

# Statistics of the purse seine fleet of France's overseas territories targeting tropical tunas in the Indian Ocean (2001-2012)

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## SUMMARY

*In 2012, the France's Overseas Territories purse seine fishing fleet of the Indian Ocean was composed of 5 vessels of individual carrying capacity >800 t, which all represented a total carrying capacity of more than 5,200 t. The total cumulated nominal effort was about 1,350 and 1,100 fishing and searching days, respectively. The total number of fishing sets was about 1,300, with 48% of the sets realised on FAD-associated schools. In 2012, the total catch reached 30,000 t and was composed of 67%, 23%, and 8.5% of yellowfin, skipjack, and bigeye, respectively. Catches on free-swimming schools represented 54% of the total catch (i.e. 15,500 t) and were largely predominated by yellowfin. Catches on FAD-associated schools represented a total of 13,700 t and were characterized by a high proportion of yellowfin (45%). The catch of skipjack per positive set showed a strong decrease from more than 24 t in 2006 to less than 12 t in 2012. The catch of yellowfin per positive set increased in 2012 to 30 t set<sup>-1</sup>.*

**KEYWORDS:** fish aggregating device, *Katsuwonus pelamis*, *Thunnus albacares*, *Thunnus obesus*

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## 1. Figures

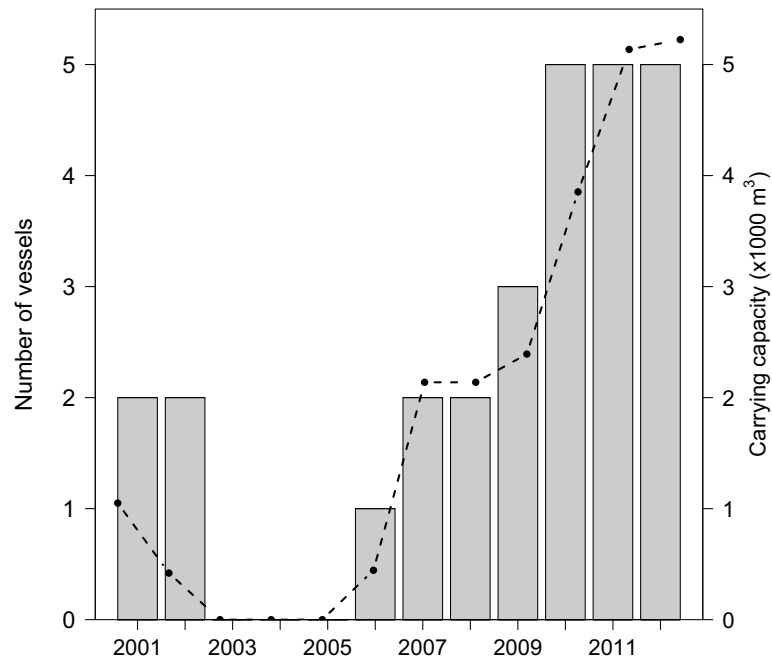


Figure 1: Fishing capacity of the France's Overseas Territories (FRAT) purse seine fleet in the Indian Ocean. Annual changes in the number of purse seiners by size category (barplots) and total carrying capacity (solid line with circles) during 1981-2012. Capacity was weighted by the vessel-specific proportion of the year at sea (in months). The vessel size category (t) was computed as 0.7 times the capacity expressed in  $\text{m}^3$

