Albatross and petrel distribution within the IATTC area: an addendum

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ABSTRACT

This paper provides an addendum to the previous paper submitted to IATTC by ACAP for the 9th IATTC Stock Assessment Review Meeting, 12-16 May 2008 (hereafter referred to as SAR-9-11b). The previous work, using remote tracking data from the Global Procellariiform Tracking Database, highlighted the importance of the IATTC area for Waved Albatross, Black-footed Albatross and Chatham Albatross. This addendum provides additional information on seabird distribution for those species for which there are new tracking data available since the last report in 2008. New tracking data were available for Black-footed Albatross, Laysan Albatross, Short-tailed Albatross and Wandering Albatross. Details on the distribution and overlap of all other species can be found within the original report. SAR-9-11b highlighted a high degree of overlap between the distribution of Waved and Black-footed Albatrosses and IATTC area throughout the year. While no new data are available for Waved Albatrosses, this remains the case for Black-footed Albatross. Laysan Albatross display largely the same degree of overlap with IATTC as previously reported despite the addition of new tracking data, while Wandering Albatross show a slight increase in overlap because of the new information. Black-footed Albatrosses display the highest degree of overlap, after Waved Albatross, which spend 100% of their time during the breeding season in the IATTC area. Overall, the new data covered in this addendum demonstrate little to change our understanding of albatross distribution in the IATTC area, and in particular, the current high degree of overlap between seabird distribution and the mitigation areas proposed in IATTC-75-07c.

Acknowledgements

Albatross and petrel tracking data presented in this report are from the Global Procellariiform Tracking Database, which exists thanks to the collaboration of scientists worldwide. Data holders of those data presented in this paper are listed below. Much of the data included in this report are unpublished, and no part of this report should be reproduced or distributed without the express permission of the data holders. The database is managed by BirdLife International and this paper was prepared for ACAP by Frances Taylor, Orea Anderson, Helen Booker, and Cleo Small (BirdLife International), who bear responsibility for the accuracy of information presented here. The presentation of material in this report does not imply any expression of opinion on the part of BirdLife International or ACAP concerning the legal status of any country, territory or area.

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Table 1. Seabird species referred to in the text

Common name	Scientific name	Threat status[1]
Black-footed Albatross	*Phoebastria nigripes*	Endangered
Chatham Albatross	*Thalassarche eremita*	Critically Endangered
Laysan Albatross	*Phoebastria immutabilis*	Vulnerable
Short-tailed Albatross	*Phoebastria albatrus*	Vulnerable
Wandering Albatross	*Diomedea exulans*	Vulnerable
Waved Albatross	*Phoebastria irrorata*	Critically Endangered

[1] Source IUCN 2008.

Table 2. Annual stages for seabird species under consideration

Stage	Season	Age class	Notes	Proportion time at sea
Incubation	Breeding	Adult	The pre-egg period was included in this stage as no tracking data was available	0.5
Brood-guard	Breeding	Adult	In the case of burrowing petrels, where the brood period is very short, lasting only a few days, this stage was ignored	0.5
Post-guard	Breeding	Adult		1
Early fail	Breeding	Adult	Breeding adults that fail before brood-guard – combined with sabbaticals	1
Late fail	Breeding	Adult	Breeding adults that fail after brood-guard – combined with breeders	1
Sabbatical	Breeding	Adult	Non-breeding adults during the breeding season	1
Immatures (B)	Breeding	Immature	Pre-breeders that have returned to the colony	1
Non-breeders	Non-breeding	Adult	Non-breeding adults during the non-breeding season - in annual breeders this is all adults	1
Immatures (NB)	Non-breeding	Immature	Pre-breeders that have returned to the colony	1
Juveniles	Breeding & Non-breeding	Juvenile	Juveniles that have not returned to the colony since fledging	1

Table 3. Percent time of each species that is spent in the IATTC area, by year quarter, based on available remote-tracking data (Q1=Jan-Mar, Q2=Apr-Jun, Q3=July-Sep, Q4=Oct-Dec). The IATTC area is that defined under the Antigua Convention. Time spent in the mitigation areas recommended in IATTC-75-07c are also given.

