REVIEW OF FISHERIES STATISTICAL DATA AVAILABLE FOR INDIAN OCEAN LONGTAIL TUNA
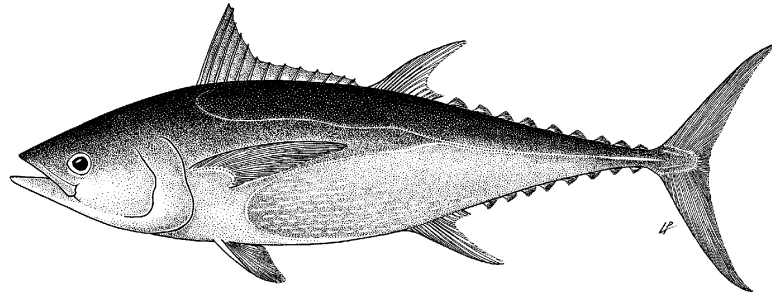
Author: IOTC Secretariat

Introduction

The overarching objective of the paper is to provide participants at the 13th Session of the IOTC Working Party on Neritic Tunas (WPNT13) with a review of the status of fisheries information available on longtail tuna (*Thunnus tonggol*) (Bleeker 1851) occurring in the Indian Ocean. The document describes the temporal and spatial trends in retained catches at global and ocean-basin scale and the main characteristics of the fisheries catching longtail tuna in the Indian Ocean, as well as providing an assessment of the reporting quality of the data sets available at the IOTC Secretariat. A full description of the data sources, processing steps to generate the data sets, and key for reporting quality scores is available in IOTC (2023).
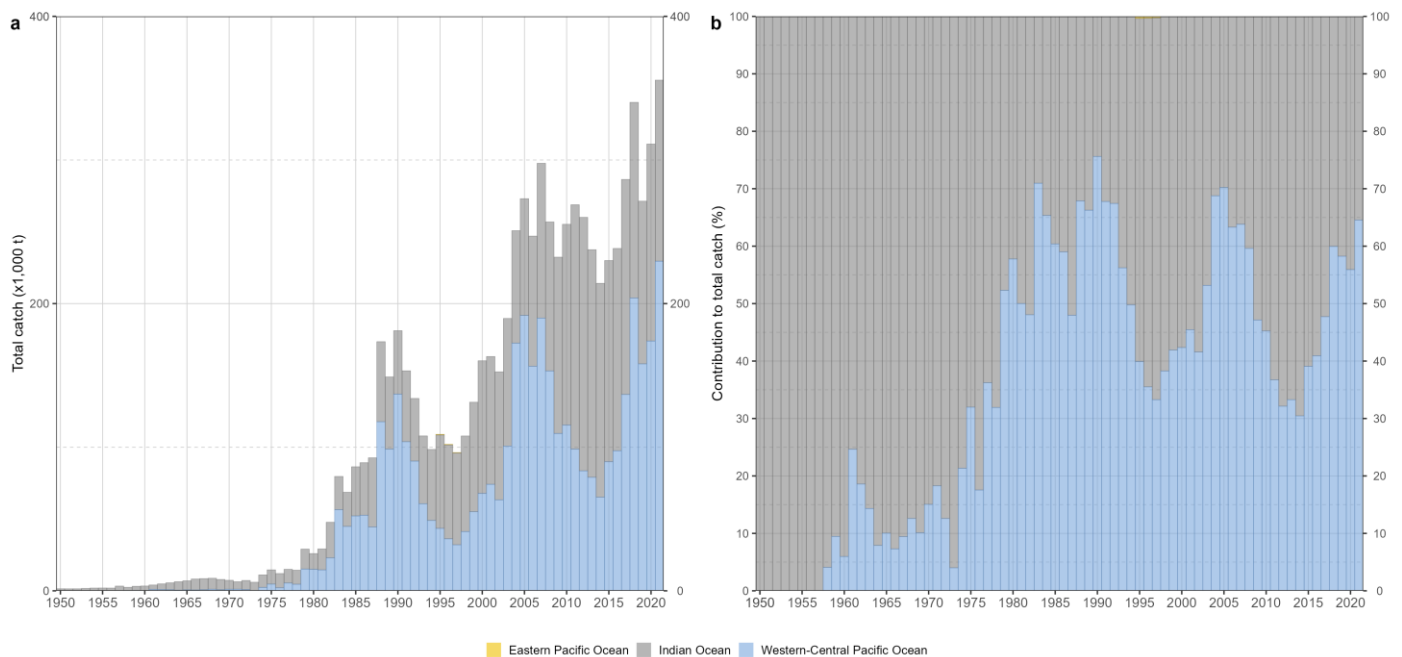
Global catches

Figure 1: Annual time series of (a) cumulative retained catches (metric tonnes; t) and (b) contribution to the total retained catches (percentage; %) of longtail tuna by ocean basin for the period 1950-2021. Source: FAO global capture production database

Indian Ocean catches & discards

Historical trends (1950-2021)

Table 1: Mean annual retained catches (metric tonnes; t) of longtail tuna by decade and fishery for the period 1950-2019. The background intensity colour of each cell is directly proportional to the catch level. Data source: best scientific estimates of retained catches

