0	0	0	3	0	0	0	<1
South Korea	South Korea	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Southern Kuriles	Disputed: Russia / Japan	<1	0	0	0	0	0	0	0	0	0	0	0	1	1	<1

Supplementary  
Table 3 cont.

EEZ*	Country†	PBT	YFT	ALT	MS	BS	SS	WS	NELE	CSL	BLWH	LET	BFAL	LAAL	SOSH	% Total
	Disputed: China / Taiwan / Viet Nam / Philippines / Brunei / Malaysia	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Spratly Islands	Disputed: China / Taiwan / Viet Nam / Philippines / Brunei / Malaysia	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Taiwan	China / Taiwan	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Tokelau	New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
Tonga	Tonga	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Tuvalu	Tuvalu	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
United States of America	United States of America	32	2	23	49	37	16	32	20	92	54	4	10	0	8	23
Vanuatu	Vanuatu	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	<1
Viet Nam	Viet Nam	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Wake Island	United States of America	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Wallis and Futuna	France	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
High Seas		6	3	26	16	29	25	63	63	<1	17	45	64	71	49	29
<b>Number of tracking days (total = 265,881)</b>		<b>65,459</b>	<b>28,989</b>	<b>4,664</b>	<b>14,990</b>	<b>5,756</b>	<b>29,802</b>	<b>11,971</b>	<b>36,193</b>	<b>7,505</b>	<b>4,689</b>	<b>39,605</b>	<b>4,237</b>	<b>5,424</b>	<b>6,597</b>	

\* All island territories and EEZs disjunct from a mainland EEZ were considered separately. Islands territories located within a mainland EEZ (for example, Hong Kong and Macau) were considered to be part of the mainland EEZ

† Some territorial claims and/or marine boundaries are disputed

‡ Pacific Ocean EEZs not visited by tracked animals during TOPP study: Cambodia, Colombia, North Korea, Singapore, Thailand, Timor-Leste

79 **Supplementary Table 4: Percent deviance explained by multinomial models predicting seasonal**  
 80 **occurrence in EEZs and the high seas from electronic tracking data.** Also listed for each model is the  
 81 number of individuals, number of daily locations, and the fixed effect included in the model.  
 82

MODELS	PERCENT DEVIANC E EXPLAINED	# IND.	# LOCATIONS	FIXED EFFECT
<b>Pacific bluefin tuna (all individuals)</b>	50.1%	292	65,459	Day of year
Trans-Pacific migrants	44.0%	12	7,002	Day of year
<b>Albacore tuna</b>	59.8%	22	4,664	Day of year
<b>White shark</b>	68.1%	65	11,971	Day of year
<b>Shortfin mako shark</b>	50.8%	67	14,990	Day of year
<b>Blue shark</b>	51.8%	59	5,756	Day of year
<b>Salmon shark (all years)</b>	44.2%	113	29,802	Day of year
2004	76.6%	32	3,439	Day of year
2005	57.1%	43	5,836	Day of year
2006	53.1%	52	7,412	Day of year
2007	69.4%	39	4,748	Day of year
2008	60.6%	21	3,392	Day of year
<b>Northern elephant seal</b>				
Females Tagged in USA (all years)	61.2%	231	29,835	Day of year
2005	68.1%	61	6,410	Day of year
2006	71.3%	60	5,554	Day of year
2007	65.8%	50	4,439	Day of year
2008	66.1%	56	5,388	Day of year
Females Tagged in Mexico (2005-2006)	72.3%	19	2,934	Day of year
<b>Black-footed albatross</b>	42.7%	70	4,237	Day of year
<b>Laysan albatross</b>	44.1%	79	5,424	Day of year
<b>Sooty shearwater</b>	56.3%	24	6,597	Day of year
<b>Leatherback turtle</b>				
Eastern Pacific Costa Rica	66.6%	44	11,333	Days elapsed after tag deployment
Western Pacific Jan-Feb Breeders	18.6%	41	5,953	Days elapsed after tag deployment
Western Pacific July-August Breeders	64.0%	35	8,710	Days elapsed after tag deployment
Western Pacific Calif. Foraging Grounds	70.3%	34	8,620	Days elapsed after tag deployment
<b>Blue whale</b>	80.8%	52	4,689	Day of year