Species		Q1	Q2	Q3	Q4	Average
Black-footed Albatross	**Total**	**31**	**33**	**40**	**31**	**34**
	N proposed mitigation area	31	33	40	31	34
Laysan Albatross	**Total**	**6**	**6**	**4**	**5**	**5**
	N proposed mitigation area	6	6	4	5	5
Short-tailed Albatross	**Total**	**1**	**1**	**1**	**1**	**1**
	N proposed mitigation area	1	1	1	1	1
Wandering Albatross	**Total**	**2**	**2**	**2**	**2**	**2**
	S proposed mitigation area	2	2	2	2	2

Table 4. Percent time spent within IATTC 5x5° grid squares for which there was longline fishing effort reported during 2000-2005, by year quarter (Q1=Jan-Mar, Q2=Apr-Jun, Q3=July-Sep, Q4=Oct-Dec).

Species	Q1	Q2	Q3	Q4	Average
Black-footed Albatross	13	6	16	17	13
Laysan Albatross	2	1	2	2	2
Short-tailed Albatross	0	0	0	0	0
Wandering Albatross	1	1	0	0	1

APPENDIX 1.

Table A. Breeding Chronology (values in brackets are assumed from similar species or inferred from other data presented in this table)

Species	Return date[a,b]	Laying period date[a,b]	Median egg date[a,b]	Incubation (days)[a,d]	Hatch date[a,b]	Brood-guard period[a,b]	End brood-guard date[a,c]	Fledging (days)[a,d]	Fledge date[a,b]
Black-footed Albatross[e]	mid Oct	mid-late Nov		60[f]	mid Jan- early Feb	1 month[f]	(mid Feb-early Mar)		Jun-Jul[e,f]
Laysan Albatross[e]	early Nov	mid Nov-mid Dec		60[f]	late Jan- mid Feb	1 month	(late Feb- mid Mar)		early Jul
Short-tailed Albatross[g]	Oct	late Oct-late Nov		64-65	Dec-Jan	"few weeks"	Feb[h]	c. 5 months	mid May - Jun[h]
Wandering Albatross	Nov	10 Dec-17 Jan	24 Dec	78.4±1.2	most Mar	c. 1 month	(Apr)	278±17	most Dec

Notes to Table A.

[a] Assume the same for all colonies. Brooke 2004 unless otherwise stated

[b] Brooke 2004 unless otherwise stated

[c] Inferred from hatch and brood-guard period unless otherwise stated

[d] Schreiber unless otherwise stated

[e] Fefer *et al.* 1983 unless otherwise stated

[f] Naughton *et al.* 2007

[g] USFWS 2005 unless otherwise stated

[h] R. Suryan, pers comm.

Table B. Distribution data used[1] - see Appendix 2 for colonies tracked and sample size

Species	Distribution data used[1] - see Appendix 2 for colonies tracked and sample sizes							
	Incubation	**Brood-guard**	**Post-guard**	**Sabbatical**	**Immatures (B)**	**Non-breeders**	**Immatures (NB)**	**Juveniles**
Black-footed Albatross	PTT tracking	PTT tracking	PTT tracking	Non-breeders	Non-breeders	PTT & GLS tracking		
Laysan Albatross	PTT tracking	PTT tracking	PTT tracking	Non-breeders	Non-breeders	PTT & GLS tracking	Non-breeders	Non-breeders
Short-tailed Albatross	Breeders	Breeders	PTT tracking	Non-breeders	Non-breeders	PTT tracking		
Wandering Albatross	PTT & GPS tracking	PTT & GPS tracking	PTT & GPS tracking	Breeders	Breeders	**PTT & GLS tracking**	Non-breeders	Non-breeders

Notes to Table B.