| Fishery	1950s	1960s	1970s	1980s	1990s	2000s	2010s
Purse seine | Other	65	204	1,012	4,863	10,933	17,719	15,628
Longline | Other	0	0	0	0	3	0	0
Longline | Fresh	0	0	0	0	0	0	59
Longline | Deep-freezing	0	0	0	68	12	0	20
Line | Coastal longline	0	0	19	153	294	2,504	3,835
Line | Trolling	323	579	557	1,916	3,185	3,403	6,356
Line | Handline	237	239	943	1,987	1,523	3,591	8,190
Baitboat	0	0	2	20	39	51	78
Gillnet	2,935	6,205	10,026	25,891	40,923	65,081	106,313
Other	2	0	122	1,002	1,940	3,681	7,345
Total	3,562	7,228	12,681	35,901	58,853	96,029	147,825
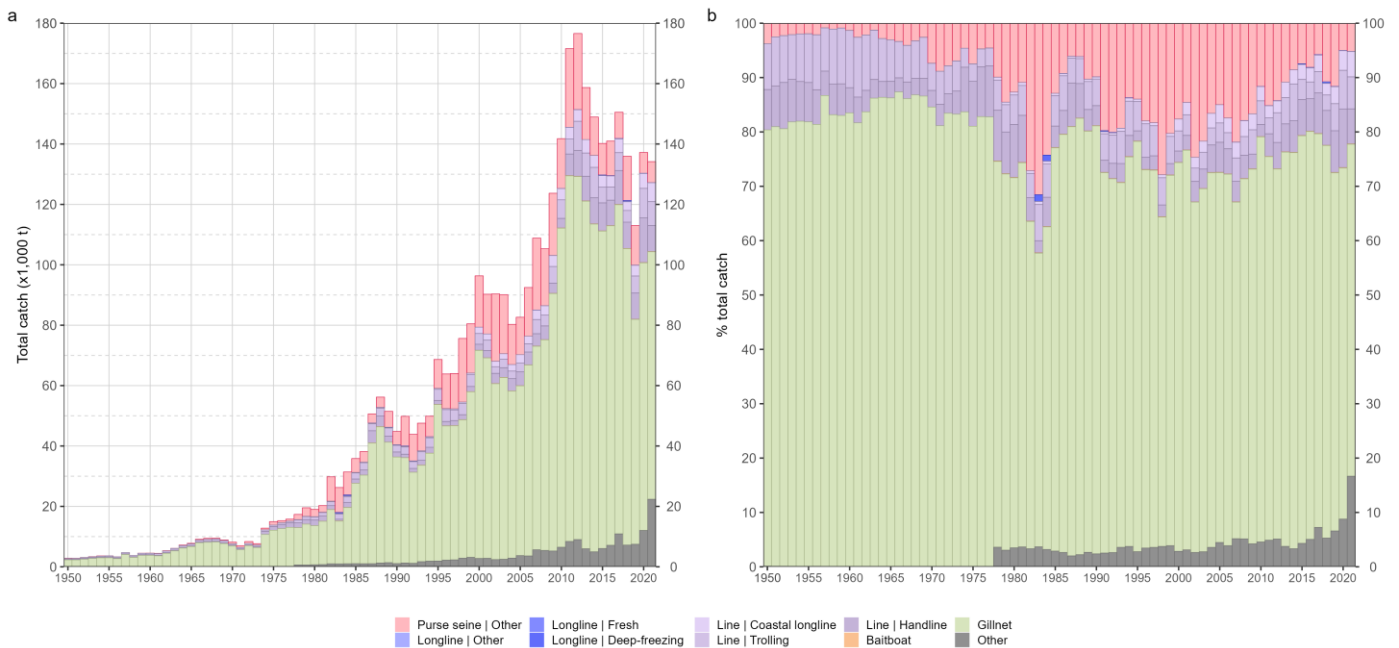
Figure 2: Annual time series of (a) cumulative retained catches (metric tonnes; t) and (b) cumulative contribution to the total retained catches (percentage; %) of longtail tuna by fishery for the period 1950-2021. Data source: best scientific estimates of retained catches

Table 2: Annual retained catches (metric tonnes; t) of longtail tuna by fishery for the period 2012-2021. The background intensity colour of each cell is directly proportional to the catch level. Data source: best scientific estimates of retained catches

