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Statistics of the European Union and associated flags purse seine
fishing fleet targeting tropical tunas in the Indian Ocean
1981-2014

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SUMMARY

Coming soon

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

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1. Introduction

European tuna purse seiners have been fishing yellowfin (*Thunnus albacares*), skipjack (*Katsuwonus pelamis*), and bigeye tuna (*Thunnus obesus*) in the Indian Ocean since the early 1980s. Tuna schools are harvested through two major fishing modes that result in different species and size composition of the catch, i.e. tunas in free-swimming schools (FSC) and tunas associated with drifting floating objects now predominated by artificial fish aggregating devices (FAD). The European and associated flags purse seine fishery has been monitored by the “Institut de Recherche pour le Développement” (IRD), the Instituto Español de Oceanografía (IEO) and the Seychelles Fishing Authority (SFA) in collaboration with the Unité Statistique Thonière of Antsiranana (USTA) in Madagascar and Albion Fisheries Research Centre (AFRC) in Mauritius. Here, we report a synthesis of the fishing activities of the European purse seiners during 1981-2014 based on the collection of logbooks and landing reports and sampling operations conducted at ports during unloading. No information on bycatch species and discards at-sea collected from observations at-sea is presented in the report. The fleet activities are described through a suite of fisheries indicators that provide information on fishing capacity and effort, catch, catch rates, size structure, and mean weight in the catch for the principal market tropical tunas, with a particular focus on the year 2014.

2. Materials & Methods

The acronym “FAD” used hereafter encompasses any type of drifting floating object to which tuna schools can associate. This definition includes “natural” objects (e.g. logs, palm branches) and anthropogenic floating objects, such as man-made bamboo rafts equipped with radio-range beacons, satellite transmitters and scanning sonars. Fishing sets made on whales were classified as free-swimming school sets whereas sets made on whale sharks (*Rhincodon typus*) were classified as FAD sets (Pallarés and Hallier 1997). By Convention, all schools of indeterminate type were included in the FSC category

2.1 Fishing effort

Nominal fishing effort was derived from logbooks and expressed in days-at-sea and fishing days considering that purse seiners operate during daylight. Searching time (days), which accounts for the expected time required for setting the purse seine, was also used to describe the nominal purse seine effort. The number of support vessels in operation was retrieved from Delgado et al. (2014) for the period 1999-2013 and from licensing information managed at SFA. The quarterly number of buoy and FAD deployments by the Spanish fleet was collected aboard purse seiners from FAD logbooks. Information on the number of FADs in use by the French fleet was derived from quarterly reports of buoy transmission activity and extended purse seine logbooks that have been including activities related to FADs and buoys since January 2013.

2.2 Catch

In 2014, a total of XXX samples were collected at unloading of European purse seiners in the ports of Victoria and Diego Suarez. Samples were used to estimate the size and species composition of the catch following a sampling and processing protocol common with purse seiners flying the flags of Spain, Guinea Conakry, Ivory Coast and other flags associated with the European purse seine fleet (?). Hence, a total

of XXX samples corresponding to more than XXXX tunas measured were used in the processing of the European purse seine fishery data for 2014.

3. Fishing capacity and effort

A total of 39 distinct purse seiners and 15 support vessels operated in the Indian Ocean in 2014 (Fig. 2 and Table 1). The fleet was composed of 15 purse seiners of carrying capacity 800-1200 t, 14 of capacity 1200-2000 t and 6 of capacity > 2,000 t (Table 2). A small-sized vessel of <800 t capacity and < 80 m length overall joined the fleet in late December 2014. Overall, the total capacity of the fleet has remained stable during 2009-2014 at about 46,000 t of fish hold volume. The nominal fishing effort of the fleet increased by about 10% in 2014 and reached more than 10,600 fishing days and about 8,900 searching days (Fig. 3 and Table 3). In addition, the number of support vessels increased from 10 to 15 between 2010 and 2014, corresponding to a ratio of about 0.4 support vessel for 1 purse seiner in 2014. It is noteworthy that the number of support vessels of the European and associated flags fleet has increased to 18 in 2015. Information available from Seychelles support vessels indicates that they spend most of the time at sea (> 300 days) as they only spend short time periods at port for refueling and crew change (Assan et al. 2015). The time at-sea of support vessels should then be fully accounted for in the total effort of the fleet.

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4. Figures

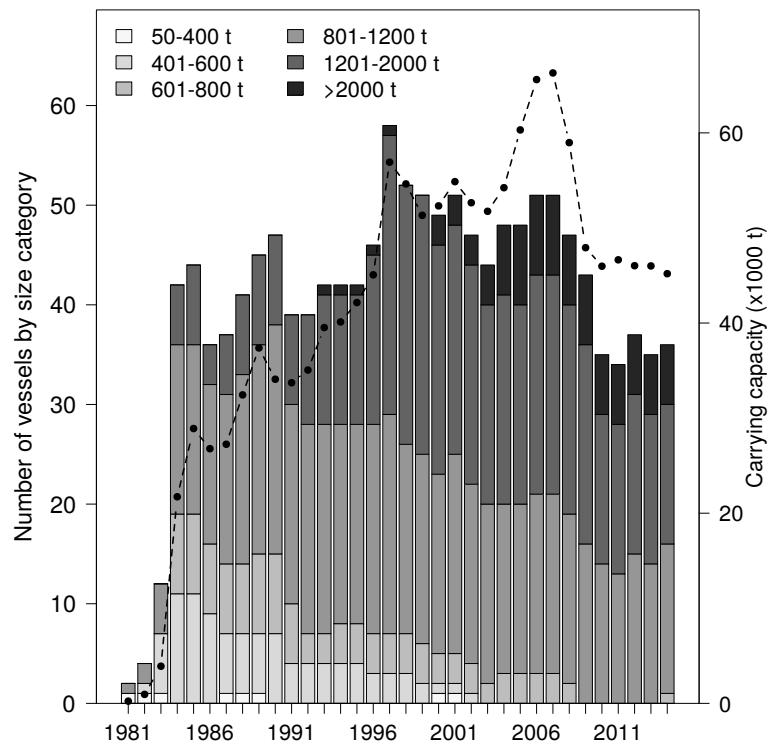


Figure 1: Fishing capacity of the European Union and associated flags purse seine fishing fleet in the Indian Ocean. Annual changes in the number of purse seiners by size category (barplots) and total carrying capacity (solid line with circles) during 1981-2014

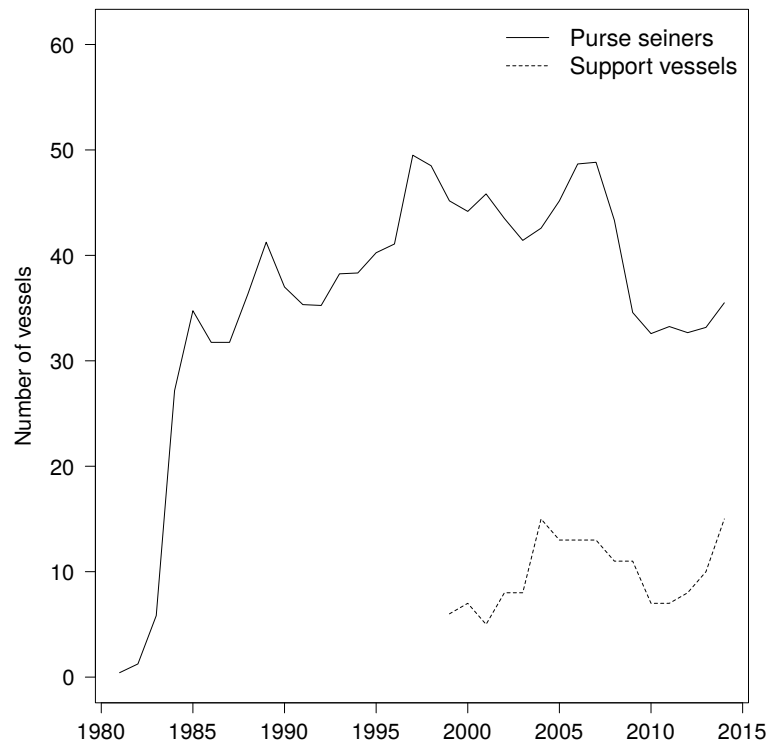


Figure 2: Number of active vessels in the European and associated flags purse seine fleet. Annual total number of purse seiners and support vessels in the Indian Ocean during 1981-2014. The number of purse seiners was weighed by the monthly proportion of time at sea in each year