Black-footed Albatross	All non-breeding tracks (from adults, juveniles and immatures) were pooled to create the non-breeder distribution[2]. As this species has a restricted range without long migration routes to over-wintering grounds, it was assumed that non-breeders during the breeding season would follow the same distribution as during the non-breeding season.
Laysan Albatross	Separate breeding grids were created for each colony and then combined, weighted by colony size. All non-breeding tracks were pooled to create the non-breeder distribution[2]. As this species has a restricted range without long migration routes to over-wintering grounds, it was assumed that non-breeders during the breeding season would follow the same distribution as during the non-breeding season.
Short-tailed Albatross	Only post-guard tracks were available for breeding, but as these showed a very restricted breeding range, even during late chick-rearing, it was assumed that the incubation and brood-guard stages would follow a similar distribution. All non-breeding tracks (from adults and juveniles) were pooled to create the non-breeder distribution. Although there appeared to be a general west-east migration by post-breeders, it is unsure whether this applies to all non-breeders as at-sea tracking from the Aleutians was only performed after the breeding season. It was thus assumed that non-breeders during the breeding season would follow the same distribution as during the non-breeding season, except that the distribution was restricted to no further north than the South Bering Sea/Aleutian Island chain from January to April (R. Suryan, pers comm.)
Wandering Albatross	Separate breeding/non-breeding grids were created for each colony and weighted by colony size. It was assumed that non-breeders (except juveniles) during the breeding season were distributed as for breeders as a whole. Non-breeding data from all colonies were pooled as sample sizes were small and a large proportion of the birds were of unknown provenance.

[1] Merged cells indicate where tracks from different phases were pooled

[2] Separate grids were produced for PTT and GLS data, and then combined, weighting them by the number of hours of tracking in each grid - see methods in SAR-9-11b

APPENDIX 2.

Remote tracking data held in the Global Procellariiform Tracking Database for species addressed in this paper. Changes from SAR-9-11b are shown in bold.

Species	Site	Annual Breeding Pairs	Global popn (%)	Data submitted: Status (Number of tracks) All tracks are PTT unless otherwise specified.
Black-footed Albatross	Midway Atoll	21,830	35%	Non-breeding juvenile (10 tracks)
	Tern Island (FFS)	4,259	7%	**Breeding (129 tracks)**, non-breeding (24 GLS, 1 PTT)
	At-sea deployment			Non-breeding adult (20 tracks) and immature (13 tracks)
Laysan Albatross	Isla Guadalupe	337	0%	Breeding (118 tracks)
	Tern Island (FFS)	3,226	1%	**Breeding (134 tracks)**, non-breeding (8 PTT, 28 GLS)
	At-sea deployment			Non-breeding (18 tracks)
Short-tailed Albatross	Torishima	325	84%	**Breeding (21 tracks), post-breeding (29 tracks), juvenile (2 tracks)**
	at-sea deployment			Non-breeding adult (3 tracks) and juvenile (6 tracks)
Wandering Albatross	Iles Crozet	2,062	26%	Breeding (204 tracks)
	Iles Kerguelen	1,094	14%	Breeding (11 tracks)
	Prince Edward Is	2,707	34%	Breeding (20 tracks), post-breeding (3 tracks)
	South Georgia (Islas Georgias del Sur)	2,001	25%	Breeding (222 PTT, 66 GPS), post-breeding (4 tracks), **non-breeding adult** (4 PTT, **25 GLS**) and **immature/juvenile (86 GLS)**
	At-sea deployment			Non-breeding (5 tracks)

