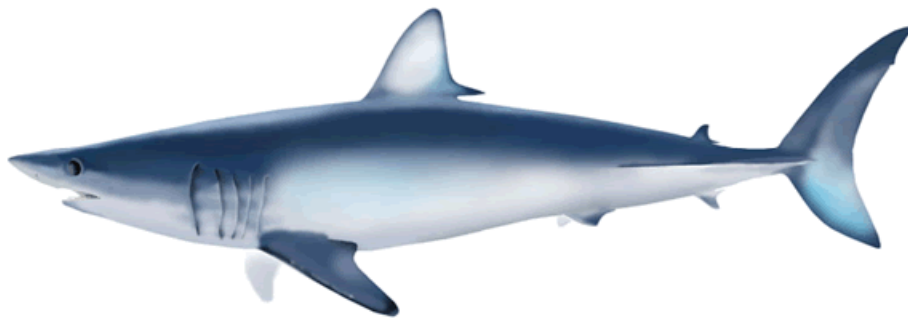


## The catch of shark caught by Taiwanese offshore longline fisheries in 2001-2010

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## Introduction:

Sharks are important components in Taiwanese offshore fisheries and are the major bycatch species of the far sea tuna longline fisheries. Despite of the large quantities of shark catch, the low economical value of shark meat makes it continue to be a bycatch species of other fisheries. A lack of detailed data on shark catch, effort, and fishing grounds for individual species in Northwest Pacific hinders the implementation of shark resources management.

The sharks caught by Taiwanese offshore longline fisheries landed almost all their catches in Nanfanao, Chengkung and Tungkang fishing ports located at eastern Taiwan. The catch data suggested that the shark landings of offshore fisheries were dominated by blue sharks in 62.2% (Table 1), and followed by shortfin mako shark, bigeye thresher shark, scalloped hammerhead shark and pelagic thresher shark, respectively (Fig. 1 & Table 1). This study presents the catches and trends of blue sharks caught by Taiwanese offshore longline fisheries. The live released and dead discarded would not be included in this study because of lack of related information

## Material and Method

The offshore longline catch in number and weight of sharks were detailed in species in the sale records of Nanfanao and Chengkung fish market. A total of 12 shark species were documented in the sale records, and the catch record of blue shark was from 2001, while the other 11 species included shortfin mako shark were from 1989. There was no species specific information in the sale record at the Tungkang fish market. Because of the lack of the observer programs for offshore longline vessels in Taiwan, the information of dead discarded and live released or escaped were unknown in this study. The species specific information was not available for shark in 1980-1989, and the catch record of blue shark was from 2001. In this study, the shark compositions from 2001 to 2010 were used for back calculated the catch of blue shark in 1980-2000, and the catch of blue shark at the Tungkang in 2001 to 2010. The most of blue shark were processed and froze at the vessels, where the head, fins, and the organs of blue sharks were removed. The frozen shark landing could be restored into total catch by using the ratio between processed weight and whole body weight of blue shark from 4 samples.

## Results

Blue sharks dominated in the sharks landings at Nanfanao and Chengkung fishing ports in 2001-2010. The blue shark occupied 57.6% of total sharks landing and 89.3% of total blue shark landing were frozen in Nanfanao in 2001-2001. After transforming frozen blue shark landings into total catches, the annual catches of blue sharks were the highest at 2005 in 7934 tons and the lowest at 2001 in 4066 tons. The annual catches of blue shark had an increasing trend from 4065 tons in 2001 to 7934 tons in 2005, and constantly around 7500 tons per year since 2005 in Nanfanao (Fig. 2). The annual blue shark landing at Chengkung ranged from 268 tons to 689 tons with the average landing in 391 tons, which only occupied 3.9% of total blue shark catches caught by Taiwanese offshore longline fisheries in 2001 -2011 (Fig. 2). There were similar trends in Chengkung and Nanfanao, the catches of blue shark increased from 288 tons in 2001 to 689 tons in 2007, but decreased to 227 tons in Chengkung in 2010 (Fig. 2). Total large shark landings ranged from 686 tons to 3059 tons at Tungkang fish market in 2001 -2011. Due to the lack of shark species specific information, we calculated the landings of blue shark at Tungkang by using shark composition and ratio between the landing of fresh and frozen blue shark at Nanfanao. The calculated landings of blue shark ranged widely from 394 tons to 1762 tons at Tungkang in 2001-2010, and increased from 1368 tons in 2001 to 1762 tons in 2006, but decreased even since to 394 tons in 2011. After transformed frozen blue shark landing into whole catches, the blue shark catch ranged from 896 tons to 3999 tons at Tungkang in 2001 to 2010 (Fig. 2). Overall, the yield of blue sharks caught by Taiwanese offshore longline fisheries ranged from 7898 tons to 11777 tons in 2001-2010. There was an increased trend of blue shark catches from 2001 to 2006 with the rate in 9.8% (tons/year). However, the catches of blue sharks decreased to 8477 tons in 2010 because of the declines in the blue shark catches at Tungkang (Fig. 2 & Table 2). The blue shark catches would be traced back to 1980 by using the composition of shark catch in this study. The total blue catches were from 4372 tons to 14745 tons in 1980-2000, and blue shark catch decreased from 9061 tons in 1980 to 4372 tons in 1994, but dramatically increased to 14745 tons in 2000 since then (Table 3).