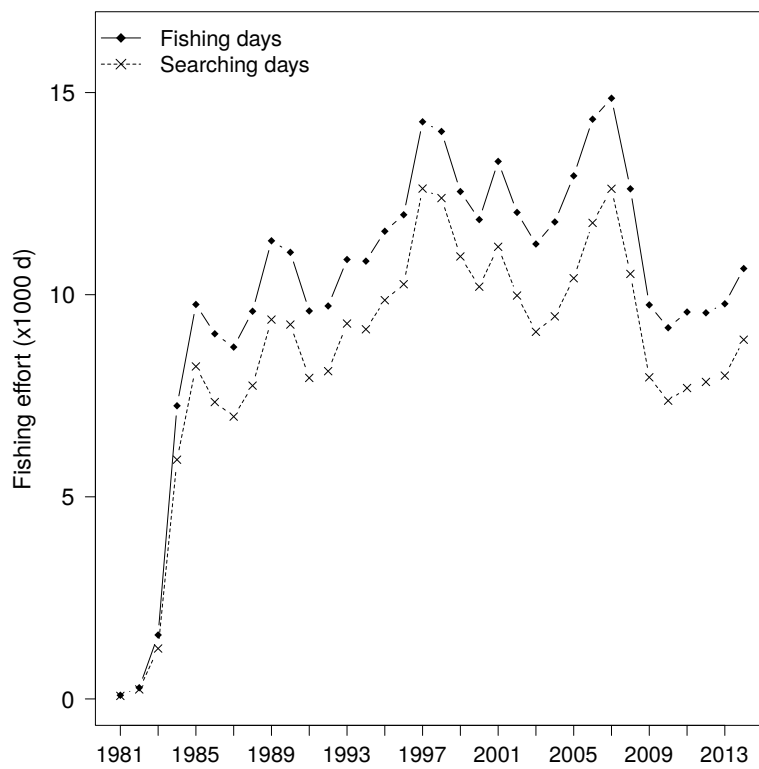


Figure 3: Changes in nominal effort over time. Annual total number of fishing and searching days for the European Union and associated flags purse seine fishing fleet in the Indian Ocean during 1981-2014

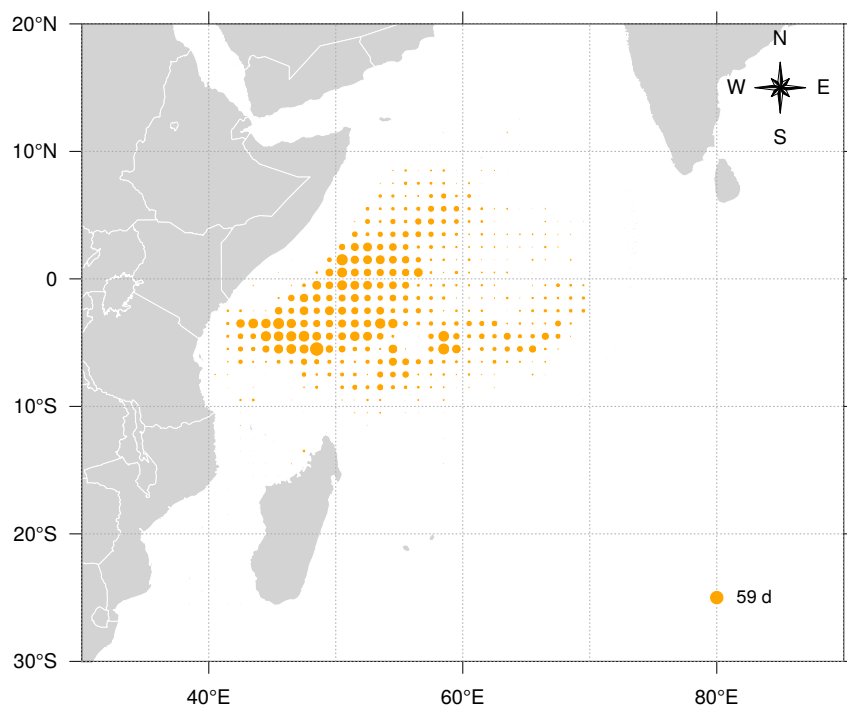


Figure 4: Fishing grounds. Spatial distribution of fishing effort (in searching days) of the European Union and associated flags purse seine fishing fleet in 2012

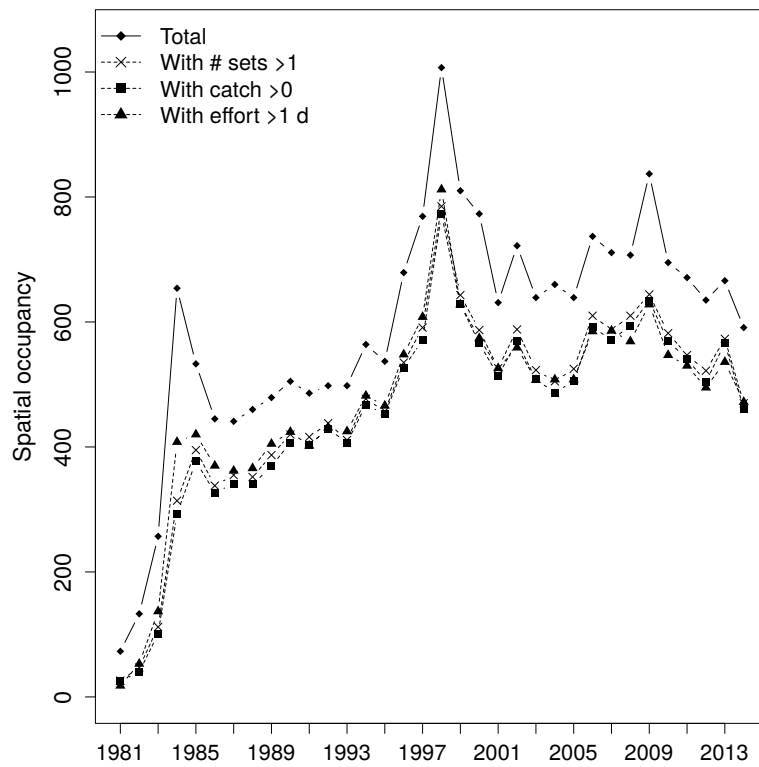


Figure 5: Changes in spatial extent of the fishery over time Annual number of 1-degree squares explored by the European and associated flags purse seine fishing fleet during 1981-2014

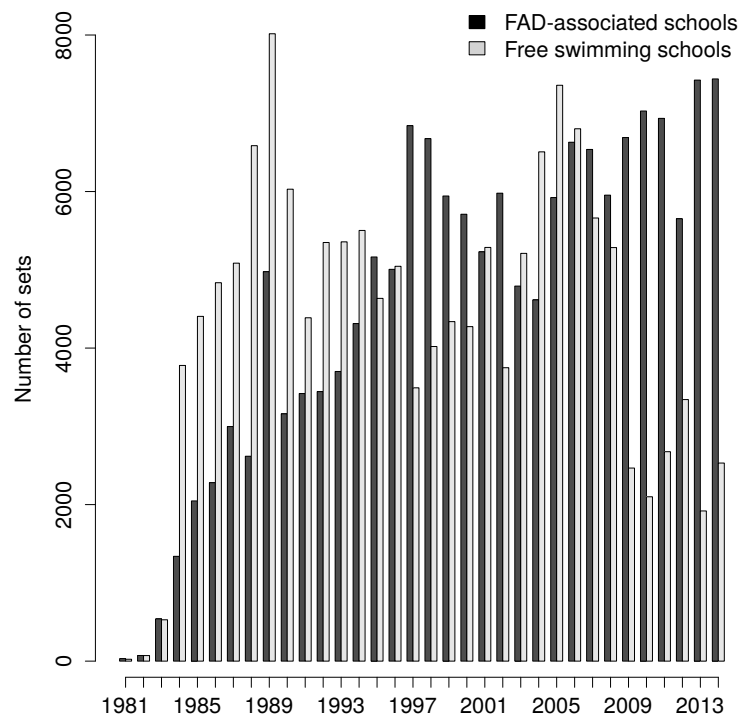


Figure 6: Fishing operations. Annual number of fishing sets made by the European Union and associated flags purse seine fishing fleet on FAD-associated and free-swimming schools during 1981-2014. Line with solid circles indicates the percentage of sets made on FAD-associated schools over free-swimming schools. Grey solid line indicates the 50% value