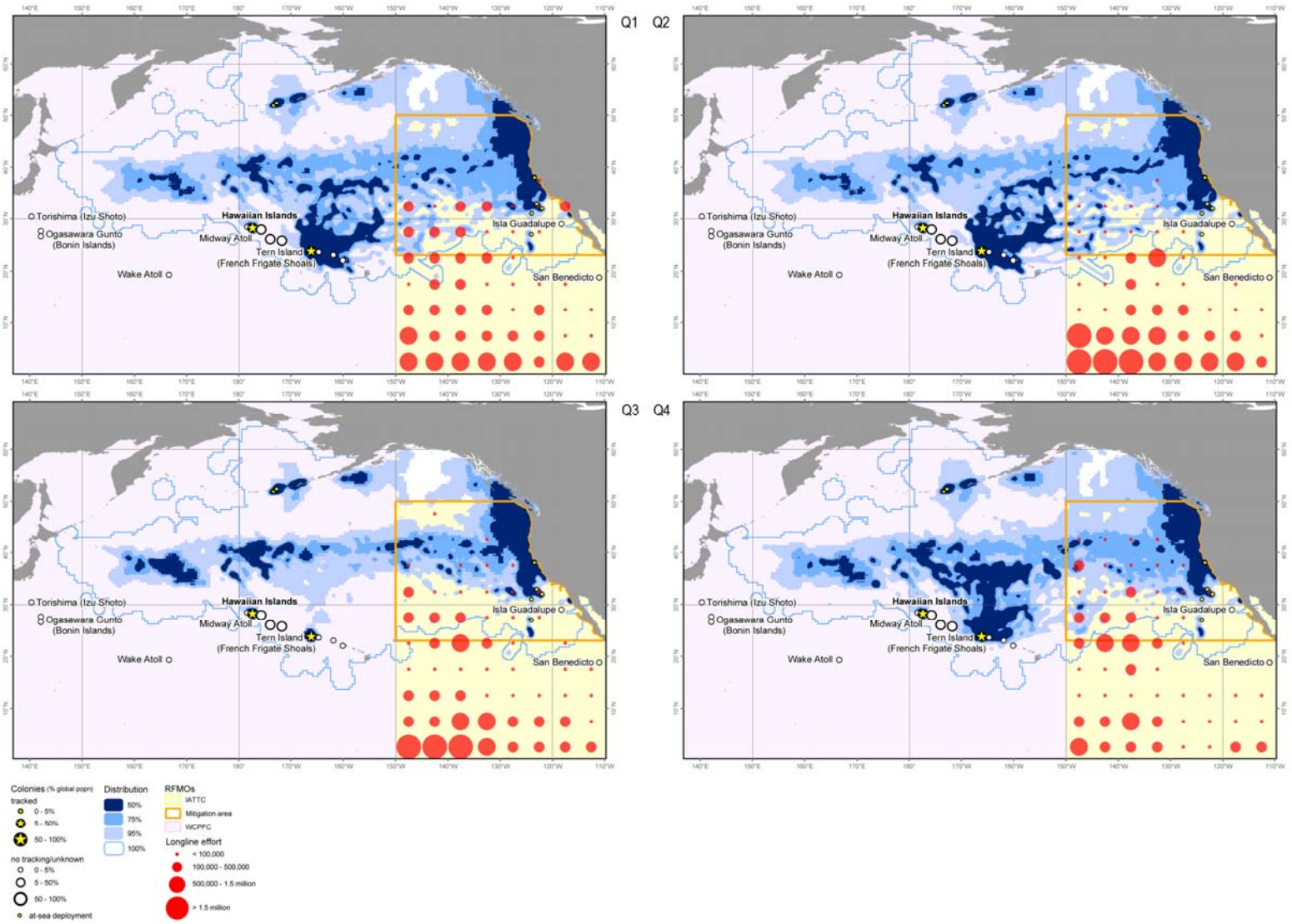

Figure 1. Black-footed Albatross distribution in the IATTC area by year quarter (Q1=Jan-Mar, Q2=Apr-Jun, Q3=Jul-Sep, Q4=Oct-Dec), and overlap with IATTC longline fishing effort 2000-2005 (average number of hooks set per 5º grid square per quarter per year). Highest densities of bird distribution are shown in dark blue. The 100% contour indicates the full extent of the distribution of tracked birds, and full range (estimated from other sources) is shown for comparison. The mitigation areas recommended in IATTC-75-0c are also shown.