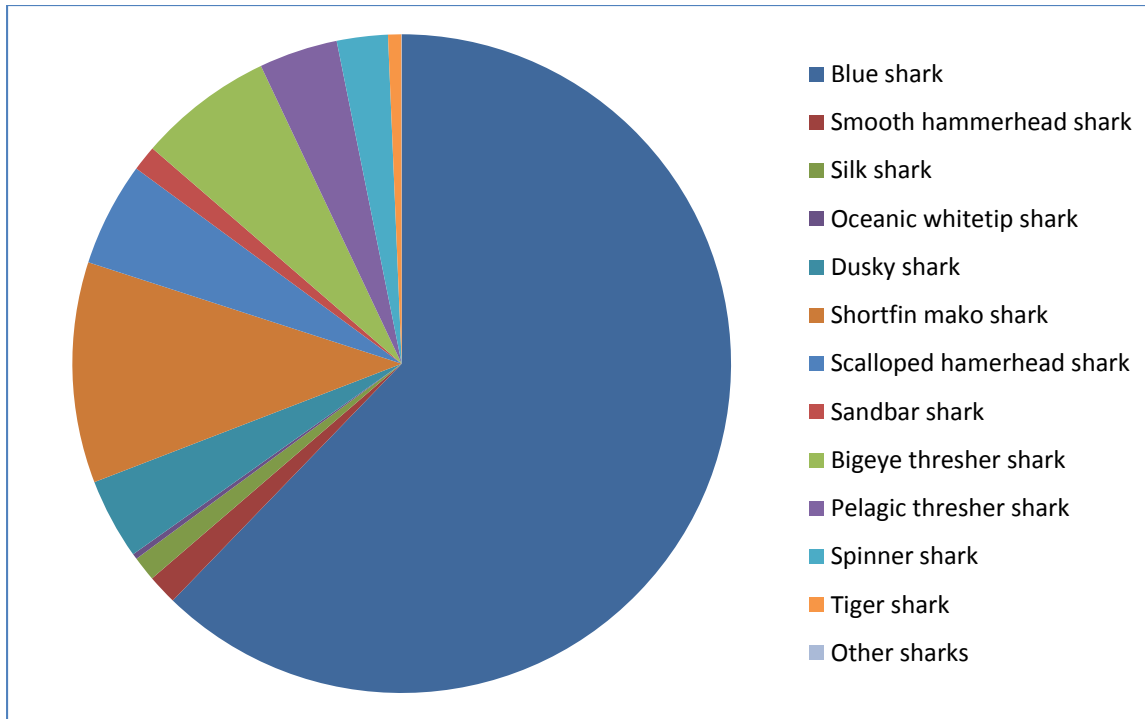


Fig. 1 The catch composition in weight of sharks caught by Taiwanese offshore longline fisheries in 2001-2000.