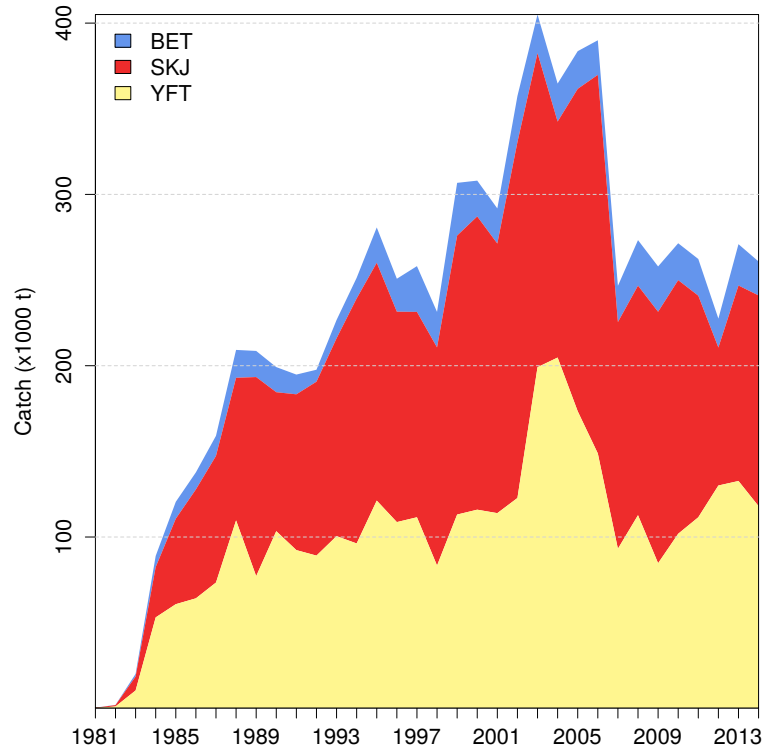


Figure 7: Total fishery production. Catch by species of the European Union and associated flags purse seine fishing fleet during 1981-2014

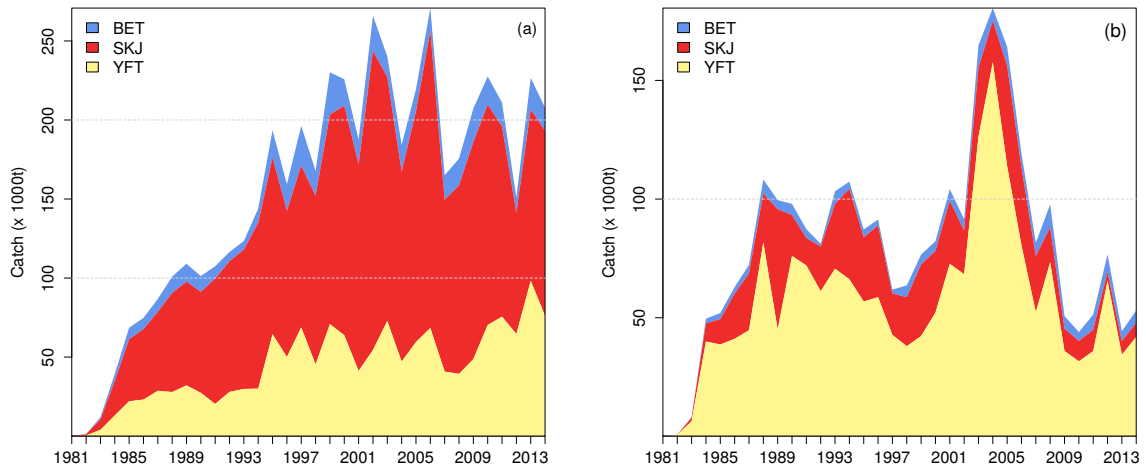


Figure 8: Fishery production by major fishing mode. Catch by species of the European Union and associated flags purse seine fishing fleet on (a) FAD-associated and (b) free-swimming schools during 1981-2014

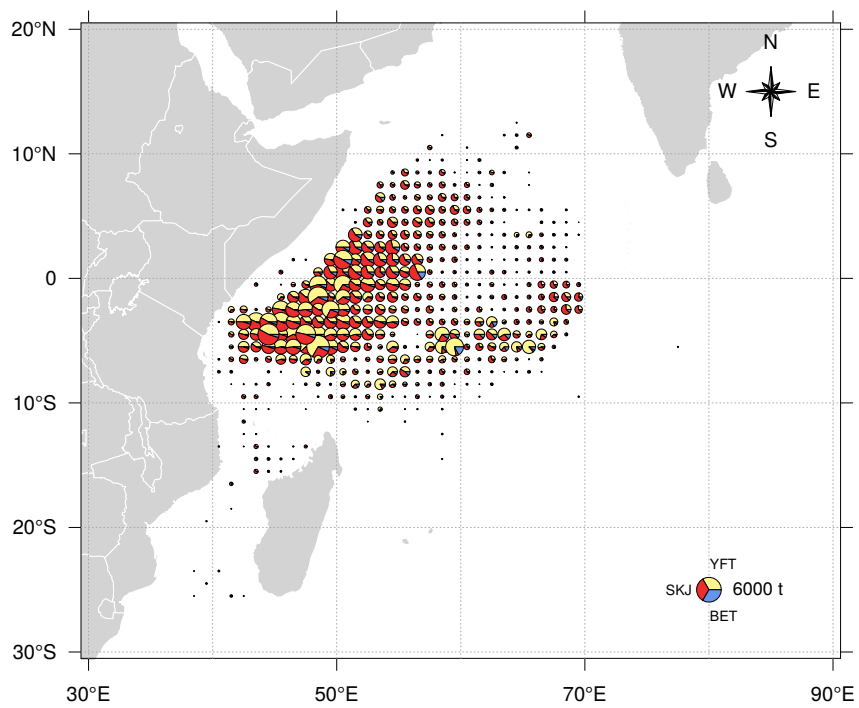


Figure 9: Spatial distribution of tuna catches of the European Union and associated flags purse seine fishing fleet in 2014

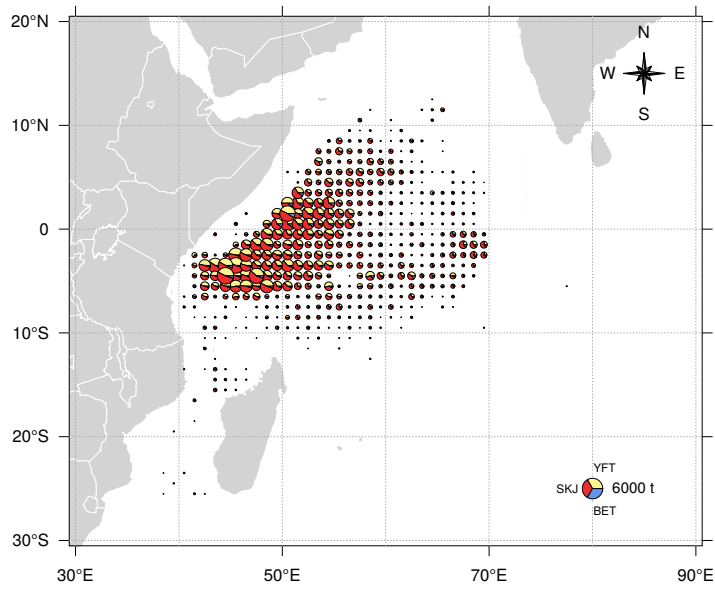


Figure 10: Spatial distribution of tuna catches of the European Union and associated flags purse seine fishing fleet made on FAD-associated schools in 2014

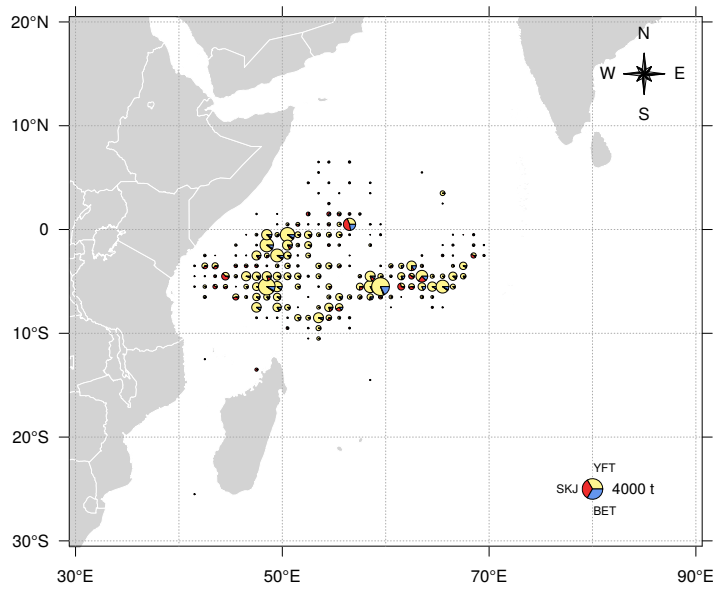


Figure 11: Spatial distribution of tuna catches of the European Union and associated flags purse seine fishing fleet made on FSC-associated schools in 2014

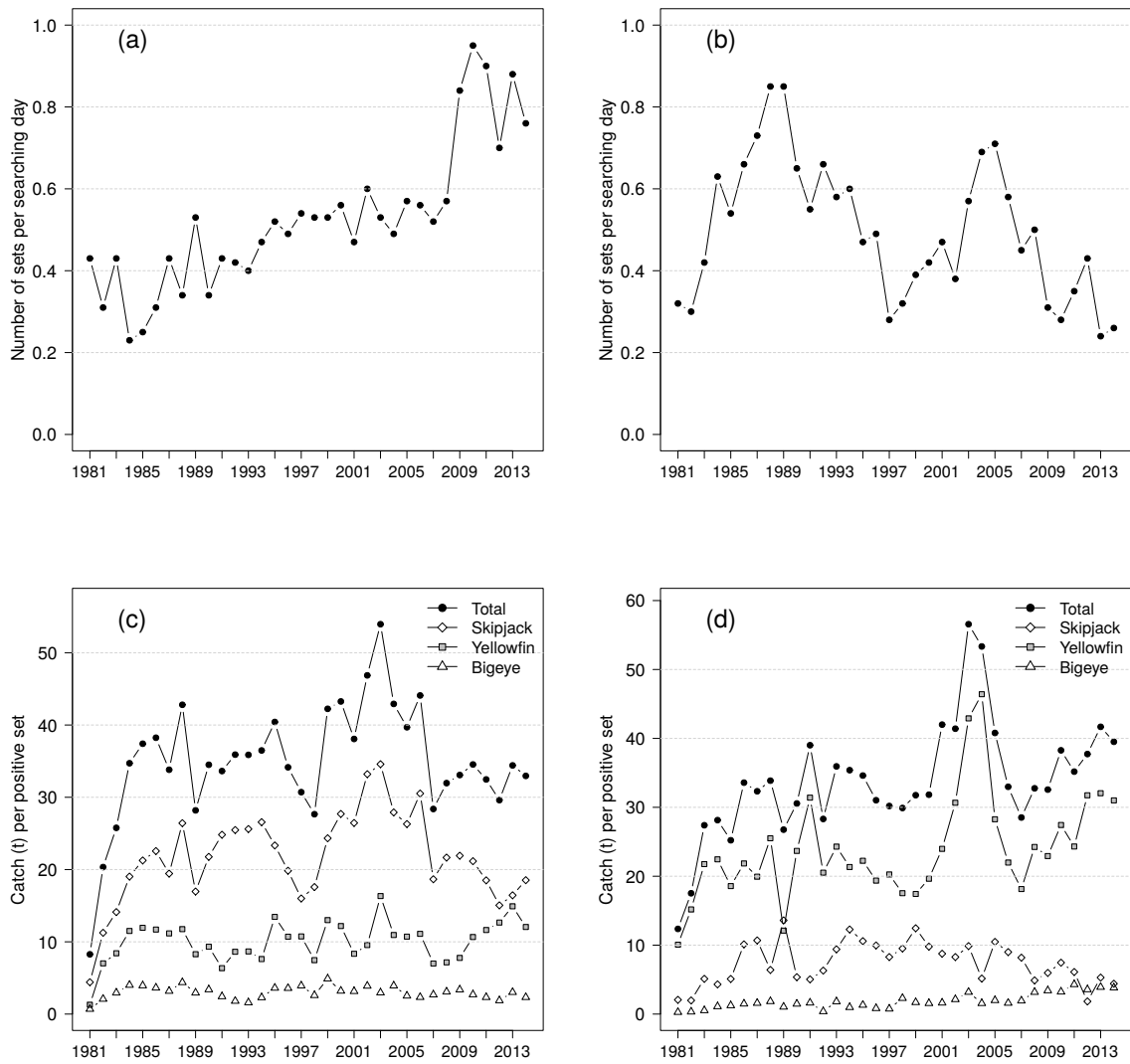


Figure 12: (a-b) Annual number of sets per searching day and (c-d) catch per positive set on (left panel) FAD-associated and (right panel) free-swimming schools for the European Union and associated flags purse seine fishing fleet in the Indian Ocean during 1981-2014

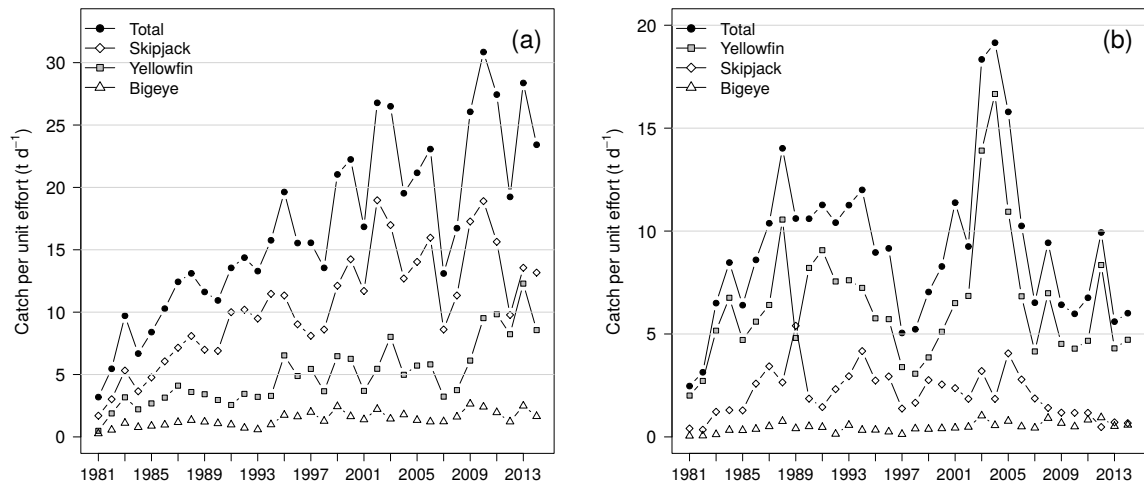


Figure 13: Annual catch rates (in t per searching day) of the European Union and associated flags purse seine fishing fleet on (a) FAD-associated and (b) free-swimming schools in the Indian Ocean during 1981-2014

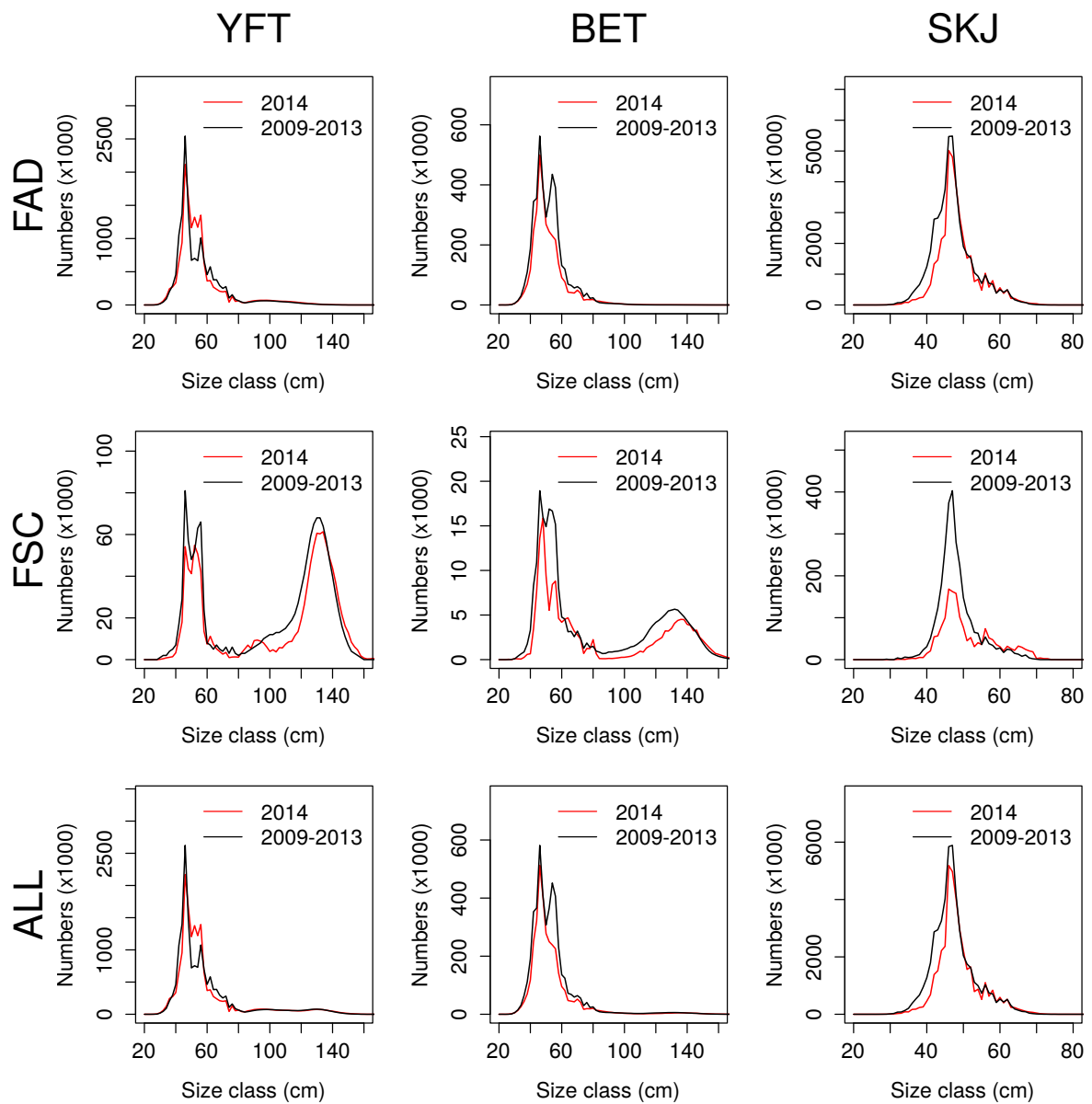


Figure 14: Size structure of the catch. Size distribution (in numbers) of the species-specific catch for the European Union and associated flags purse seine fishing fleet in 2014 (red line) and for an average year representing the period 2007-2011 (black line)

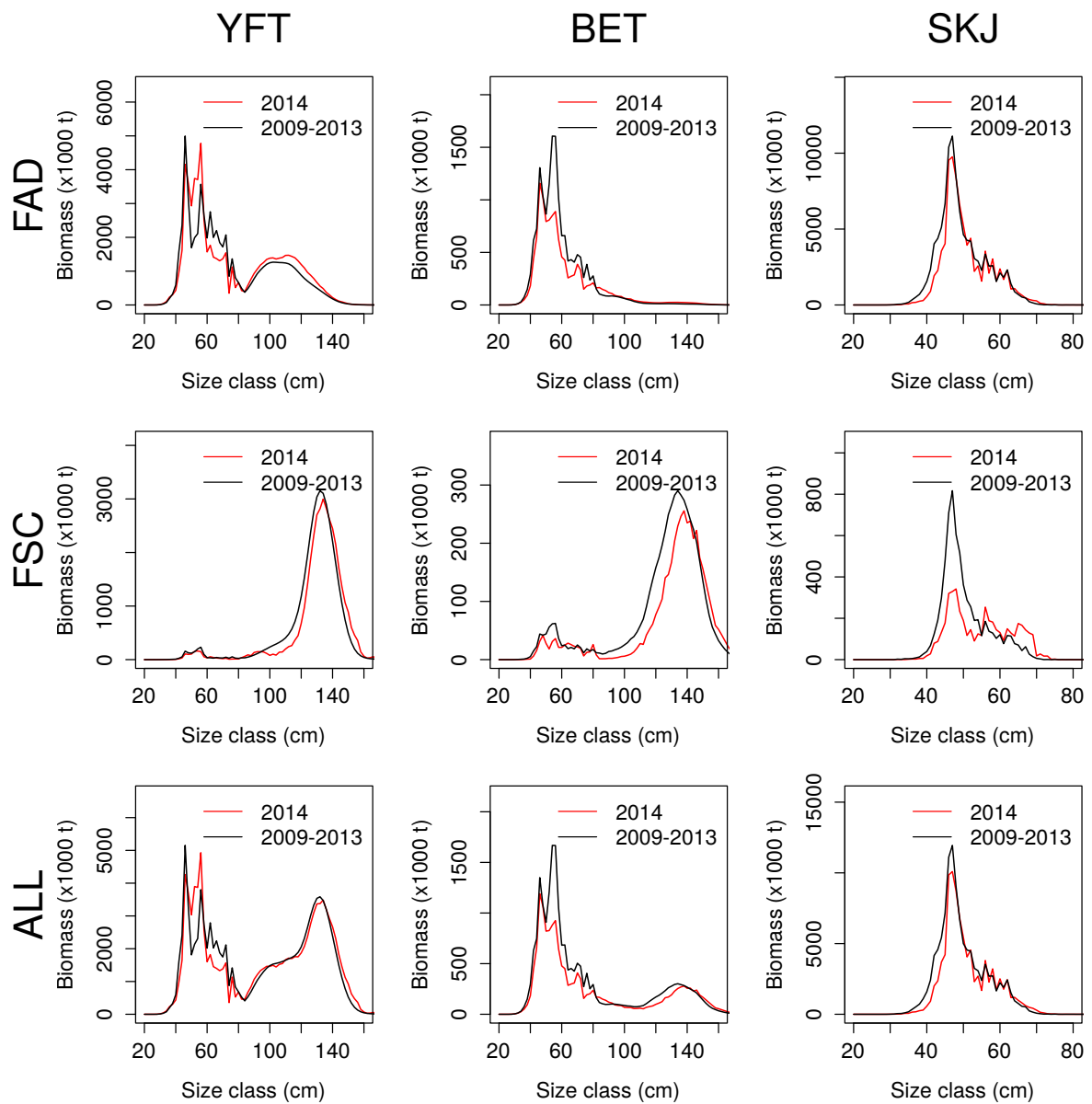


Figure 15: Size structure of the catch. Size distribution (in biomass) of the species-specific catch for the European Union and associated flags purse seine fishing fleet in 2014 (red line) and for an average year representing the period 2007-2011 (black line)