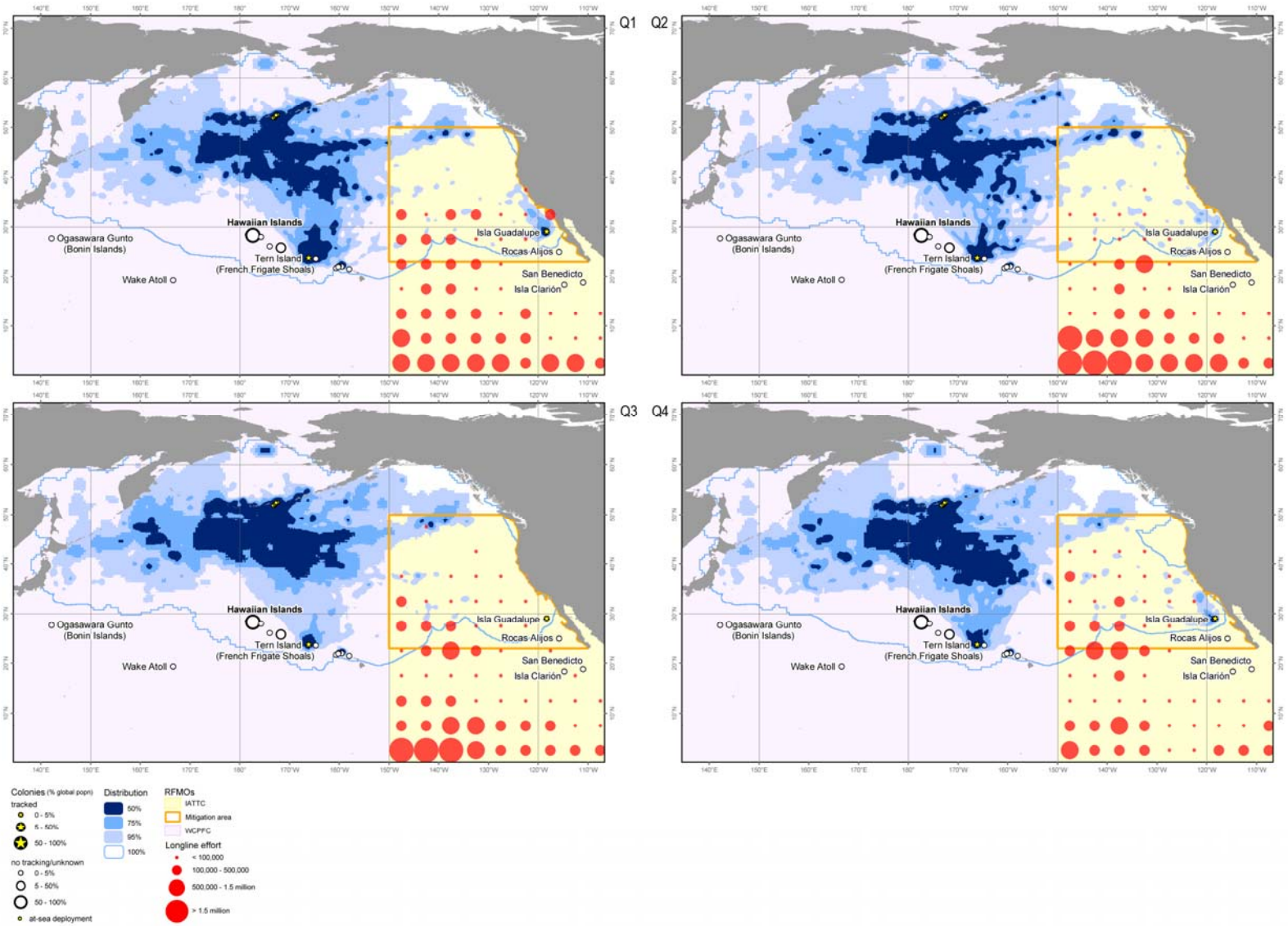

Figure 2. Laysan Albatross distribution in the IATTC area by year quarter (Q1=Jan-Mar, Q2=Apr-Jun, Q3=Jul-Sep, Q4=Oct-Dec), and overlap with IATTC longline fishing effort 2000-2005 (average number of hooks set per 5º grid square per quarter per year). Highest densities of bird distribution are shown in dark blue. The 100% contour indicates the full extent of the distribution of tracked birds, and full range (estimated from other sources) is shown for comparison. The mitigation areas recommended in IATTC-75-0c are also shown.

