

# Catch and length data of striped marlin (*Kajikia audax*) from Taiwanese fisheries in the western and central North Pacific Ocean\*

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## Abstract

Catches of striped marlin from the distant-water longline fishery were lower than those from the offshore longline fishery, both of which showed an increasing trend in the early 2000s, but decreased since 2007. A proportion of striped marlin was taken by coastal harpoon fishery, with an average catch of around 100 mt for 1967-2013. In contrast, only a small amount of striped marlin catch was reported for the offshore and coastal gillnet, set-net, and all the other fisheries in the WCNPO. The eye fork length data for striped marlin were collected from the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean, with sample sizes ranging from 162 to 847. Although the smallest and largest striped marlin measured from this fishery varied among years, the mean lengths of measured fish seem relatively stable (from 160.8 to 175.3 cm EFL) during 2006-2013.

**Keywords:** fishery information, catch and length data, striped marlin, Taiwan

## Introduction

Two North Pacific striped marlin stocks were delineated at 140°W and north of the equator by Billfish Working Group of ISC (2010), which are a western and central North Pacific Ocean (WCNPO) stock and an eastern Pacific Ocean (EPO) stock in the North Pacific Ocean. The boundaries were suggested by genetic information and the identified or suggested spawning areas of striped marlin, as well as analyses of fisheries data from longline fisheries (ISC, 2011). This paper aims to provide updated available fishery data for the WCNPO stock of striped marlin caught by Taiwanese fisheries, including catch estimates by fishery and size frequency data in eye fork length within the two-stock structure scenario in the North Pacific Ocean.

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## **Materials and methods**

Nominal catch data of striped marlin by fishery in the North Pacific Ocean were obtained from the Oversea Fisheries Development Council (OFDC) of Taiwan, and the Taiwan Fisheries Yearbooks provided by Fisheries Agency (FA) of Taiwan. For the Taiwanese distant-water tuna longline fishery, the striped marlin catches were separated into the WCNPO and EPO stocks based on logbook information. Catches from the offshore and coastal fisheries such as gillnets, set-nets, and harpoons were assigned to the WCNPO stock because these fisheries only operated in waters near Taiwan. Eye fork length (EFL) data of striped marlin collected from the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean were summarized using length frequencies by year. Size data of striped marlin were collected through on-board sampling that the measurement is carried out by fishermen on the initial 30 fishes caught from each operation.

## **Results and discussion**

Catches of striped marlin for the WCNPO stock from the distant-water longline fishery were lower than those from the offshore longline fishery (Table 1), both of which showed an increasing trend in the early 2000s, but have decreased since 2007 (Fig. 1). A proportion of striped marlin was taken by coastal harpoon fishery, with an average catch of around 100 mt for 1967-2013. In contrast, only a small amount of striped marlin catch was reported for the offshore and coastal gillnet, set-net, and all the other fisheries in the WCNPO. Eye fork length data for striped marlin were collected from the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean, with sample sizes ranging from 162 to 847 (Table 2). Although the smallest and largest striped marlin measured from this fishery varied among years, the mean lengths of measured fish seem relatively stable (from 160.8 to 175.3 cm EFL) during 2006-2013 (Fig. 2).