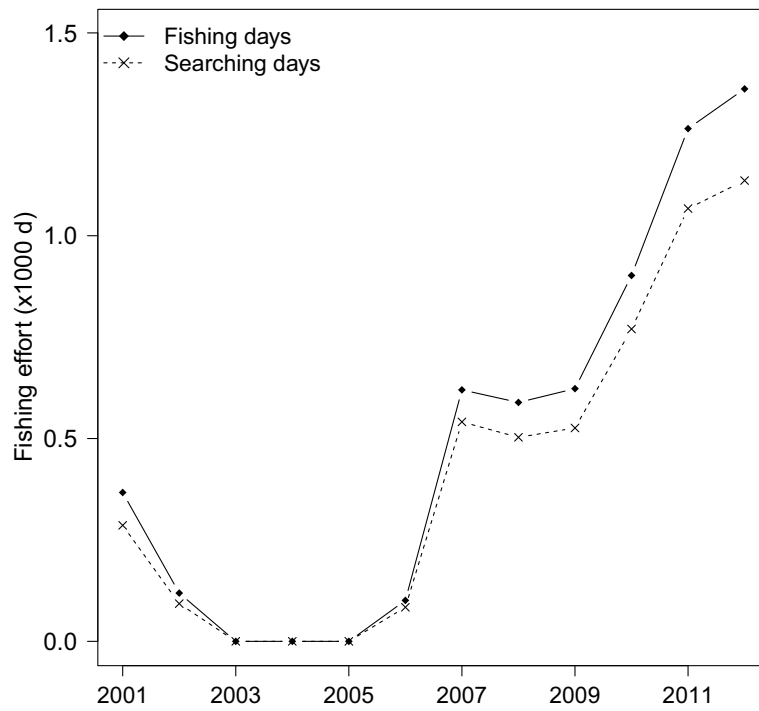


Figure 2: Changes in nominal effort over time. Annual total number of fishing and searching days for the France's Overseas Territories (FRAT) purse seine fishing fleet in the Indian Ocean during 1981-2012

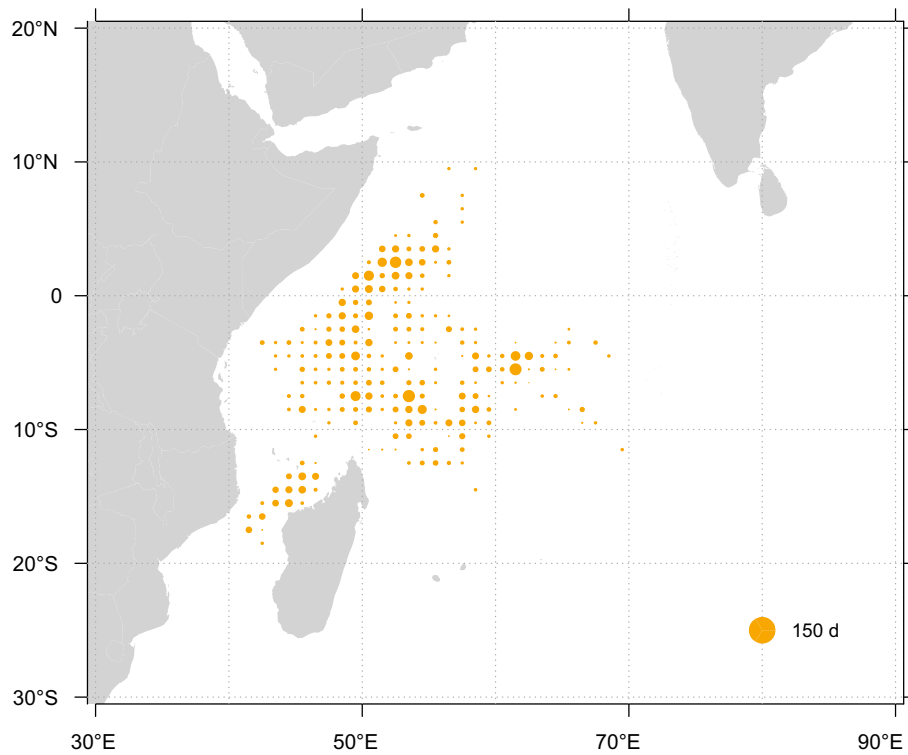


Figure 3: Fishing grounds. Spatial distribution of fishing effort (in searching days) of the France's Overseas Territories (FRAT) purse seine fishing fleet in 2012