| Fishery	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Purse seine | Other	25,218	17,228	12,742	10,497	11,467	8,715	14,664	13,156	6,885	6,971
Longline | Other	0	0	0	0	0	0	0	0	0	0
Longline | Fresh	0	0	0	80	56	50	371	35	36	22
Longline | Deep-freezing	30	0	0	61	41	51	15	7	11	4
Line | Coastal longline	3,822	4,465	3,933	3,866	3,673	4,581	2,910	3,541	4,960	6,253
Line | Trolling	9,663	7,708	10,069	5,196	4,339	5,935	3,863	5,624	9,772	7,908
Line | Handline	8,554	8,146	8,636	9,252	8,430	11,202	8,707	8,672	14,781	8,628
Baitboat	78	91	81	79	75	94	60	69	102	81
Gillnet	120,217	115,102	108,526	105,128	105,793	108,996	98,173	74,465	88,614	81,946
Other	9,010	5,959	4,952	6,034	7,106	10,899	7,182	7,453	12,032	22,358
Total	176,592	158,700	148,940	140,194	140,980	150,523	135,944	113,022	137,194	134,171
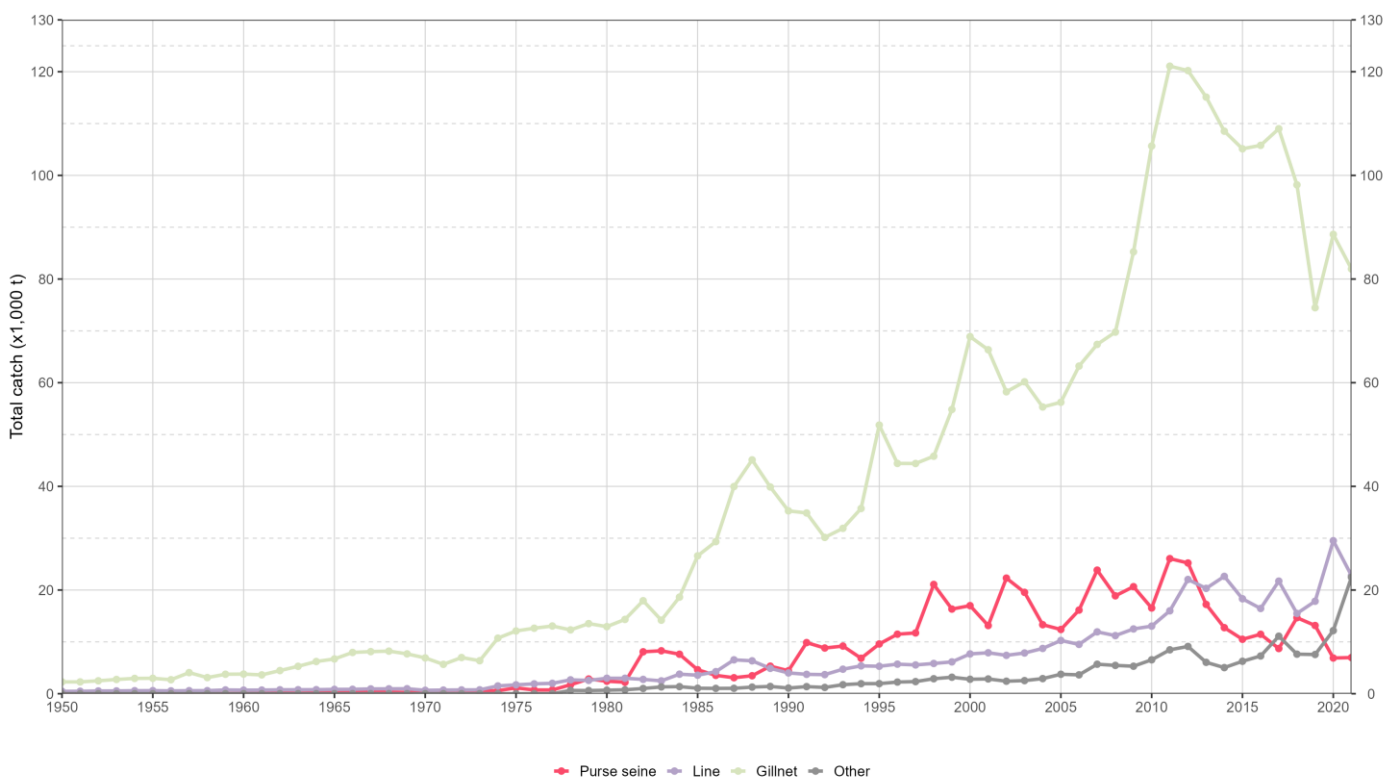
Figure 3: Annual time series of retained catches (metric tonnes; t) of longtail tuna by fishery group for the period 1950-2021. Data source: best scientific estimates of retained catches
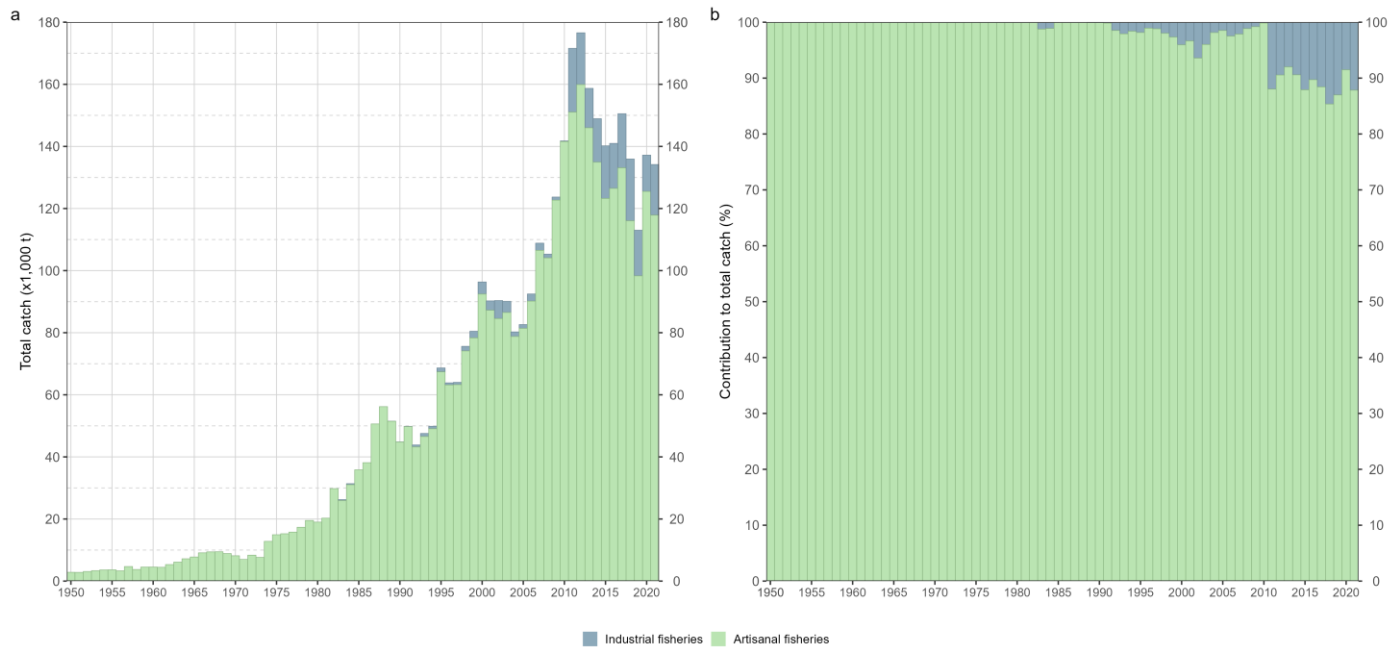
Figure 4: Annual time series of (a) cumulative retained catches (metric tonnes; t) and (b) cumulative contribution to the total retained catches (percentage; %) of longtail tuna by type of fishery for the period 1950-2021. Data source: best scientific estimates of retained catches

Recent fishery features (2017-2021)

Table 3: Mean annual retained catches (metric tonnes; t) of longtail tuna by fishery between 2017 and 2021. Data source: best scientific estimates of retained catches

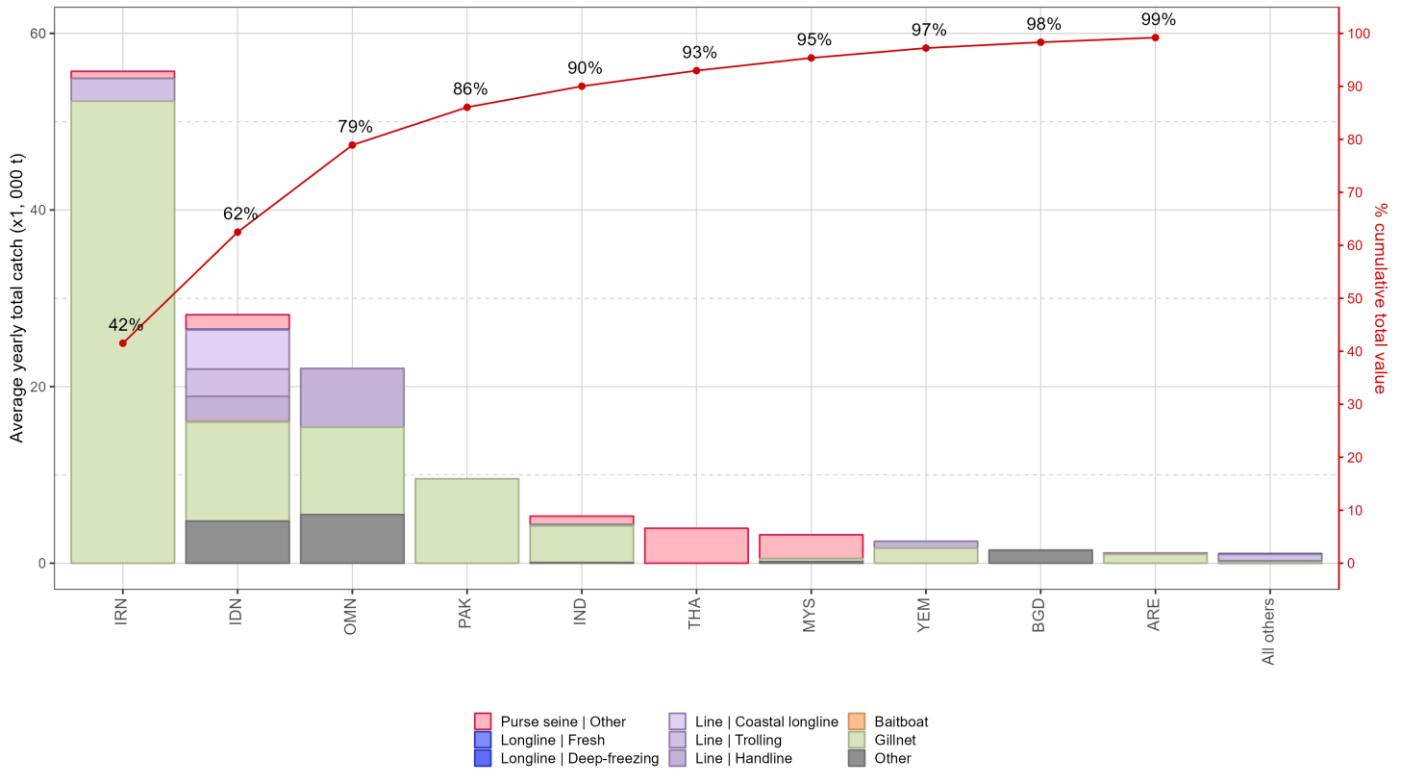| Fishery	Fishery code	Catch	Percentage
Gillnet	GN	90,439	67.4
Other	OT	11,985	8.9
Line | Handline	LIH	10,398	7.7
Purse seine | Other	PSOT	10,078	7.5
Line | Trolling	LIT	6,620	4.9
Line | Coastal longline	LIC	4,449	3.3
Longline | Fresh	LLF	103	0.1
Baitboat	BB	81	0.1
Longline | Deep-freezing	LLD	18	0.0