## **References**

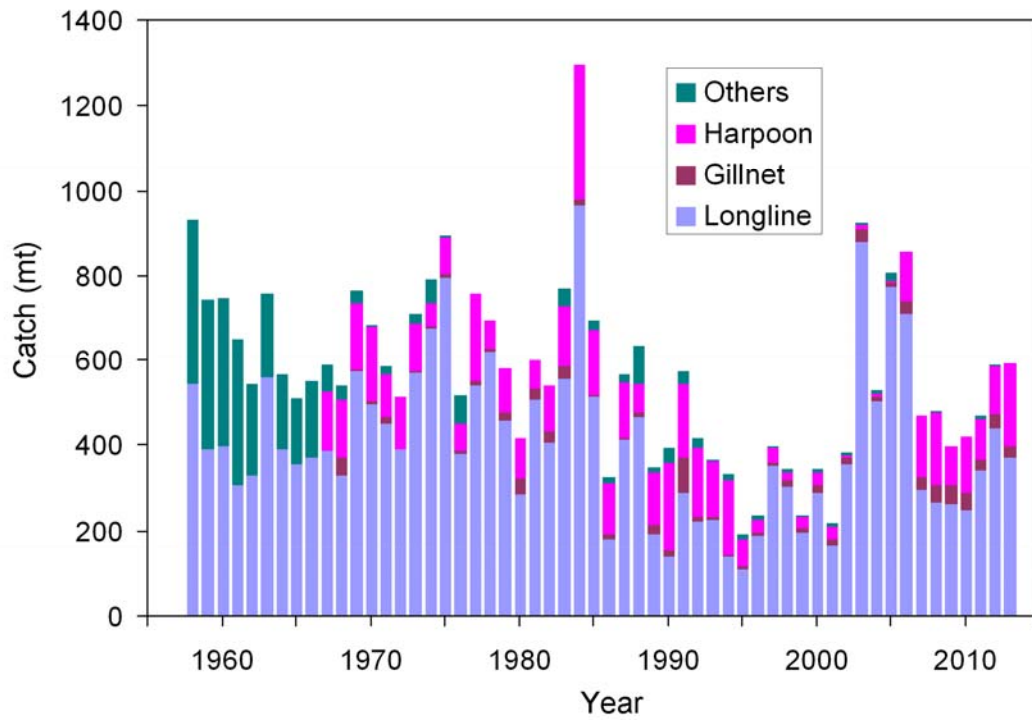
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**Table 1.** Catch estimates (mt) of striped marlin by fishery for Taiwan in the western and central North Pacific Ocean. DWLL: distant-water longline; OSLL: offshore longline; CTLL: coastal longline; OSGN: offshore gillnet; CTGN: coastal gillnet; CTSN: coastal set-net; CTHP: coastal harpoon; “Others” indicates catches from offshore and coastal other fisheries or unknown. “Blank” means no data available and “0” represents catches less than 1 mt.