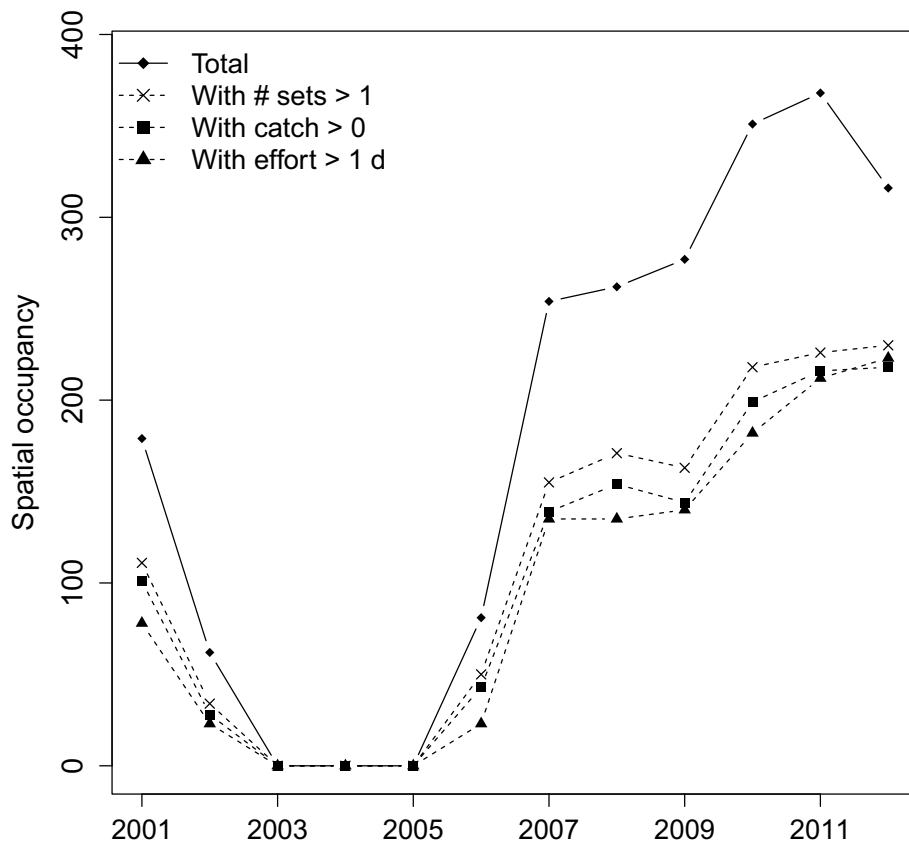


Figure 4: Changes in spatial extent of the fishery over time. Mean annual number of 1-degree squares explored by each vessel of the France's Overseas Territories (FRAT) purse seine fishing fleet during 1981-2012. Solid line indicates standard deviation. Only vessels in activity during 12 months were selected. A loess function was fitted to the data to illustrate the trend

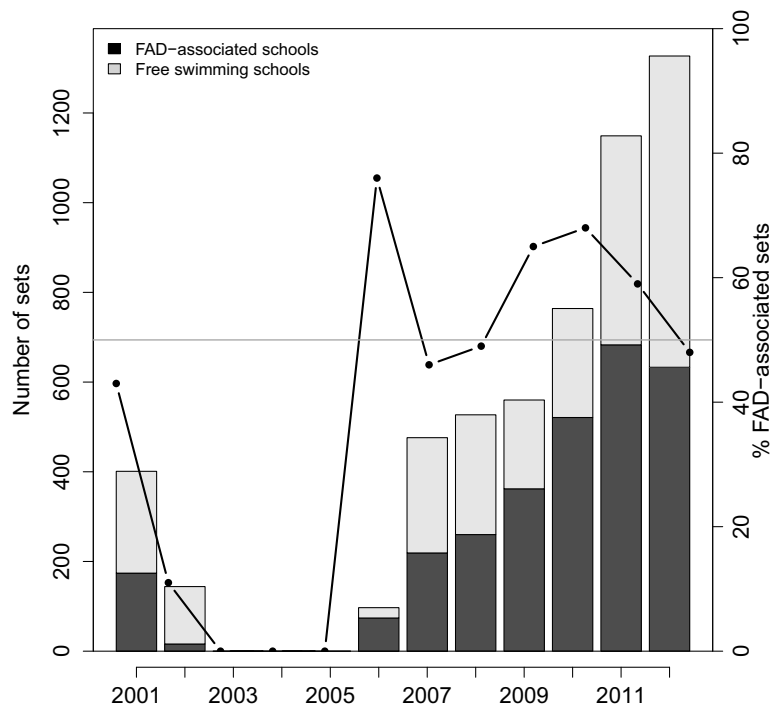


Figure 5: Fishing operations. Annual number of fishing sets in the France's Overseas Territories (FRAT) purse seine fishery on FAD-associated and free-swimming schools during 1981-2012. Line with solid circles indicates the percentage of sets made on FAD-associated schools over free-swimming schools. Grey solid line indicates the 50% value