Figure 5: Mean annual retained catches (metric tonnes; t) of longtail tuna by fleet and fishery between 2017 and 2021, with indication of cumulative contribution (percentage; %) of catches by fleet. Data source: best scientific estimates of retained catches
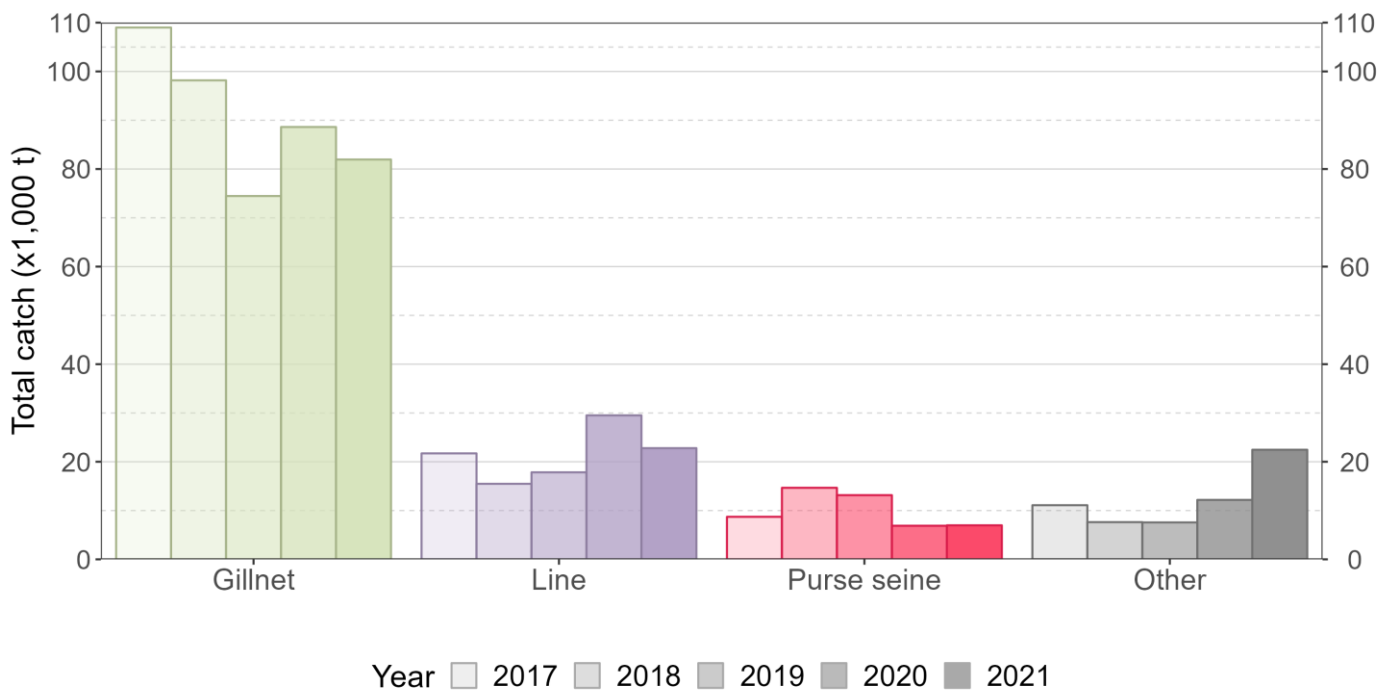