84 **Supplementary Table 5: Percentage of the year marine predators are estimated to spend within Pacific Ocean EEZs and the high seas.** Uncertainty  
 85 is represented by the interquartile range (25%, 75%). Percentages were estimated from results presented in Fig. 2 and Supplementary Figs. 1-2.  
 86 Model details: Methods and Supplementary Table 4. Species codes: PBT, Pacific bluefin tuna (all individuals); PBT (TP), trans-Pacific migrants  
 87 (see Supplementary Fig. 2); AT, albacore tuna; MS, shortfin mako shark; BS, blue shark; SS, salmon shark; WS, white shark; NELE (USA), female  
 88 northern elephant seals from Año Nuevo State Reserve, California, USA rookery, NELE (MEX), females from Islas San Benito, Baja California,  
 89 Mexico rookery; BLWH, blue whale; LET(CR), leatherback turtles from Costa Rica; BFAL, black-footed albatross; LAAL, Laysan albatross; SOSH,  
 90 sooty shearwater. Percentages may not total 100 due to rounding. Leatherback turtles have a multi-year migratory cycle; estimates are for the first  
 91 year of this cycle following breeding/tag deployment.  
 92

	PBT	PBT (TP)	AT	WS	MS	BS	SS	NELE (USA)	NELE (MEX)	BFAL	LAAL	SOSH	LET (CR)	BLWH
<b>High Seas</b>	0.2 (0.2,0.3)	44.9 (36,45)	12.2 (7,19)	62.5 (61, 64)	3.7 (2, 5)	8.3 (6, 11)	23.7 (21, 27)	66.6 (66, 67)	36.5 (32, 38)	66.7 (63, 68)	74.5 (72, 76)	65.9 (60, 66)	79.2 (76, 80)	30.3 (18, 36)
<b>USA</b>	28.7 (28, 30)	25.7 (16, 27)	27.6 (21,33)	37.4 (36, 39)	46.8 (42, 50)	55.9 (51, 59)	3.2 (2, 4)	33.1 (32, 34)	7 (4, 13)	7.7 (6, 10)	<1 (0.1,0.1)	<1 (0.1,0.1)	55.8 (52, 57)	
<b>Mexico</b>	71.1 (70, 72)	28.3 (19, 29)	60.2 (49,65)	<1 (0,0.1)	49.5 (44, 53)	35.7 (31, 40)	<1 (0, 0.1)	55.9 (35, 59)			<1 (0, 0.3)	<1 (7, 23)	13.2	
<b>Alaska</b>							70.0 (67, 72)	0.1 (0, 0.1)		1.0 (1, 2)	4.5 (3, 6)	<1 (0.2, 1)		
<b>Canada</b>							<1 (0.1, 0.2)	3.1 (3, 4)	0.3 (0.2,0.4)	<1 (0.3, 11)	2.7 (2, 4)			
<b>Hawaii</b>				<1 (0,1)	<1 (0.1,0.3)					21.6 (20, 23)	17.5 (16, 19)			
<b>Russia</b>										3.2 (3,4)	4.2 (3,5)			
<b>Central Pac. Isl.</b>											3.8 (3.8, 4)			
<b>Japan</b>	<1 (0, 0.01)	1.1 (<1,3)									4.0 (2, 6)			
<b>New Zealand</b>											20.7 (18, 22)			
<b>Costa Rica</b>												16.4 (15, 19)		
<b>Galapagos</b>												3.8 (3, 5)		
<b>Other</b>	<1 (0, 0.01)	<1 (0,0.2)			<1 (0, 0.3)	<1 (0, 0.1)				<1 (0.1, 1)	<1 (0.2,0.4)	<1 (0.5, 2)	<1 (0.2, 1)	<1 (0.1, 4)

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