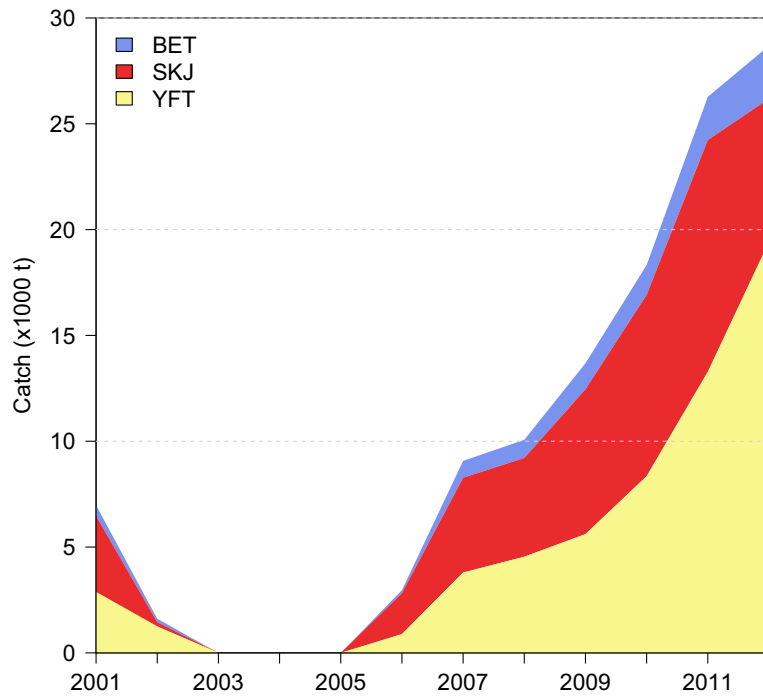


Figure 6: Total fishery production. Catch by species of the France's Overseas Territories (FRAT) purse seine fishing fleet during 1981-2012

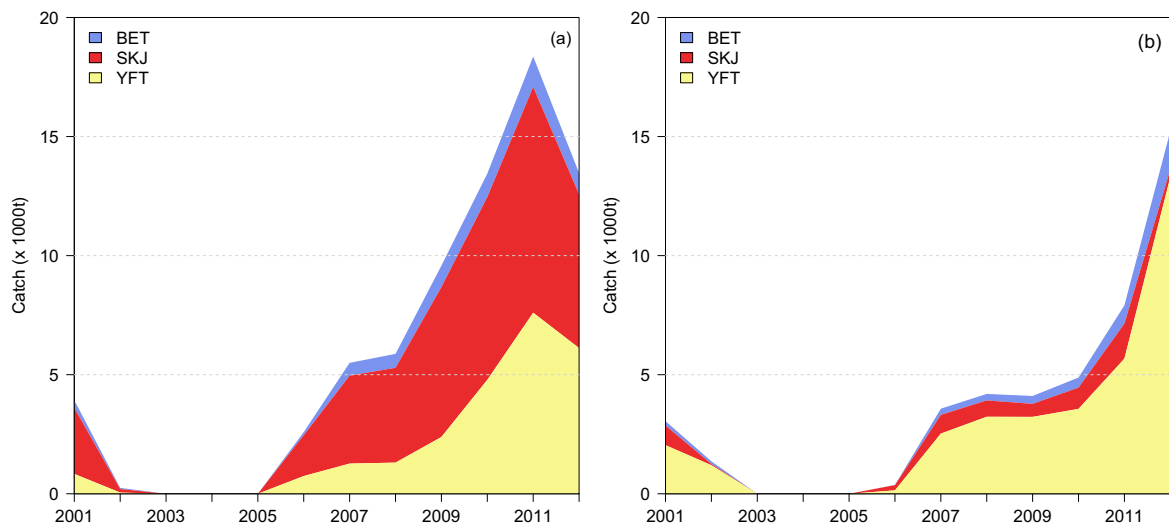


Figure 7: Fishery production by major fishing mode. Catch by species of the France's Overseas Territories (FRAT) purse seine fishing fleet on (a) FAD-associated and (b) free-swimming schools during 1981-2012