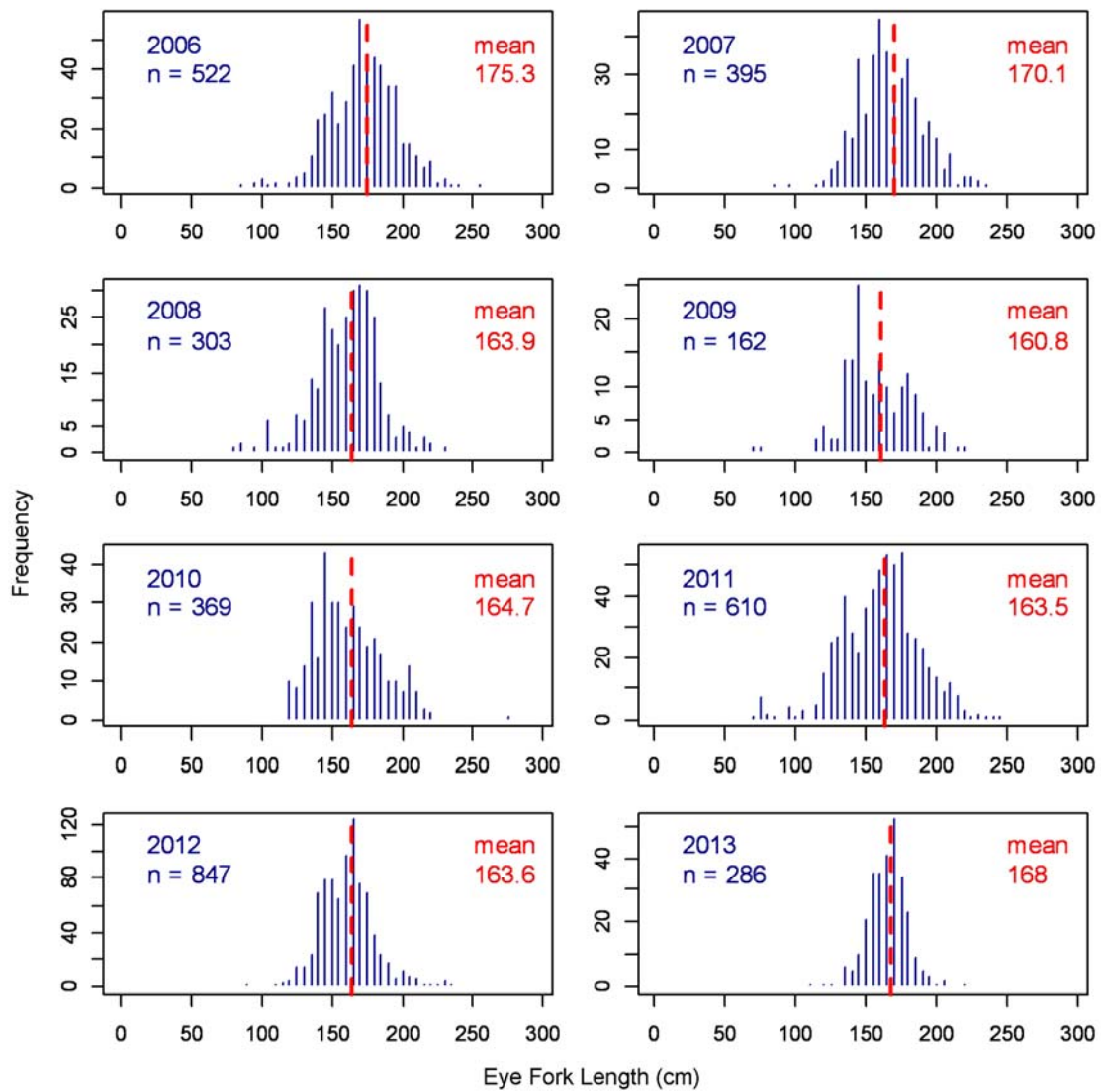
Year	DWLL	OSLL	CTLL	OSGN	CTGN	CTSN	CTHP	Others	Total
1958		543						387	930
1959		391						354	745
1960		398						350	748
1961		306						342	648
1962		332						211	543
1963		560						199	759
1964		392						175	567
1965		355						157	512
1966		370						180	550
1967		385					141	63	589
1968		332		40			134	34	540
1969	2	571		5			159	28	765
1970		495		8			175	6	684
1971		449		16			101	18	584
1972	9	380		1			124	1	515
1973	1	568		4			115	20	708
1974	24	650		7			53	58	792
1975	64	732		7			86	3	892
1976	32	347		9			61	70	519
1977	17	524		9			207	3	760
1978		618		7			70	1	696
1979	26	432		18		2	104		582
1980	61	223		39			92	1	416
1981	16	491		25			70		602
1982	7	397		24	2		112		542
1983		555		27	4		144	39	769
1984		965		16			314		1295
1985		513		6		1	152	23	695
1986		179		13			119	16	327
1987	31	383		2		1	132	16	565
1988	7	457		12		7	70	80	633
1989	7	184		23			124	10	348
1990	2	137		16		12	207	21	395
1991	36	254		80	1		173	32	576
1992	1	219		10	1		163	24	418
1993	5	221		6	1	3	132		368
1994	1	137		5		4	176	11	334
1995	27	83		4	1	4	67	6	192
1996	26	162		8		3	30	6	235
1997	59	290	2	9		3	33		396
1998	90	205	9	15	1	6	19		345
1999	66	128	3	7	1	5	26		236
2000	128	161	1	17	1	6	29	1	344
2001	36	129		16		5	30		216
2002	129	226		14	1	8	6		384
2003	199	681	0	26	1	5	11	0	923
2004	243	261	0	8	2	5	7	2	528
2005	190	584		1	8	9	5	9	806
2006	172	537		0	30		117	0	856
2007	99	199			29		141		468
2008	74	192			43		168	2	479
2009	36	225		0	46		92		399
2010	46	200		1	41		131	3	422
2011	72	269			27	1	95	4	468
2012	87	352			34		114	1	588
2013	87	285		0	24	0	197	0	593

**Table 2.** Summary of striped marlin eye fork length (EFL in cm) data collected from the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean.

Year	Sample size	Minimum EFL	Mean EFL	Maximum EFL
2006	522	90	175.3	260
2007	395	87	170.1	237
2008	303	82	163.9	232
2009	162	75	160.8	224
2010	369	122	164.7	280
2011	610	71	163.5	248
2012	847	93	163.6	240
2013	286	114	168.0	224



**Fig. 1.** Catches of striped marlin (1958-2013) by fishery for Taiwan in the western and central North Pacific Ocean. “Others” indicates offshore and coastal gillnet, set-net, harpoon, and all the other fisheries for 1958-1966, or other fisheries from 1967 (see Table 1).



**Fig. 2.** Length frequency distributions of striped marlin caught in the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean.