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Fue Shin Fishery Ltd. Electronic Monitoring Data Collection Improvement Measures

January 2025

CONFIDENTIAL

Introduction

This report presents an aggregated analysis of the electronic monitoring (EM) data collected from 12 of fishing trips conducted by three vessels under the Fue Shin Fishery Ltd. (FSF) Pacific Ocean Longline Tuna Fishery Improvement Project (FIP). EM systems were installed to monitor and estimate catches of targeted tuna species and to document interactions with non-targeted and endangered, threatened, and protected (ETP) species. The primary objectives are to ensure data accuracy from at least 20% of sets, cross-reference EM data with logbook records, and assess bycatch mitigation measures to support compliance with FIP standards and the Marine Stewardship Council (MSC) Principle 2 criteria. Key indicators in this report include total catches, bycatch events, fishing effort (hooks set per trip), and the ratio of retained to discarded species, which are essential for evaluating the implementation of sustainable fishing practices.

Data and Analysis

The data analyzed are from 12 individual trips where EM was deployed to estimate catches of target and non-target species, both retained and discarded, across three vessels. Individual trip data include the total number of hooks set, observed catches, and bycatch events, allowing for detailed assessments of species interactions, particularly for primary tuna targets such as albacore, bigeye, yellowfin, and skipjack.

Additionally, the bait species used across all sets were identified as *Trachurus spp.* (JAX).

Target Species Analysis

Total counts for both retained and discarded catches across all trips are summarized below.

Table 1. Summary of numbers of tuna caught, separated by species.

Species	Retained	Discarded	Total
ALB	3101	194	3295
BET	289	105	394
BFT	2	3	5
SBF	9	40	49
SKJ	318	350	668
TUN	38	115	153
YFT	913	234	1147
Total	4670	1041	5711

Bycatch Analysis

Bycatch across the analyzed trips totaled 744 specimens, of which 432 (58%) were retained and 312 (42%) were discarded. *Tetrapturus audax* (MLS; striped marlin) were the most frequently encountered bycatch species, with 157 specimens recorded. Of these, 155 were retained and only one was discarded, underscoring their high economic value and importance to the fishery.

The second and third most frequently encountered bycatch species were *Dasyatis violacea* (PLS; pelagic stingray) and *Acanthocybium solandri* (WAH), with 129 and 106



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specimens recorded, respectively. PLS exhibited a notable discard rate, with 118 of 129 specimens released, reflecting its limited market demand or utility. Conversely, WAH had a high retention rate, with 105 of 106 specimens retained, underscoring its commercial importance.

Table 2. Summary of bycatch numbers, separated by species.

Species	Retained	Discarded	Total
ALI	0	15	15
BAZ	7	0	7
BIL	17	4	21
BRZ	3	6	9
BLM	2	0	2
BUM	6	0	6
COM	1	0	1
DOL	4	1	5
GBA	22	9	31
GEP	1	1	2
GES	0	60	60
LAG	0	2	2
LEC	31	13	44
LOP	0	1	1
MLS	155	2	157
MZZ	9	50	59
OCZ	0	1	1
OIL	3	0	3
PLS	11	118	129
POA	0	2	2
RRU	5	3	8



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SFA	10	0	10
SSP	17	0	17
SWO	21	11	32
TCR	0	3	3
TST	2	9	11
WAH	105	1	106
Total	432	312	744

Endangered, Threatened, and Protected (ETP) Species Analysis

Interactions with Endangered, Threatened, and Protected (ETP) species across the observed trips totaled 134 specimens, of which 45 (34%) were retained and 89 (66%) were discarded. These figures reflect the fishery's commitment to minimizing the retention of ETP species, aligning with conservation objectives and regulatory compliance.

Prionace glauca (BSH; blue shark) was the most frequently encountered ETP species, with 48 specimens recorded. Of these, 42 were retained and six were discarded, highlighting its perceived commercial or operational value within the fishery. In contrast, *Carcharhinus falciformis* (FAL; silky shark) interactions were predominantly discards, with 21 of the 22 specimens released, largely adhering to international conservation measures that ban retention of this species (e.g. CMM 2022-04).

Carcharhinus longimanus (OCS) interactions resulted in complete discards, with all 15 specimens released. This pattern underscores strict compliance with retention bans for this species. *Requiem sharks* (RSK) and *Selaceae spp.* (SKH) also had high discard rates, with 19 of 20 and all 19 specimens discarded, respectively, further reflecting adherence to conservation regulations.

Table 3. Summary of ETP species interactions.