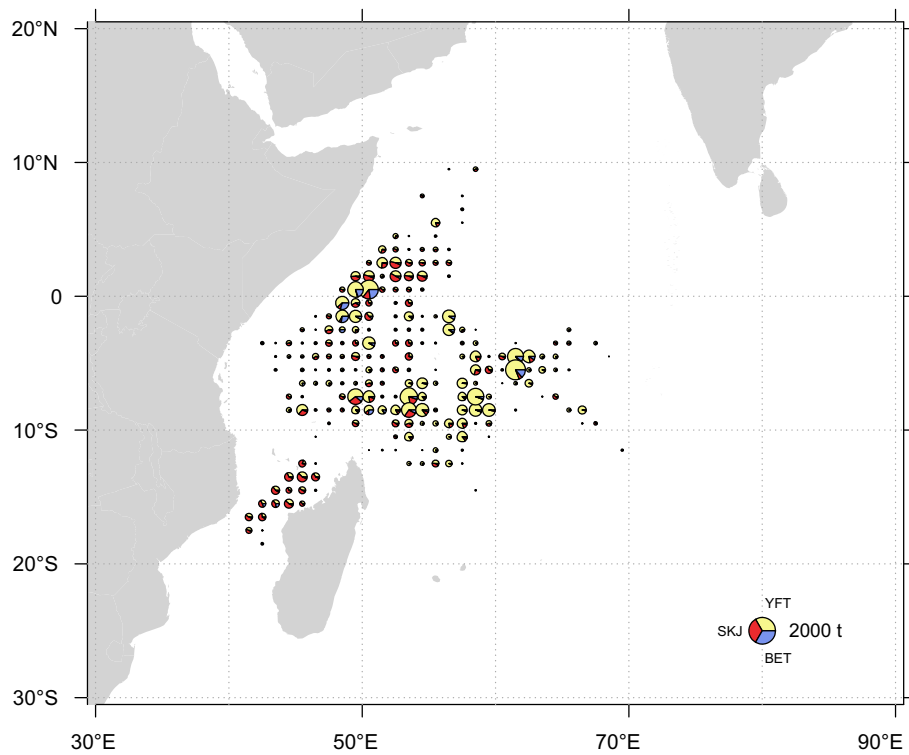


Figure 8: Spatial distribution of tuna catches of the France's Overseas Territories (FRAT) purse seine fishing fleet in 2012

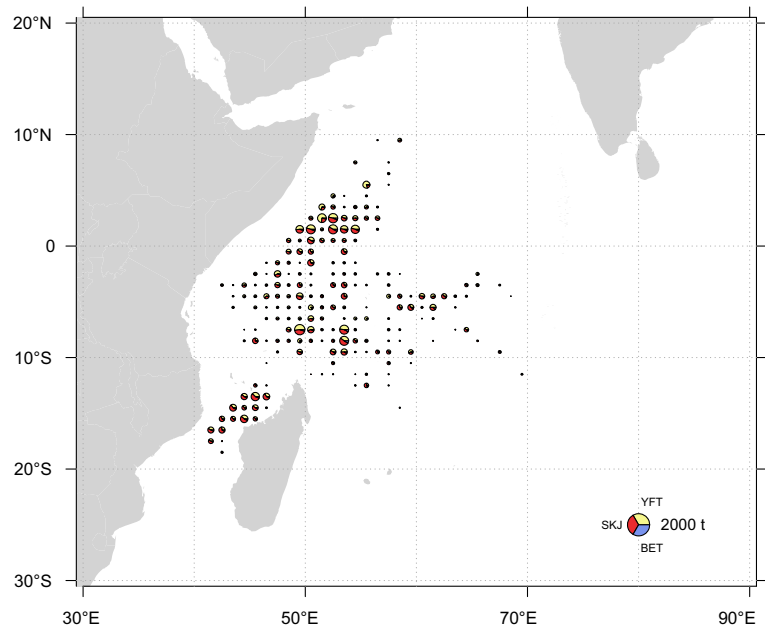


Figure 9: Spatial distribution of tuna catches of the France's Overseas Territories (FRAT) purse seine fishing fleet made on FAD-associated schools in 2012

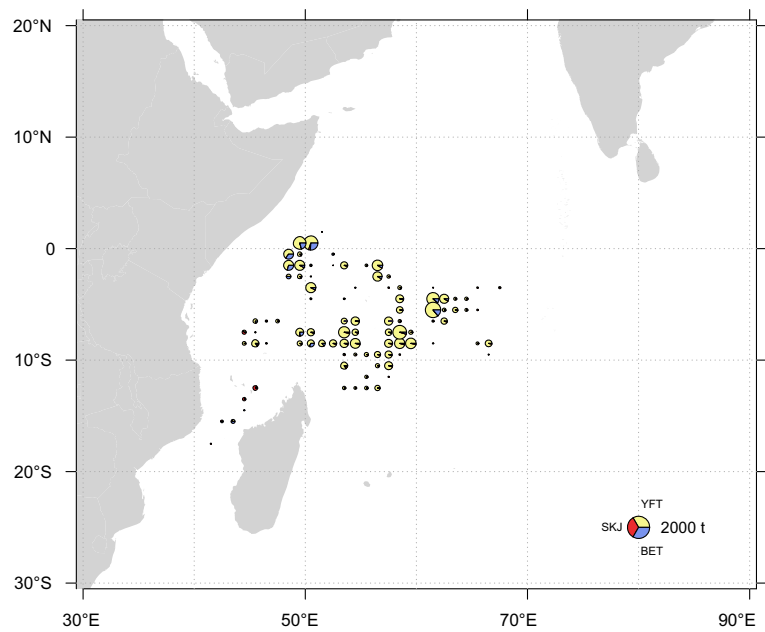


Figure 10: Spatial distribution of tuna catches of the France's Overseas Territories (FRAT) purse seine fishing fleet made on FSC-associated schools in 2012