Figure 6: Annual trends in retained catch (metric tonnes; t) of longtail tuna by fishery group between 2017 and 2021. Data source: best scientific estimates of retained catches
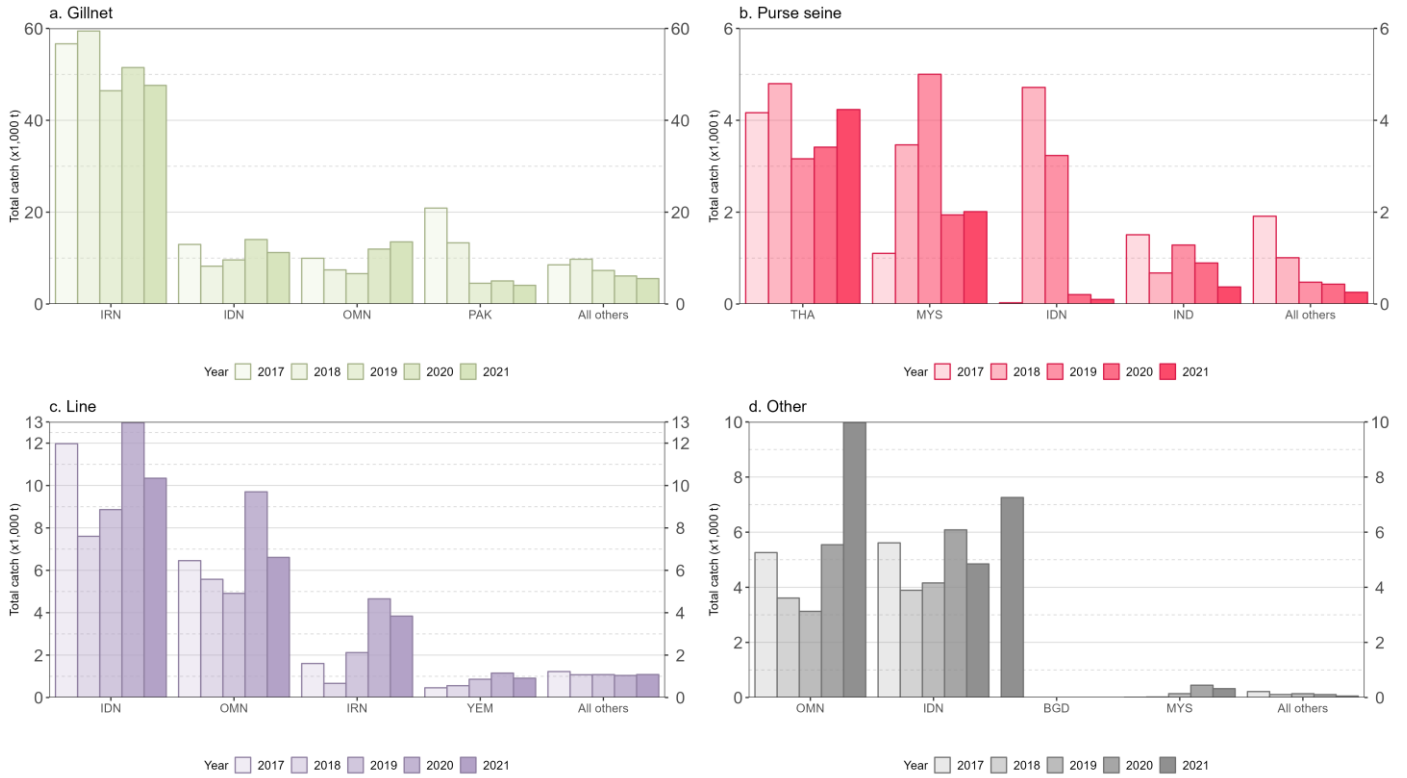
Figure 7: Annual trends in retained catch (metric tonnes; t) of longtail tuna by fishery group and fleet between 2017 and 2021. Data source: best scientific estimates of retained catches
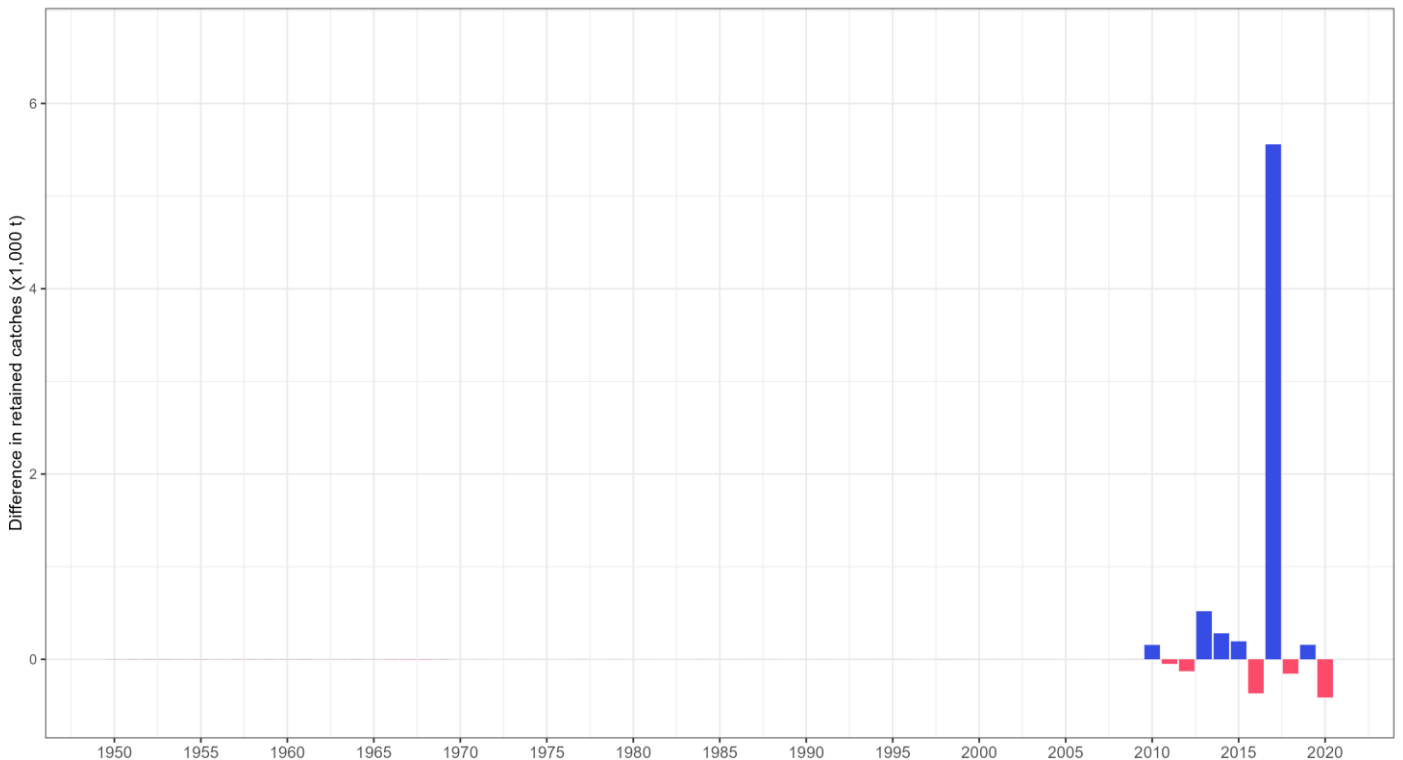
Changes from previous Working Party

Figure 8: Differences in the annual retained catches (metric tonnes; t) of longtail tuna available at this WPNT and its previous session (WPNT12 meeting held in July 2022). Details by year, fleet, fishery group, and Indian Ocean major area given in Appendix II

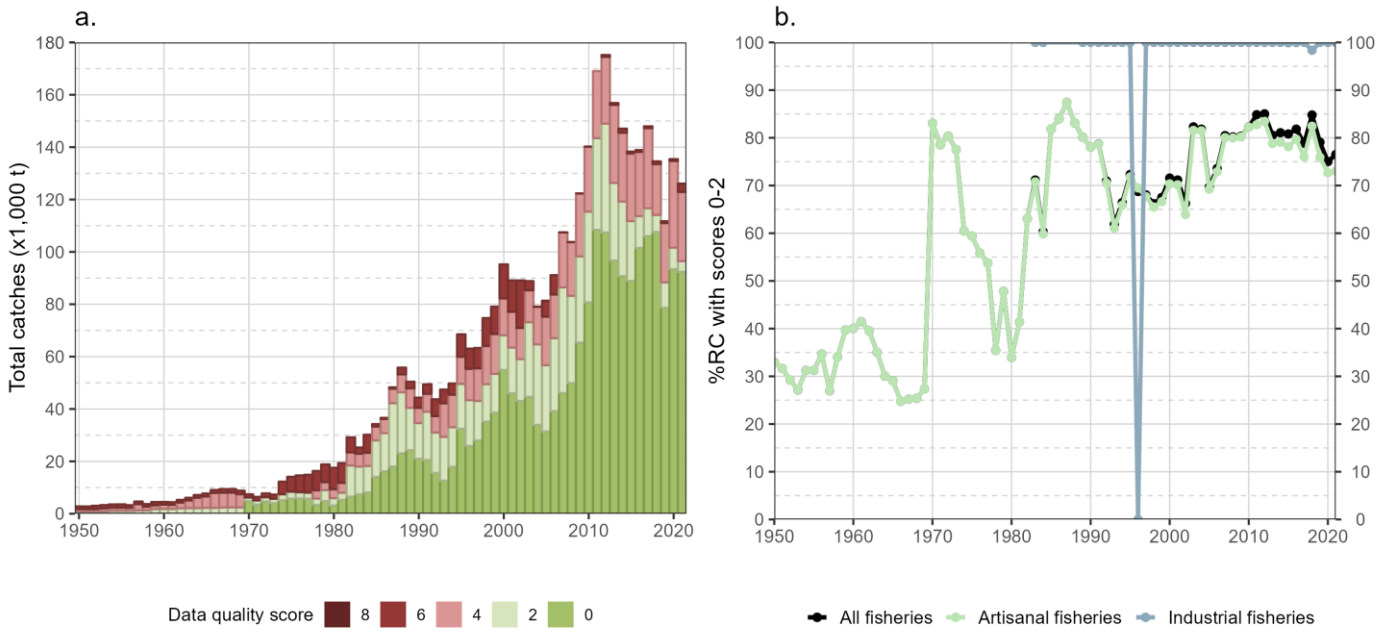## Uncertainties in retained catch data

Figure 9: Annual time series of (a) cumulative retained catches (metric tonnes; t) estimated by quality score and (b) contribution of retained catches fully or partially reported to the IOTC Secretariat to all retained catches (percentage; %) of longtail tuna for all fisheries and by type of fishery, for the period 1950-2021

Spatial distribution of catch

Geo-references catches

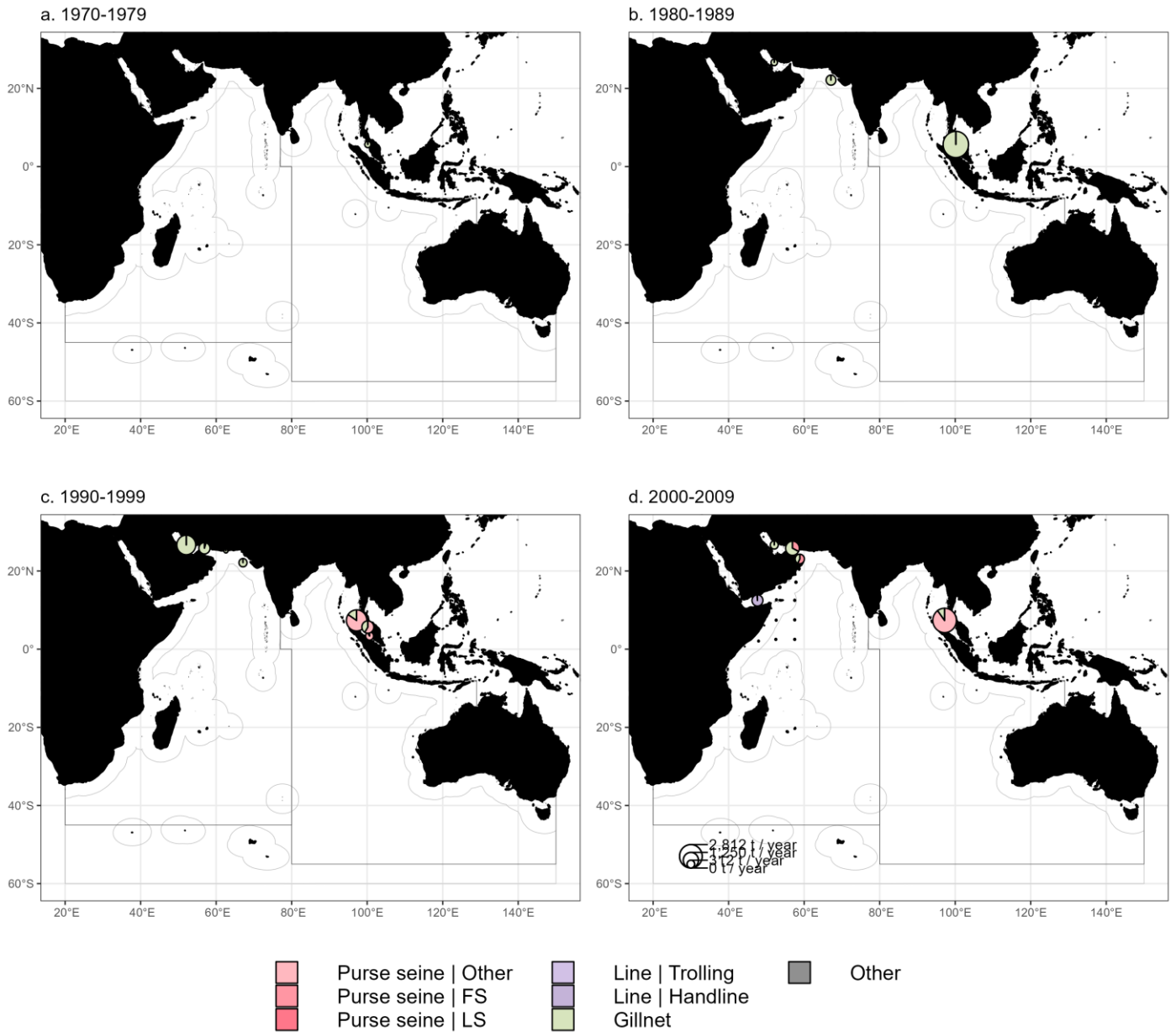### Geo-referenced catches by fishery and decade (1950-2009)

Figure 10: Mean annual time-area catches (metic tonnes; t) of longtail tuna, by decade, 5-degree grid area, and fishery. Light grey solid lines delineate areas beyond national jurisdiction. Data source: time-area catches

Geo-referenced catches by fishery, last years (2017-2021) and decade (2010-2019)
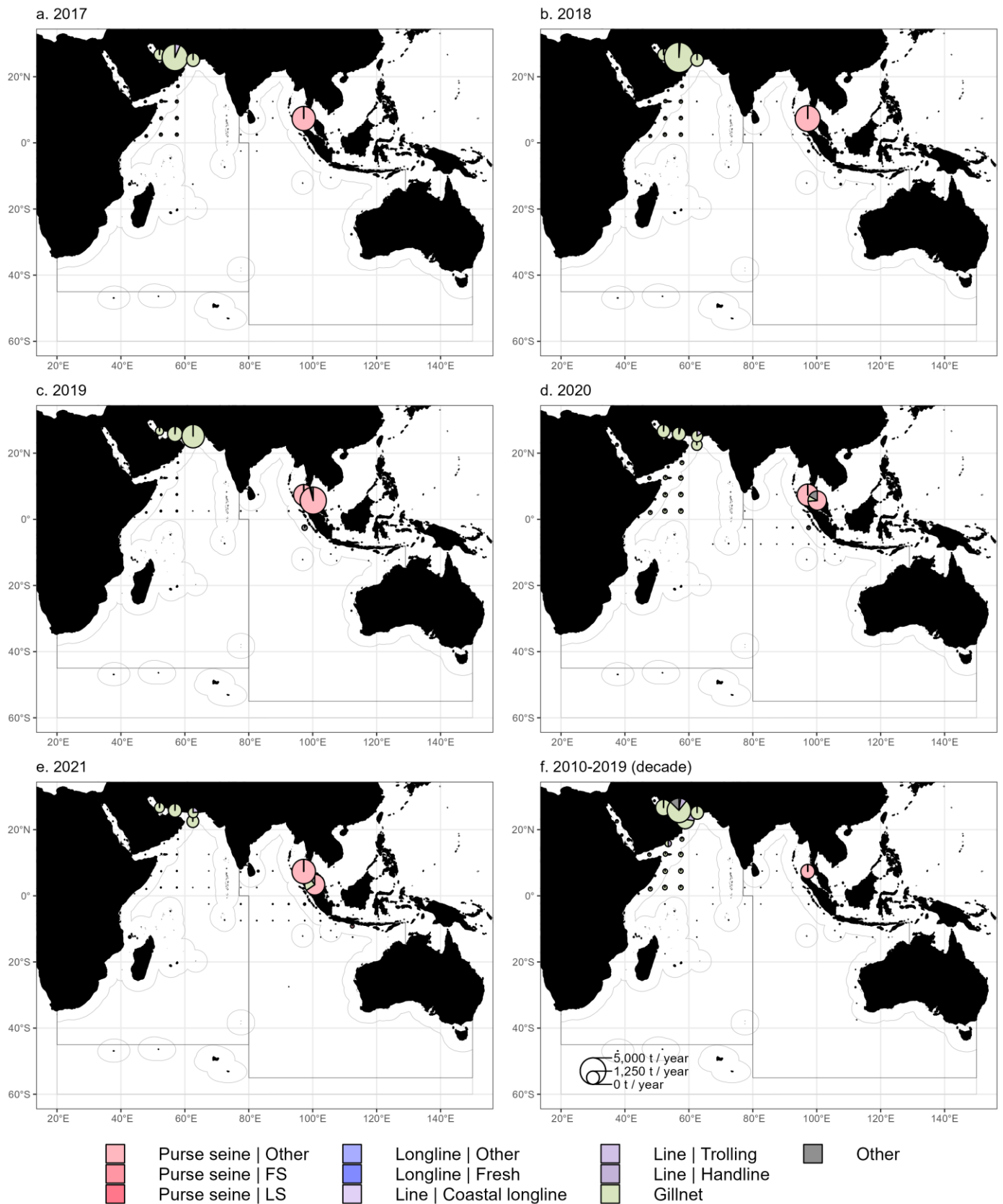

Figure 11: Mean annual time-area catches (metric tonnes; t) of longtail tuna, by year and decade, 5-degree grid area, and fishery. Light grey solid lines delineate areas beyond national jurisdiction. Data source: time-area catches

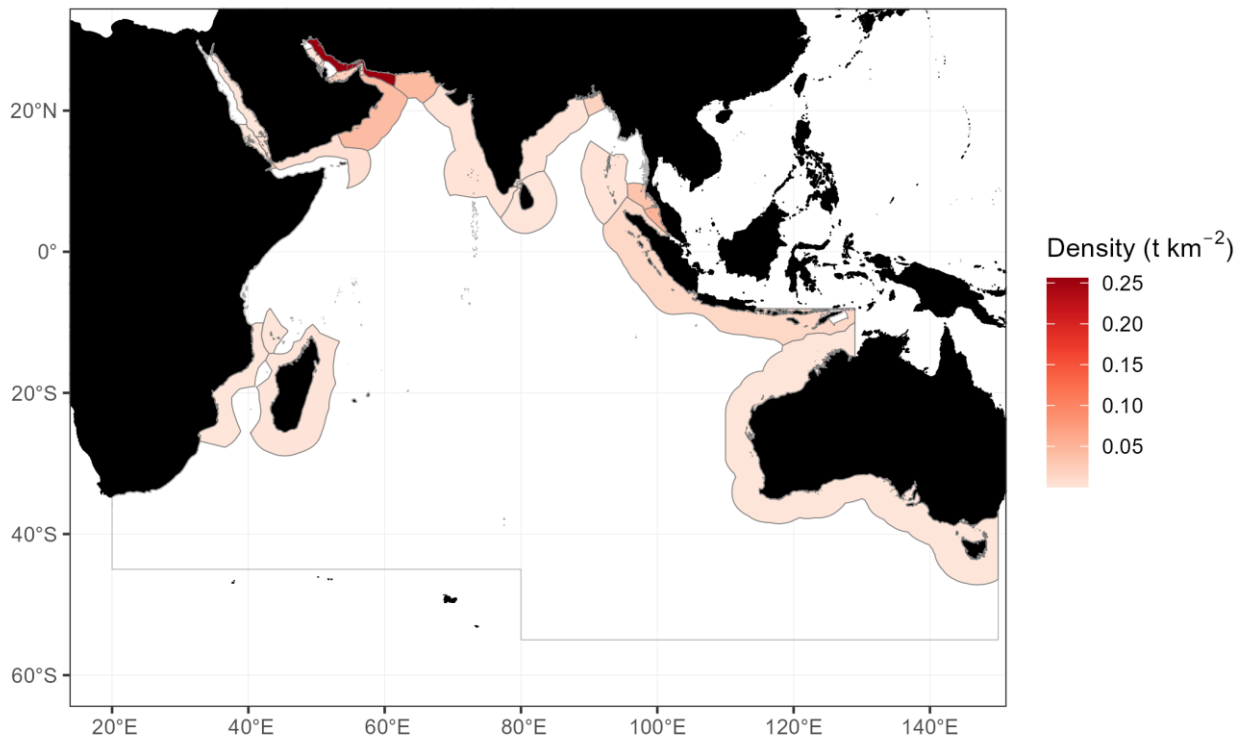# Domestic catches within areas under national jurisdiction (2017-2021)