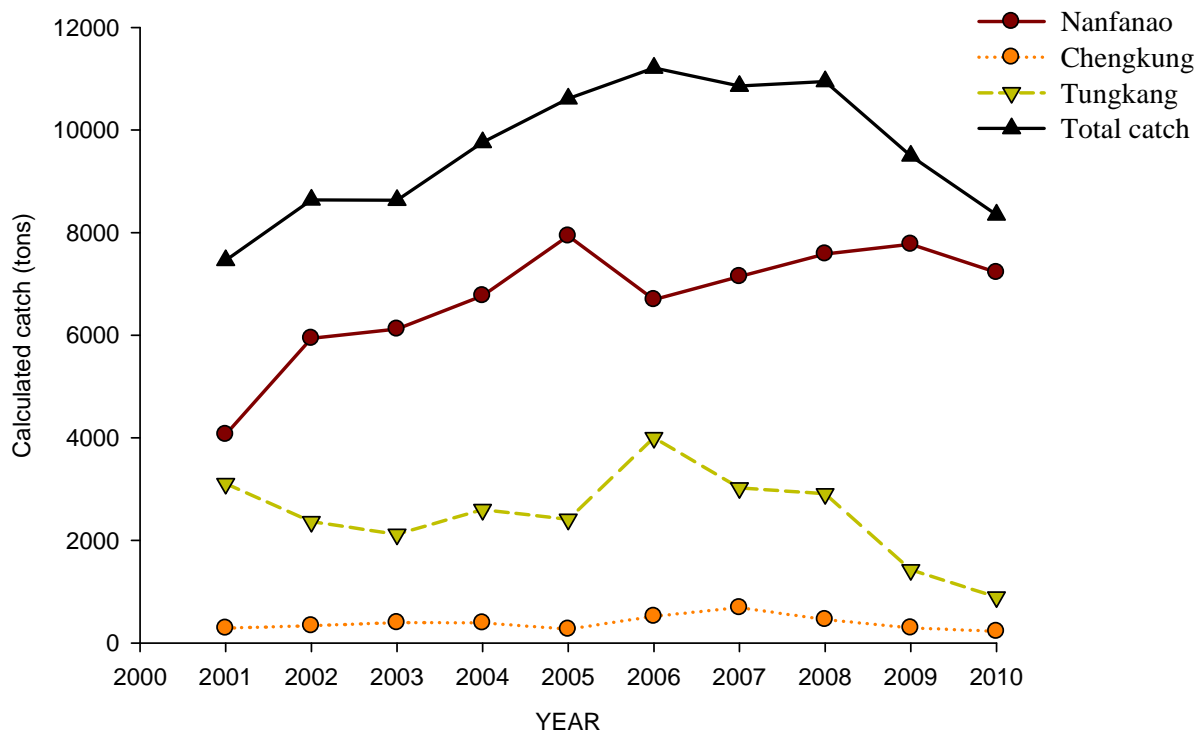


Fig.2 The calculated catch of blue shark caught by Taiwanese offshore longline fishery in 2001 to 2010

Table 1 The composition of shark landings (tons) at the Nanfanao and Chengkung fishing ports in 2001-2010

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Summary
Blue shark	1967	2789	2924	3237	3763	3358	4212	3902	3539	3214	32906
Smooth hammerhead shark	92	96	124	78	58	64	65	57	82	57	774
Silk shark	65	141	71	62	69	52	44	54	44	39	642
Oceanic whitetip shark	45	24	22	10	8	8	7	6	6	5	141
Dusky shark	172	193	339	358	181	227	188	141	131	170	2099
Shortfin mako shark	840	610	803	953	417	443	549	338	285	490	5729
Scalloped hamerhead shark	270	293	412	385	230	281	215	165	255	198	2704
Sandbar shark	71	98	122	87	47	57	50	32	63	33	661
Bigeye thresher shark	372	458	521	405	404	287	330	290	225	212	3504
Pelagic thresher shark	329	247	202	159	178	153	178	243	173	183	2044
Spinner shark	127	168	174	205	140	163	106	62	97	82	1325
Tiger shark	26	40	62	43	19	32	46	41	22	13	343
Other sharks	0	0	0	5	0	0	0	0	0	0	6
Summary	4376	5157	5775	5988	5516	5125	5990	5332	4922	4698	52879

Table 2 The calculated blue shark catches caught by Taiwanese offshore longline fisheries in 2001 to 2010.

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fresh landings	434	447	496	514	382	708	916	964	487	1244
Frozen landings	2901	3383	3361	3783	4071	4286	3738	4056	3748	3333
Total Landings	3335	3830	3857	4297	4453	4994	4655	5019	4236	4577
Restored catch	7459	8638	8634	9759	10612	11212	10857	10948	9495	8346

Table 3 The back-calculated blue shark catches caught by Taiwanese offshore longline fisheries in 1980 to 2000.

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Nanfanao	3781	4276	3991	3253	3202	4194	3860	3623	3341	2927	3171
Chengkung	275	240	233	242	303	280	355	256	237	201	185
Tungkang	5006	3707	4470	4063	3449	3545	2729	1657	1979	2722	3066
TOTAL	9061	8223	8694	7558	6954	8019	6944	5536	5557	5851	6422

YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Nanfanao	2886	2344	2919	2634	3414	4584	3911	3638	6077	7399
Chengkung	230	221	201	203	254	263	227	290	352	570
Tungkang	3596	2852	2173	1536	3340	2809	5335	4234	4122	6776
TOTAL	6712	5417	5292	4372	7008	7655	9473	8162	10551	14745