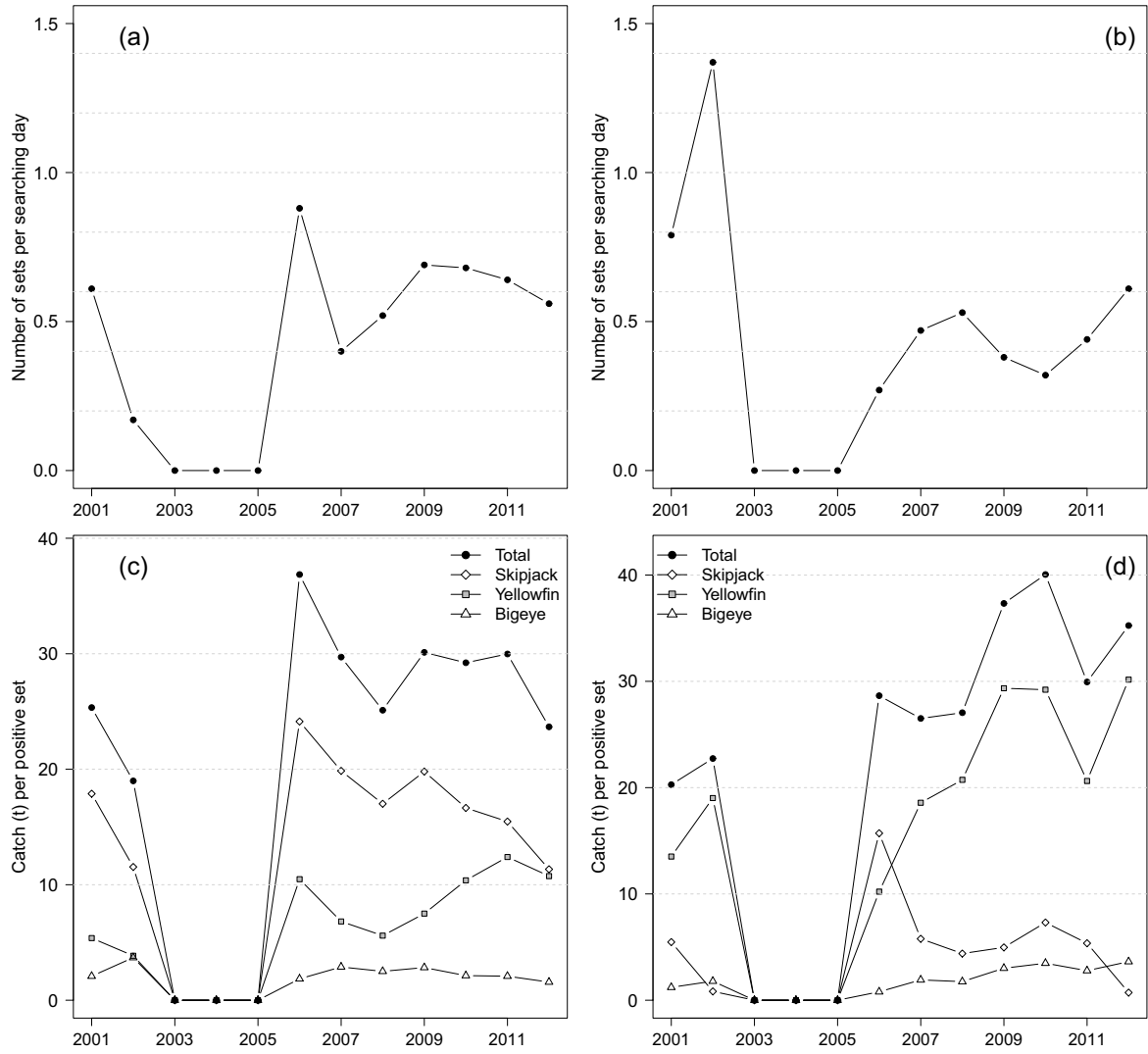


Figure 11: (a-b) Annual number of sets per searching day and (c-d) catch per positive set on (left panel) FAD-associated and (right panel) free-swimming schools for the France's Overseas Territories (FRAT) purse seine fishing fleet in the Indian Ocean during 1981-2012