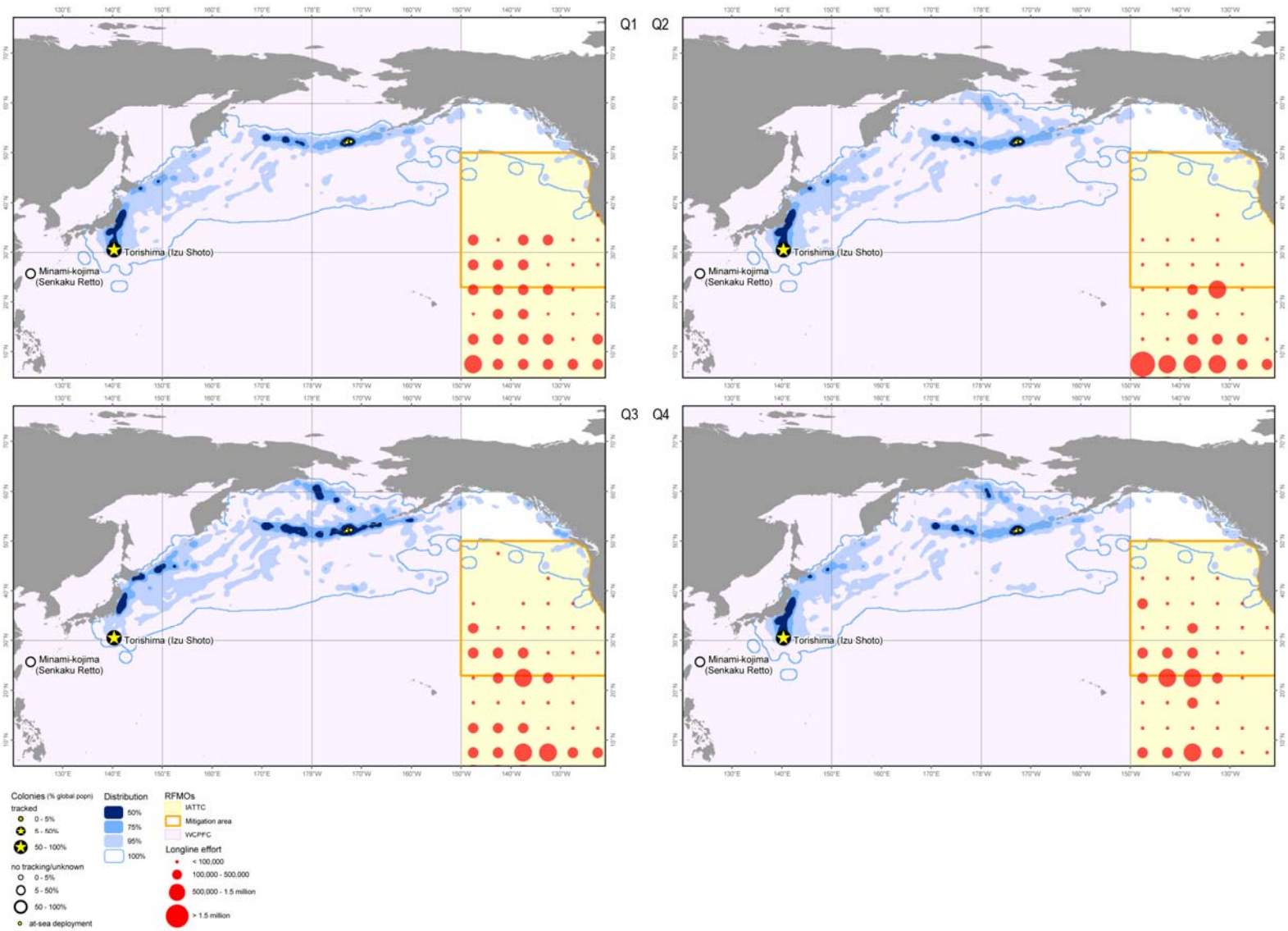

Figure 3. Short-tailed Albatross distribution in the IATTC area by year quarter (Q1=Jan-Mar, Q2=Apr-Jun, Q3=Jul-Sep, Q4=Oct-Dec), and overlap with IATTC longline fishing effort 2000-2005 (average number of hooks set per 5º grid square per quarter per year). Highest densities of bird distribution are shown in dark blue. The 100% contour indicates the full extent of the distribution of tracked birds, and full range (estimated from other sources) is shown for comparison. The mitigation areas recommended in IATTC-75-0c are also shown.