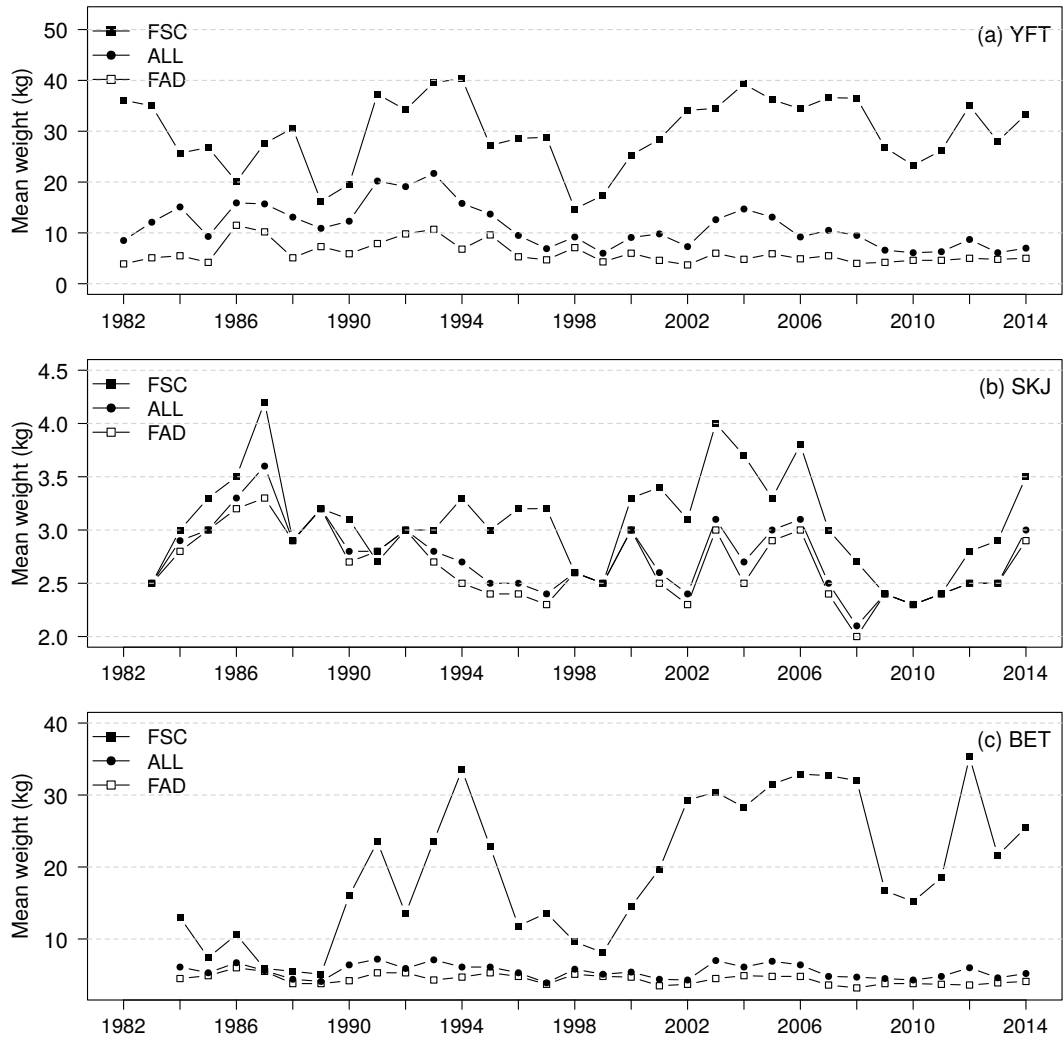


Figure 16: Annual time series of mean weight (kg) for (a) yellowfin, (b) skipjack, and (c) bigeye tuna for each fishing mode during 1982-2014

5. Tables

Table 1: Annual number of vessels by flag for the European tropical tuna purse seine fishing fleet of the Indian Ocean during 1981-2014. The table can include repetitions of vessels in case of flag change over a year. ANT = Dutch Antillas, BEL = Belize, ESP = Spain, FRA = France, FRAT = France Overseas Territories, IRN = Iran, ITA = Italy, PAN = Panama, MUS = Mauritius, SYC = Seychelles, VCT = Saint Vincent

Year	ANT	BEL	ESP	FRA	FRAT	IRN	ITA	MLT	MUS	PAN	SYC	VCT	TOTAL
1981	0	0	0	2	0	0	0	0	0	0	0	0	2
1982	0	0	0	4	0	0	0	0	0	0	0	0	4
1983	0	0	0	12	0	0	0	0	0	0	0	0	12
1984	0	0	14	26	0	0	0	1	0	1	0	0	42
1985	0	0	16	26	0	0	0	1	0	1	0	0	44
1986	0	0	12	22	0	0	0	1	0	1	0	0	36
1987	0	0	14	21	0	0	0	1	0	1	0	0	37
1988	0	0	18	21	0	0	0	2	0	1	0	0	42
1989	0	0	21	21	0	0	0	2	0	1	0	0	45
1990	0	0	21	21	0	0	0	2	0	3	0	0	47
1991	0	0	17	18	0	0	0	1	0	3	0	0	39
1992	0	0	18	17	0	0	0	1	0	3	0	0	39
1993	0	4	19	17	0	0	0	2	0	4	0	0	46
1994	0	4	18	17	0	0	0	0	0	3	0	0	42
1995	0	4	19	17	0	0	0	1	0	3	0	0	44
1996	0	4	22	17	0	0	0	0	0	3	0	0	46
1997	4	5	23	19	0	0	1	0	0	4	5	4	65
1998	4	4	20	16	0	0	1	0	0	2	5	0	52
1999	4	4	20	15	0	0	1	0	0	2	5	0	51
2000	5	5	17	15	0	0	1	0	0	1	6	0	50
2001	4	5	17	18	2	2	1	0	0	1	9	0	59
2002	4	0	18	16	2	0	1	0	0	1	7	0	49
2003	4	1	18	14	0	0	1	0	0	1	11	0	50
2004	1	0	20	15	0	1	1	0	0	1	13	0	52
2005	0	0	20	16	0	0	1	0	0	0	11	0	48
2006	0	0	22	17	1	0	1	0	0	0	10	0	51
2007	0	0	21	17	2	0	1	0	0	0	10	0	51
2008	0	0	17	17	2	0	1	0	0	0	10	0	47
2009	0	0	15	15	3	0	1	0	0	0	10	0	44
2010	0	0	13	8	5	0	0	0	0	0	9	0	35
2011	0	0	13	8	5	0	0	0	0	0	8	0	34
2012	0	0	14	10	5	0	0	0	0	0	8	0	37
2013	0	0	14	8	5	0	0	0	1	0	7	0	35
2014	0	0	15	13	1	0	1	0	2	0	10	0	42

Table 2: 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 1981-2014. 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	1201-2000	>2000	Nb_vessels	Nb_vessels_weighted	CC
1981	1	0	0	1	0	0	2	0	233
1982	1	1	0	2	0	0	4	1	945
1983	1	6	0	5	0	0	12	6	3907
1984	0	11	8	17	6	0	42	27	21727
1985	0	11	8	17	8	0	44	35	28904
1986	0	9	7	16	4	0	36	32	26784
1987	1	6	7	17	6	0	37	32	27252
1988	1	6	7	19	8	0	41	36	32443
1989	1	6	8	21	9	0	45	41	37379
1990	0	7	8	23	9	0	47	37	34089
1991	0	4	6	20	9	0	39	35	33723
1992	0	4	3	21	11	0	39	35	35055
1993	0	4	3	21	13	1	42	38	39521
1994	0	4	4	20	13	1	42	38	40113
1995	0	4	4	20	13	1	42	40	42153
1996	0	3	4	21	17	1	46	41	45069
1997	0	3	4	22	28	1	58	50	56919
1998	0	3	4	19	26	0	52	48	54627
1999	0	2	4	19	26	0	51	45	51329
2000	1	1	3	18	23	3	49	44	52321
2001	1	1	3	20	23	3	49	46	54870
2002	0	1	3	18	22	3	46	44	52652
2003	0	0	2	18	20	4	44	41	51751
2004	0	0	3	17	21	7	48	43	54234
2005	0	0	3	17	20	8	48	45	60309
2006	0	0	3	18	22	8	51	49	65605
2007	0	0	3	18	22	8	51	49	66302
2008	0	0	2	17	21	7	47	43	58975
2009	0	0	0	16	20	7	43	35	47925
2010	0	0	0	14	15	6	35	33	45975
2011	0	0	0	13	15	6	34	33	46648
2012	0	0	0	15	16	6	37	33	46029
2013	0	0	0	14	15	6	35	33	46004
2014	0	0	1	15	14	6	39	36	45189

Table 3: Annual nominal fishing effort of the European Union and associated flags purse seine fishing fleet expressed in fishing and searching days during 1981-2014. 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
1981	91	75
1982	277	235
1983	1582	1247
1984	7252	5918
1985	9758	8225
1986	9033	7344
1987	8704	6984
1988	9590	7750
1989	11333	9384
1990	11048	9261
1991	9598	7941
1992	9721	8108
1993	10870	9286
1994	10830	9144
1995	11569	9864
1996	11977	10259
1997	14277	12625
1998	14038	12390
1999	12551	10946
2000	11858	10198
2001	13297	11185
2002	12035	9979
2003	11254	9082
2004	11799	9464
2005	12940	10407
2006	14341	11776
2007	14860	12619
2008	12619	10514
2009	9747	7956
2010	9182	7378
2011	9571	7691
2012	9552	7842
2013	9775	7998
2014	10647	8886

Table 4: Annual number of 1-degree squares explored by the European Union and associated flags purse seine fishing fleet during 1981-2014. #sets indicates squares where a least 1 fishing set was made.