Species	Retained	Discarded	Total
BSH	42	6	48
FAL	1	21	22



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LMA	1	1	2
OCS	0	15	15
PSK	0	1	1
RSK	1	19	20
SHX	0	6	6
SKH	0	19	19
SMA	0	0	0
THR	0	1	1
Total	45	89	134

Fishing Efforts Analysis

The analysis of fishing efforts across the fleet highlights the level of activity and the monitoring coverage provided by the EM systems. A total of 1,088,288 hooks were deployed during 259 sets, with data collected from three vessels over multiple months. Fishing efforts were distributed across the fleet, with an average of 4,202 hooks per set. The EM systems analyzed 181,964 hooks, accounting for 16.7% of the total hooks deployed, and monitored 52 sets, representing 20.1% of all sets conducted.

Table 4. Summary of fishing efforts

Metric	# of sets collected in trip	# of sets analyzed	% of sets analyzed	# of hooks set in trip	# of hooks analyzed	% of hooks analyzed
Total	259	52	20.1%	1,088,288	181,964	16.7%

Mitigation Measures

To minimize bycatch and ETP species interactions, the three vessels employed key mitigation measures across observed trips. The consistent use of mainline set shooters enabled deeper and faster line setting, reducing seabird exposure and bycatch risks. Night setting and side setting were also frequently used; night setting reduced seabird



interactions during their inactive hours, while side setting kept baited hooks closer to the vessel, further limiting seabird access.

The absence of wire traces and shark lines demonstrates a proactive approach to shark conservation. Without these gear types, sharks are less likely to become fatally hooked or retained, aligning with best practices for minimizing shark bycatch and mortality. This reflects a clear commitment to sustainable fishing practices and the reduction of ETP species interactions.

Table 5. Summary of mitigation measures applied across observed vessels (% of sets applied)

Mitigation Measure	Vessel 1	Vessel 2	Vessel 3
Night setting	100%	47.1%	0%
Side setting	0%	52.9%	77.8%
Mainline set shooter	100%	100%	100%
Bird curtain	0%	0%	0%
Tori line	0%	0%	0%
Blue-dyed bait	0%	0%	0%
Hook shielding device	0%	0%	0%
Wire traces	0%	0%	0%
Shark lines	0%	0%	0%

EM should be used to verify compliance with seabird bycatch mitigation measures whenever vessels operate south of 25°S. EM data can also identify when sets occur below this latitude. Although there are differences in relevant CMMs for WCPFC and IOTC areas, we recommend that, for FIP purposes and to simplify instructions, all vessels use at least two of the following three measures whenever operating south of 25°S:

1. Night setting



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2. Line weighting
3. Bird-scaring lines

Starting January 2020, WCPFC (2018-03) will allow an alternative measure—hookpods—which can be assessed on a case-by-case basis through EM, using vessel-specific instructions to DOS.



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Appendix: Glossary of Codes

Code	Scientific Name	Code	Scientific Name
ALB	<i>Thunnus alalunga</i>	OCS	<i>Carcharhinus longimanus</i>
ALI	<i>Alepisaurus</i> spp.	OCZ	<i>Carcharhinus longimanus</i>
BAZ	Sphyracidae	OIL	<i>Ruvettus pretiosus</i>
BET	<i>Thunnus obesus</i>	PLS	<i>Dasyatis violacea</i>
BFT	<i>Thunnus thynnus</i>	POA	<i>Brama brama</i>
BIL	Billfish	PSK	*
BLM	<i>Istiompax indica</i>	RRU	<i>Elagatis bipinnulata</i>
BRZ	Bramiidae spp.	RSK	Requiem sharks
BSH	<i>Prionace glauca</i>	SBF	<i>Thunnus maccoyii</i>
BUM	<i>Makaira nigricans</i>	SFA	<i>Istiophorus platypterus</i>
COM	*	SHX	Squaliformes spp.
DOL	<i>Coryphaena hippurus</i>	SKH	Selaceae spp.
FAL	<i>Carcharhinus falciformis</i>	SKJ	<i>Katsuwonus pelamis</i>
GBA	<i>Sphyracna barracuda</i>	SMA	<i>Isurus oxyrinchus</i>
GEP	Gempylidae spp.	SSP	<i>Tetrapturus angustirostris</i>
GES	<i>Gempylus serpens</i>	SWO	<i>Xiphias gladius</i>
JAX	<i>Trachurus</i> spp.	TCR	<i>Taractes rubescens</i>
LAG	<i>Lampris guttatus</i>	THR	<i>Alopias</i> spp
LEC	<i>Lepidocybium flavobrunneum</i>	TST	<i>Taractichthys steindachneri</i>
LMA	*	TUN	Tunas



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LOP	Lophotes capellei	WAH	Acanthocybium solandri
MLS	Tetrapturus audax	YFT	Thunnus albacares
MZZ	Unknown fish spp.		
*COM, LMA, PSK: Scientific name missing from the original report			