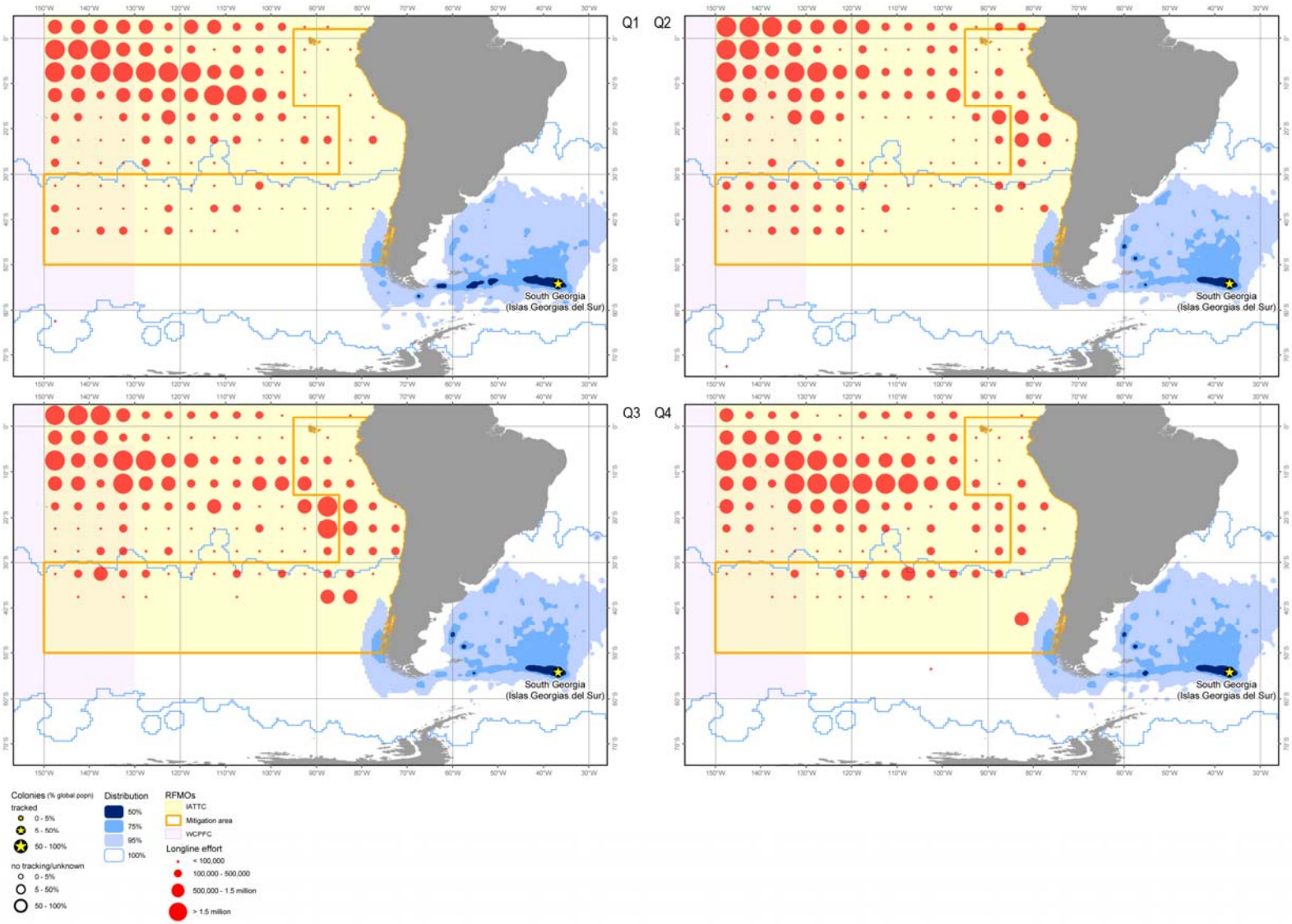

Figure 4. Wandering Albatross distribution in the IATTC area by year quarter (Q1=Jan-Mar, Q2=Apr-Jun, Q3=Jul-Sep, Q4=Oct-Dec), and overlap with IATTC longline fishing effort 2000-2005 (average number of hooks set per 5º grid square per quarter per year). Highest densities of bird distribution are shown in dark blue. The 100% contour indicates the full extent of the distribution of tracked birds, and full range (estimated from other sources) is shown for comparison. The mitigation areas recommended in IATTC-75-0c are also shown.