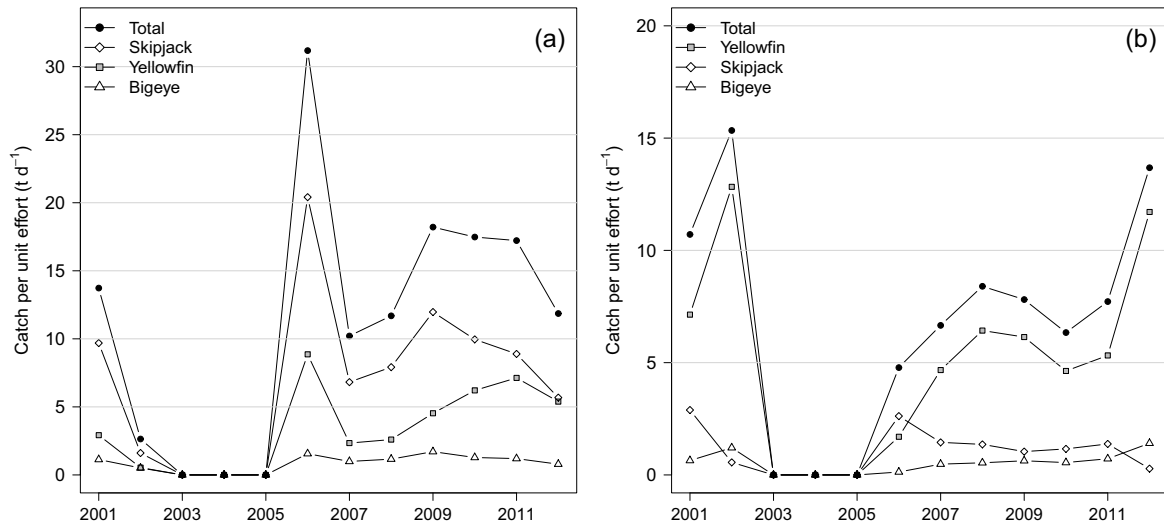


Figure 12: Annual catch rates (in t per searching day) of the France's Overseas Territories (FRAT) purse seine fishing fleet on (a) FAD-associated and (b) free-swimming schools in the Indian Ocean during 1981-2012

## 2. Tables

Table 1: Annual number of purse seiners by size category and total carrying capacity of the European tropical tuna purse seine fishing fleet of the Indian Ocean during 1981-2012. Total carrying capacity (CC) was weighted by the proportion of the year at sea (in months)

Year	50-400	401-600	601-800	801-1200	>1200	Total	CC
2001	0	0	0	2	0	2	1050
2002	0	0	0	2	0	2	420
2003	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0
2006	0	0	0	1	0	1	445
2007	0	0	0	2	0	2	2138
2008	0	0	0	2	0	2	2138
2009	0	0	0	3	0	3	2392
2010	0	0	0	5	0	5	3853
2011	0	0	0	5	0	5	5136
2012	0	0	0	5	0	5	5225

Table 2: Annual nominal fishing effort of the France's Overseas Territories (FRAT) purse seine fleet expressed in fishing and searching days during 1981-2012. Searching days was derived from the total time spent at sea corrected for periods of damage, route towards port, and purse seine operation

Year	Fishing days	Searching days
2001	367	286
2002	119	93
2003	0	0
2004	0	0
2005	0	0
2006	101	84
2007	620	541
2008	589	503
2009	623	526
2010	902	770
2011	1264	1067
2012	1362	1136

Table 3: Annual number of 1-degree squares explored by the France's Overseas Territories (FRAT) purse seine fishing fleet during 1981-2012. #sets indicates squares where a least 1 fishing set was made.

Year	TOTAL	#sets>0	Catch>0	Effort>1 d	Effort>5 d
2001	179	111	101	78	10
2002	62	34	28	23	3
2003	0	0	0	0	0
2004	0	0	0	0	0
2005	0	0	0	0	0
2006	81	50	43	23	1
2007	254	155	139	135	19
2008	262	171	154	135	20
2009	277	163	144	140	24
2010	351	218	199	182	36
2011	368	226	216	212	80
2012	316	230	218	223	88

Table 4: Number of positive and null sets by fishing mode made by the France's Overseas Territories (FRAT) purse seine fishing fleet in the Indian ocean during 1981-2012. FAD = Fish Aggregating Device; FSC = Free-Swimming School

	ALL			FAD			FSC		
	Total	Positive	Null	Total	Positive	Null	Total	Positive	Null
2001	401	306	95	174	155	19	227	151	76
2002	144	76	68	16	13	3	128	63	65
2003	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0
2006	97	85	12	74	71	3	23	14	9
2007	476	322	154	219	186	33	257	136	121
2008	527	390	137	260	234	26	267	156	111
2009	560	428	132	362	318	44	198	110	88
2010	764	583	181	521	461	60	243	122	121
2011	1149	888	261	683	613	70	466	275	191
2012	1327	1010	317	633	569	64	694	441	253

Table 5: Catch by species for the France's Overseas Territories (FRAT) purse seine fishing fleet of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
2001	2875	3598	504	13	0	6990
2002	1248	202	161	69	0	1679
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	887	1933	141	0	57	3018
2007	3795	4480	796	30	30	9130
2008	4543	4666	858	28	0	10094
2009	5612	6842	1230	0	1	13685
2010	8347	8569	1408	34	0	18357
2011	13276	10955	2042	338	0	26610
2012	19419	6768	2499	330	0	29016