Year	TOTAL	#sets	Catch >0	Effort > 1 d	Effort > 5 d
1981	73	26	25	18	
1982	133	47	40	53	10
1983	257	112	101	137	60
1984	654	314	293	408	220
1985	533	395	377	420	330
1986	445	338	327	370	270
1987	441	355	341	362	254
1988	460	352	340	366	263
1989	479	387	369	405	284
1990	505	420	407	424	311
1991	486	416	403	402	293
1992	498	438	429	431	330
1993	498	411	407	425	302
1994	564	477	467	482	348
1995	537	457	453	466	326
1996	679	535	527	548	395
1997	769	591	571	608	417
1998	1007	785	773	812	542
1999	810	643	628	628	418
2000	773	587	566	574	378
2001	631	526	514	526	394
2002	722	588	569	559	412
2003	639	523	508	507	351
2004	660	505	487	508	340
2005	639	525	505	508	365
2006	737	610	592	585	409
2007	711	587	571	586	415
2008	707	610	594	569	436
2009	837	644	634	628	418
2010	695	582	569	547	364
2011	671	547	541	530	344
2012	635	522	504	495	340
2013	666	573	566	536	401
2014	591	470	461	472	319

Table 5: Number of positive and null sets by fishing mode made by the European Union and associated flags purse seine fishing fleet in the Indian ocean during 1981-2014. FAD = Fish Aggregating Device; FSC = Free-Swimming School

	ALL			FAD			FSC		
	Total	Positive	Null	Total	Positive	Null	Total	Positive	Null
1981	56	44	12	32	29	3	24	15	9
1982	143	105	38	72	63	9	71	42	29
1983	1068	766	302	540	470	70	528	296	232
1984	5117	2940	2177	1339	1144	195	3778	1796	1982
1985	6452	3932	2520	2047	1846	201	4405	2086	2319
1986	7115	3855	3260	2280	1974	306	4835	1881	2954
1987	8082	4811	3271	2997	2568	429	5085	2243	2842
1988	9204	5580	3624	2618	2373	245	6586	3207	3379
1989	12992	7591	5401	4976	3869	1107	8016	3722	4294
1990	9190	6148	3042	3160	2937	223	6030	3211	2819
1991	7806	5493	2313	3419	3199	220	4387	2294	2093
1992	8793	6227	2566	3444	3246	198	5349	2981	2368
1993	9058	6350	2708	3701	3441	260	5357	2909	2448
1994	9816	7051	2765	4313	3949	364	5503	3102	2401
1995	9799	7343	2456	5164	4790	374	4635	2553	2082
1996	10051	7732	2319	5006	4669	337	5045	3063	1982
1997	10334	8509	1825	6842	6398	444	3492	2111	1381
1998	10696	8299	2397	6676	6130	546	4020	2169	1851
1999	10281	8058	2223	5943	5555	388	4338	2503	1835
2000	9984	7896	2088	5710	5242	468	4274	2654	1620
2001	10516	7978	2538	5230	4946	284	5286	3032	2254
2002	9728	7930	1798	5979	5701	278	3749	2229	1520
2003	10002	7405	2597	4792	4461	331	5210	2944	2266
2004	11123	7704	3419	4616	4307	309	6507	3397	3110
2005	13281	9579	3702	5923	5550	373	7358	4029	3329
2006	13432	9820	3612	6630	6162	468	6802	3658	3144
2007	12200	8709	3491	6538	5823	715	5662	2886	2776
2008	11238	8528	2710	5954	5503	451	5284	3025	2259
2009	9157	7836	1321	6690	6267	423	2467	1569	898
2010	9129	7743	1386	7029	6590	439	2100	1153	947
2011	9611	7978	1633	6935	6500	435	2676	1478	1198
2012	8995	7283	1712	5653	5220	433	3342	2063	1279
2013	9343	7968	1375	7424	6888	536	1919	1080	839
2014	9970	8295	1675	7439	6826	613	2531	1469	1062

Table 6: Catch by species for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
1981	188	158	23	0	56	425
1982	1081	792	145	0	0	2018
1983	10400	8153	1536	0	136	20225
1984	53083	29350	6528	469	228	89659
1985	60791	49895	9870	620	483	121659
1986	64208	63563	9965	208	693	138637
1987	73421	73907	11750	217	43	159338
1988	109696	83232	16293	242	732	210194
1989	77147	116231	15249	6	0	208633
1990	103406	81119	14666	207	61	199459
1991	92353	90945	11529	2216	39	197081
1992	89152	101507	6994	3254	0	200908
1993	100500	115469	10727	1261	0	227958
1994	96242	143002	12074	2526	0	253844
1995	121250	138832	20634	1231	0	281947
1996	108710	122804	19247	1490	1221	253473
1997	111529	119875	26721	1869	201	260195
1998	83344	127319	20722	1310	0	232695
1999	113111	162850	30779	521	18	307279
2000	115952	171189	20903	1069	2149	311262
2001	113935	157363	20512	1239	22596	315645
2002	122774	207712	26941	712	1371	359511
2003	199137	183295	22573	1476	736	407217
2004	204762	137736	22201	240	1098	366036
2005	173396	188214	22009	169	848	384635
2006	148791	220989	20202	1358	1017	392357
2007	93139	132322	21147	714	285	247606
2008	112736	133997	26582	1391	304	275010
2009	84700	146780	26465	422	65	258431
2010	101899	148056	21527	207	56	271746
2011	111514	129349	21439	725	37	263064
2012	130071	80516	16903	1206	56	228752
2013	132697	114114	24134	499	206	271650
2014	118005	122996	19829	513	172	261515

Table 7: Catch by species made on FAD-associated schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
1981	37	128	20	0	56	240
1982	442	709	131	0	0	1282
1983	3959	6637	1381	0	136	12114
1984	13102	21672	4572	0	191	39537
1985	22050	39250	7278	14	459	69051
1986	23102	44527	7157	0	693	75478
1987	28688	49925	8179	0	20	86812
1988	27890	62689	10387	0	602	101567
1989	32057	65605	11389	0	0	109051
1990	27383	63896	9958	35	61	101333
1991	20330	79392	7785	54	25	107585
1992	27970	82686	5852	15	0	116523
1993	29831	88113	5469	9	0	123422
1994	30043	104900	9043	89	0	144076
1995	64433	111808	17298	50	0	193589
1996	50022	92611	16732	94	0	159459
1997	68772	102395	25107	185	0	196459
1998	45336	106692	15739	130	0	167897
1999	70853	132641	26654	108	16	230272
2000	63826	145198	16766	116	881	226787
2001	41229	130812	15575	125	566	188306
2002	54444	189264	22200	16	1278	267203
2003	72833	154242	13185	6	420	240686
2004	47120	120195	16902	2	617	184835
2005	59498	145979	13984	20	802	220282
2006	68380	188082	14350	0	901	271713
2007	40774	108675	15581	7	248	165284
2008	39377	119219	16972	35	294	175897
2009	48720	137402	21116	26	64	207328
2010	70259	139456	17805	42	56	227617
2011	75582	120319	15088	45	37	211071
2012	64570	76718	9552	59	18	150916
2013	98280	108421	19937	50	202	226890
2014	76085	117028	14652	181	147	208093

Table 8: Catch by species made on free-swimming schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	OTH	TOTAL
1981	151	31	4	0	0	185
1982	638	83	14	0	0	736
1983	6441	1516	155	0	0	8111
1984	39981	7678	1956	469	37	50122
1985	38741	10645	2592	606	24	52608
1986	41106	19036	2809	208	0	63159
1987	44733	23982	3571	217	23	72526
1988	81806	20543	5906	242	130	108626
1989	45090	50626	3860	6	0	99583
1990	76023	17223	4708	172	0	98126
1991	72023	11553	3744	2162	14	89496
1992	61182	18821	1142	3240	0	84385
1993	70669	27357	5258	1252	0	104536
1994	66199	38102	3031	2437	0	109768
1995	56817	27024	3337	1181	0	88359
1996	58688	30193	2515	1396	1221	94014
1997	42757	17480	1614	1684	201	63736
1998	38008	20627	4983	1180	0	64798
1999	42258	30209	4125	413	2	77007
2000	52126	25991	4137	953	1268	84475
2001	72706	26552	4936	1114	22030	127339
2002	68330	18448	4741	696	93	92308
2003	126304	29053	9389	1470	316	166532
2004	157642	17541	5299	238	481	181201
2005	113898	42234	8025	149	46	164353
2006	80411	32908	5852	1358	116	120644
2007	52365	23647	5566	707	37	82322
2008	73360	14779	9610	1355	10	99113
2009	35980	9379	5349	396	0	51104
2010	31641	8601	3722	166	0	44129
2011	35932	9030	6351	680	0	51992
2012	65501	3798	7351	1147	38	77836
2013	34417	5693	4197	449	4	44760
2014	41921	5968	5177	332	24	53422

Table 9: Number of sets per searching on FAD-associated (FAD) and free-swimming schools (FSC) for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	FAD	FSC
1981	0.43	0.32
1982	0.31	0.30
1983	0.43	0.42
1984	0.23	0.63
1985	0.25	0.54
1986	0.31	0.66
1987	0.43	0.73
1988	0.34	0.85
1989	0.53	0.85
1990	0.34	0.65
1991	0.43	0.55
1992	0.42	0.66
1993	0.40	0.58
1994	0.47	0.60
1995	0.52	0.47
1996	0.49	0.49
1997	0.54	0.28
1998	0.53	0.32
1999	0.53	0.39
2000	0.56	0.42
2001	0.47	0.47
2002	0.60	0.38
2003	0.53	0.57
2004	0.49	0.69
2005	0.57	0.71
2006	0.56	0.58
2007	0.52	0.45
2008	0.57	0.50
2009	0.84	0.31
2010	0.95	0.28
2011	0.90	0.35
2012	0.70	0.43
2013	0.88	0.24
2014	0.76	0.26