Table 6: Catch by species made on FAD-associated schools for the France's Overseas Territories (FRAT) purse seine fishing fleet of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
2001	834	2772	322	0	0	3928
2002	50	150	48	0	0	247
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	744	1713	131	0	29	2617
2007	1268	3694	536	0	28	5526
2008	1308	3981	585	0	0	5875
2009	2384	6295	899	0	1	9578
2010	4783	7676	984	28	0	13472
2011	7602	9481	1278	15	0	18376
2012	6118	6451	896	7	0	13471

Table 7: Catch by species made on free-swimming schools for the France's Overseas Territories (FRAT) purse seine fishing fleet of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
2001	2041	826	182	13	0	3062
2002	1198	52	113	69	0	1432
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	143	220	11	0	27	401
2007	2527	786	260	30	2	3605
2008	3234	685	273	28	0	4219
2009	3229	547	331	0	0	4107
2010	3564	892	424	5	0	4886
2011	5674	1474	764	322	0	8235
2012	13302	317	1603	323	0	15545

Table 8: Number of sets per searching on FAD-associated (FAD) and free-swimming schools (FSC) for the France's Overseas Territories (FRAT) purse seine fishery of the Indian ocean during 1981-2012

	ALL	FAD	FSC	NA
2001	1.40	0.61	0.79	
2002	1.54	0.17	1.37	
2003	0.00	0.00	0.00	
2004	0.00	0.00	0.00	
2005	0.00	0.00	0.00	
2006	1.16	0.88	0.27	
2007	0.88	0.40	0.47	
2008	1.05	0.52	0.53	
2009	1.06	0.69	0.38	
2010	0.99	0.68	0.32	
2011	1.08	0.64	0.44	
2012	1.17	0.56	0.61	

Table 9: Catch per unit of effort (in t per positive set) on FAD-associated schools for the France's Overseas Territories (FRAT) purse seine fishery of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	TOTAL
2001	5.38	17.88	2.08	0.00	25.34
2002	3.85	11.54	3.69	0.00	18.99
2003	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	0.00
2006	10.48	24.13	1.85	0.00	36.86
2007	6.82	19.86	2.88	0.00	29.71
2008	5.59	17.01	2.50	0.00	25.11
2009	7.50	19.80	2.83	0.00	30.12
2010	10.38	16.65	2.13	0.06	29.22
2011	12.40	15.47	2.08	0.02	29.98
2012	10.75	11.34	1.57	0.01	23.67



Table 10: Catch per unit of effort (in t per positive set) on free-swimming schools for the France's Overseas Territories (FRAT) purse seine fishery of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	TOTAL
2001	13.52	5.47	1.21	0.09	20.28
2002	19.02	0.83	1.79	1.10	22.74
2003	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	0.00
2006	10.21	15.71	0.79	0.00	28.65
2007	18.58	5.78	1.91	0.22	26.51
2008	20.73	4.39	1.75	0.18	27.05
2009	29.35	4.97	3.01	0.00	37.33
2010	29.21	7.31	3.48	0.04	40.05
2011	20.63	5.36	2.78	1.17	29.94
2012	30.16	0.72	3.63	0.73	35.25

Table 11: Catch per unit of effort (in t per searching day) on FAD-associated schools for the France's Overseas Territories (FRAT) purse seine fishery of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	TOTAL
2001	2.92	9.69	1.13	0.00	13.73
2002	0.54	1.61	0.51	0.00	2.64
2003	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	0.00
2006	8.86	20.41	1.56	0.00	31.18
2007	2.34	6.82	0.99	0.00	10.21
2008	2.60	7.92	1.16	0.00	11.69
2009	4.53	11.97	1.71	0.00	18.21
2010	6.21	9.96	1.28	0.04	17.48
2011	7.13	8.89	1.20	0.01	17.22
2012	5.39	5.68	0.79	0.01	11.86

Table 12: Catch per unit of effort (in t per searching day) on free swimming schools for the France's Overseas Territories (FRAT) purse seine fishery of the Indian ocean during 1981-2012

Year	YFT	SKJ	BET	ALB	TOTAL
2001	7.14	2.89	0.64	0.05	10.71
2002	12.83	0.56	1.21	0.74	15.34
2003	0.00	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00	0.00
2006	1.70	2.62	0.13	0.00	4.78
2007	4.67	1.45	0.48	0.06	6.66
2008	6.43	1.36	0.54	0.06	8.40
2009	6.14	1.04	0.63	0.00	7.81
2010	4.63	1.16	0.55	0.01	6.34
2011	5.32	1.38	0.72	0.30	7.72
2012	11.71	0.28	1.41	0.28	13.68

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