Table 10: Catch per unit of effort (in t per positive set) on FAD-associated schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	TOTAL
1981	1.28	4.41	0.69	0.00	8.27
1982	7.02	11.25	2.08	0.00	20.34
1983	8.42	14.12	2.94	0.00	25.77
1984	11.50	19.03	4.01	0.00	34.71
1985	11.94	21.26	3.94	0.01	37.41
1986	11.70	22.56	3.63	0.00	38.24
1987	11.17	19.44	3.18	0.00	33.81
1988	11.75	26.42	4.38	0.00	42.80
1989	8.29	16.96	2.94	0.00	28.19
1990	9.32	21.76	3.39	0.01	34.50
1991	6.36	24.82	2.43	0.02	33.63
1992	8.62	25.47	1.80	0.00	35.90
1993	8.67	25.61	1.59	0.00	35.87
1994	7.61	26.56	2.29	0.02	36.48
1995	13.45	23.34	3.61	0.01	40.42
1996	10.71	19.84	3.58	0.02	34.15
1997	10.75	16.00	3.92	0.03	30.71
1998	7.47	17.58	2.59	0.02	27.66
1999	13.00	24.33	4.89	0.02	42.24
2000	12.18	27.70	3.20	0.02	43.26
2001	8.34	26.45	3.15	0.03	38.07
2002	9.55	33.20	3.89	0.00	46.87
2003	16.33	34.58	2.96	0.00	53.95
2004	10.94	27.91	3.92	0.00	42.92
2005	10.72	26.30	2.52	0.00	39.69
2006	11.10	30.52	2.33	0.00	44.09
2007	7.00	18.66	2.68	0.00	28.38
2008	7.16	21.66	3.08	0.01	31.96
2009	7.77	21.92	3.37	0.00	33.08
2010	10.66	21.16	2.70	0.01	34.54
2011	11.63	18.51	2.32	0.01	32.47
2012	12.67	15.05	1.87	0.01	29.61
2013	14.91	16.44	3.02	0.01	34.41
2014	12.05	18.53	2.32	0.03	32.96

Table 11: Catch per unit of effort (in t per positive set) on free-swimming schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	TOTAL
1981	10.07	2.07	0.27	0.00	12.36
1982	15.19	1.98	0.33	0.00	17.53
1983	21.76	5.12	0.52	0.00	27.40
1984	22.45	4.31	1.10	0.26	28.14
1985	18.57	5.10	1.24	0.29	25.22
1986	21.85	10.12	1.49	0.11	33.58
1987	19.94	10.69	1.59	0.10	32.33
1988	25.51	6.41	1.84	0.08	33.87
1989	12.11	13.60	1.04	0.00	26.76
1990	23.68	5.36	1.47	0.05	30.56
1991	31.40	5.04	1.63	0.94	39.01
1992	20.52	6.31	0.38	1.09	28.31
1993	24.29	9.40	1.81	0.43	35.94
1994	21.34	12.28	0.98	0.79	35.39
1995	22.25	10.59	1.31	0.46	34.61
1996	19.37	9.96	0.83	0.46	31.03
1997	20.25	8.28	0.76	0.80	30.19
1998	17.54	9.52	2.30	0.54	29.90
1999	17.43	12.46	1.70	0.17	31.76
2000	19.64	9.79	1.56	0.36	31.83
2001	23.98	8.76	1.63	0.37	42.00
2002	30.66	8.28	2.13	0.31	41.41
2003	42.90	9.87	3.19	0.50	56.57
2004	46.41	5.16	1.56	0.07	53.34
2005	28.27	10.48	1.99	0.04	40.79
2006	21.98	9.00	1.60	0.37	32.98
2007	18.14	8.19	1.93	0.24	28.52
2008	24.25	4.89	3.18	0.45	32.76
2009	22.93	5.98	3.41	0.25	32.57
2010	27.44	7.46	3.23	0.14	38.27
2011	24.31	6.11	4.30	0.46	35.18
2012	31.75	1.84	3.56	0.56	37.73
2013	32.05	5.30	3.91	0.42	41.68
2014	31.01	4.41	3.83	0.25	39.51

Table 12: Catch per unit of effort (in t per searching day) on FAD-associated schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	TOTAL
1981	0.49	1.70	0.27	0.00	3.19
1982	1.88	3.02	0.56	0.00	5.46
1983	3.17	5.32	1.11	0.00	9.71
1984	2.21	3.66	0.77	0.00	6.68
1985	2.68	4.77	0.88	0.00	8.40
1986	3.15	6.06	0.97	0.00	10.28
1987	4.11	7.15	1.17	0.00	12.43
1988	3.60	8.09	1.34	0.00	13.11
1989	3.42	6.99	1.21	0.00	11.62
1990	2.96	6.90	1.08	0.00	10.94
1991	2.56	10.00	0.98	0.01	13.55
1992	3.45	10.20	0.72	0.00	14.37
1993	3.21	9.49	0.59	0.00	13.29
1994	3.29	11.47	0.99	0.01	15.76
1995	6.53	11.34	1.75	0.01	19.63
1996	4.88	9.03	1.63	0.01	15.54
1997	5.45	8.11	1.99	0.01	15.56
1998	3.66	8.61	1.27	0.01	13.55
1999	6.47	12.12	2.44	0.01	21.04
2000	6.26	14.24	1.64	0.01	22.24
2001	3.69	11.70	1.39	0.01	16.84
2002	5.46	18.97	2.22	0.00	26.78
2003	8.02	16.98	1.45	0.00	26.50
2004	4.98	12.70	1.79	0.00	19.53
2005	5.72	14.03	1.34	0.00	21.17
2006	5.81	15.97	1.22	0.00	23.07
2007	3.23	8.61	1.23	0.00	13.10
2008	3.75	11.34	1.61	0.00	16.73
2009	6.12	17.27	2.65	0.00	26.06
2010	9.52	18.90	2.41	0.01	30.85
2011	9.83	15.64	1.96	0.01	27.44
2012	8.23	9.78	1.22	0.01	19.24
2013	12.29	13.56	2.49	0.01	28.37
2014	8.56	13.17	1.65	0.02	23.42

Table 13: Catch per unit of effort (in t per searching day) on free swimming schools for the European Union and associated flags purse seine fishing fleet of the Indian ocean during 1981-2014

Year	YFT	SKJ	BET	ALB	TOTAL
1981	2.01	0.41	0.05	0.00	2.47
1982	2.72	0.35	0.06	0.00	3.14
1983	5.16	1.22	0.12	0.00	6.50
1984	6.76	1.30	0.33	0.08	8.47
1985	4.71	1.29	0.32	0.07	6.40
1986	5.60	2.59	0.38	0.03	8.60
1987	6.41	3.43	0.51	0.03	10.38
1988	10.56	2.65	0.76	0.03	14.02
1989	4.81	5.40	0.41	0.00	10.61
1990	8.21	1.86	0.51	0.02	10.60
1991	9.07	1.45	0.47	0.27	11.27
1992	7.55	2.32	0.14	0.40	10.41
1993	7.61	2.95	0.57	0.13	11.26
1994	7.24	4.17	0.33	0.27	12.00
1995	5.76	2.74	0.34	0.12	8.96
1996	5.72	2.94	0.25	0.14	9.16
1997	3.39	1.38	0.13	0.13	5.05
1998	3.07	1.66	0.40	0.10	5.23
1999	3.86	2.76	0.38	0.04	7.04
2000	5.11	2.55	0.41	0.09	8.28
2001	6.50	2.37	0.44	0.10	11.38
2002	6.85	1.85	0.48	0.07	9.25
2003	13.91	3.20	1.03	0.16	18.34
2004	16.66	1.85	0.56	0.03	19.15
2005	10.94	4.06	0.77	0.01	15.79
2006	6.83	2.79	0.50	0.12	10.25
2007	4.15	1.87	0.44	0.06	6.52
2008	6.98	1.41	0.91	0.13	9.43
2009	4.52	1.18	0.67	0.05	6.42
2010	4.29	1.17	0.50	0.02	5.98
2011	4.67	1.17	0.83	0.09	6.76
2012	8.35	0.48	0.94	0.15	9.93
2013	4.30	0.71	0.52	0.06	5.60
2014	4.72	0.67	0.58	0.04	6.01