Figure 12: Mean annual density of catch (t km^{-2}) of longtail tuna reported for domestic fisheries operating in areas under national jurisdiction of IOTC coastal states between 2017 and 2021. Data source: best scientific estimates of retained catches

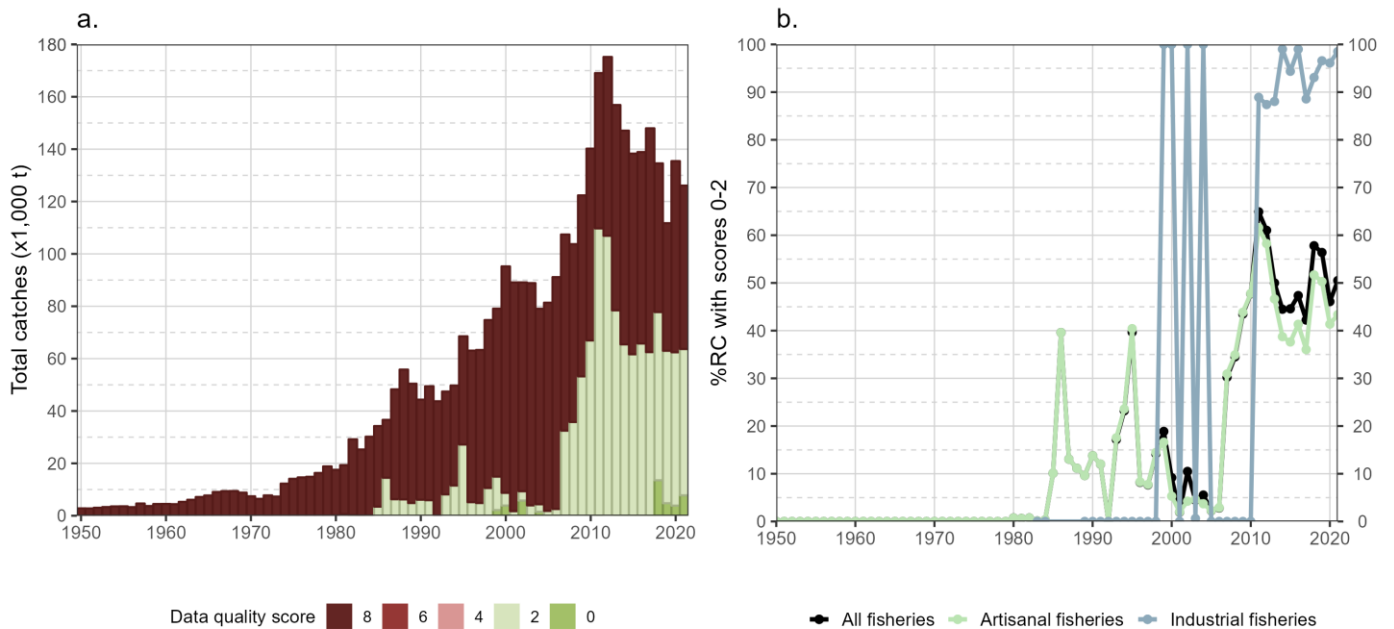# Uncertainties in geo-referenced catch and effort data

Figure 13: Annual time series of (a) cumulative retained catches (metric tonnes; t) estimated by quality score and (b) contribution of retained catches (percentage; %) with corresponding geo-referenced catch and effort data reported to the IOTC Secretariat in agreement with the requirements of Res. 15/02) to all retained catches of longtail tuna for all fisheries and by type of fishery, for the period 1950-2021

Size composition of the catch

Samples availability
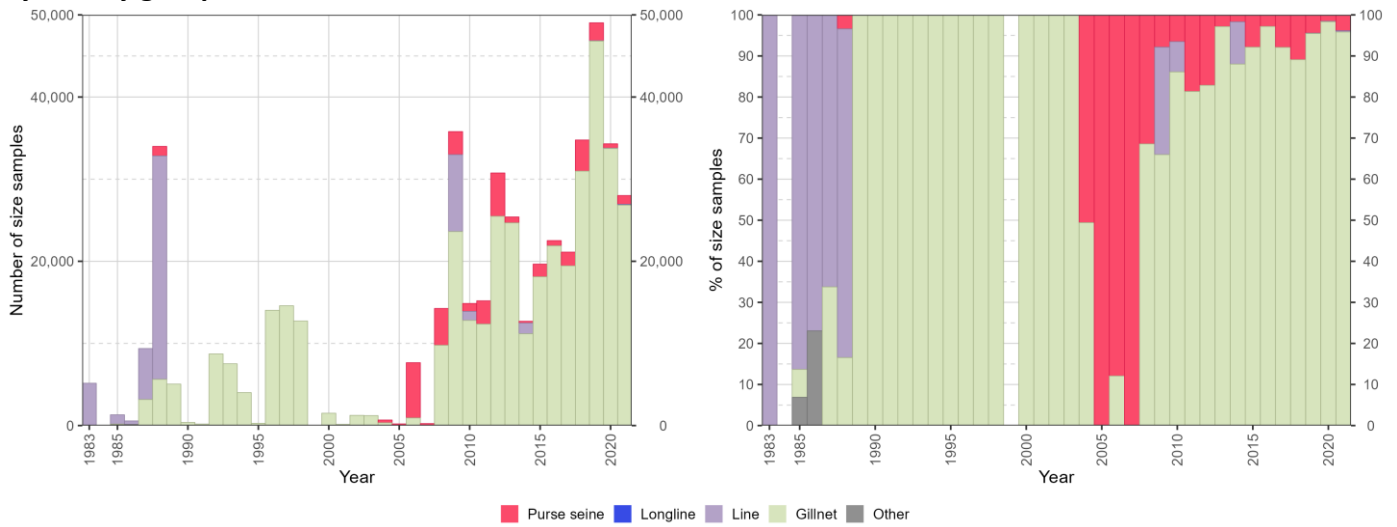
By fishery group

Figure 14: Availability of size-frequency data for longtail tuna as (left) absolute and (right) relative number of samples per year and fishery group. Data source: standardized size-frequency dataset

Purse seine fisheries

Figure 15: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in purse seine fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset
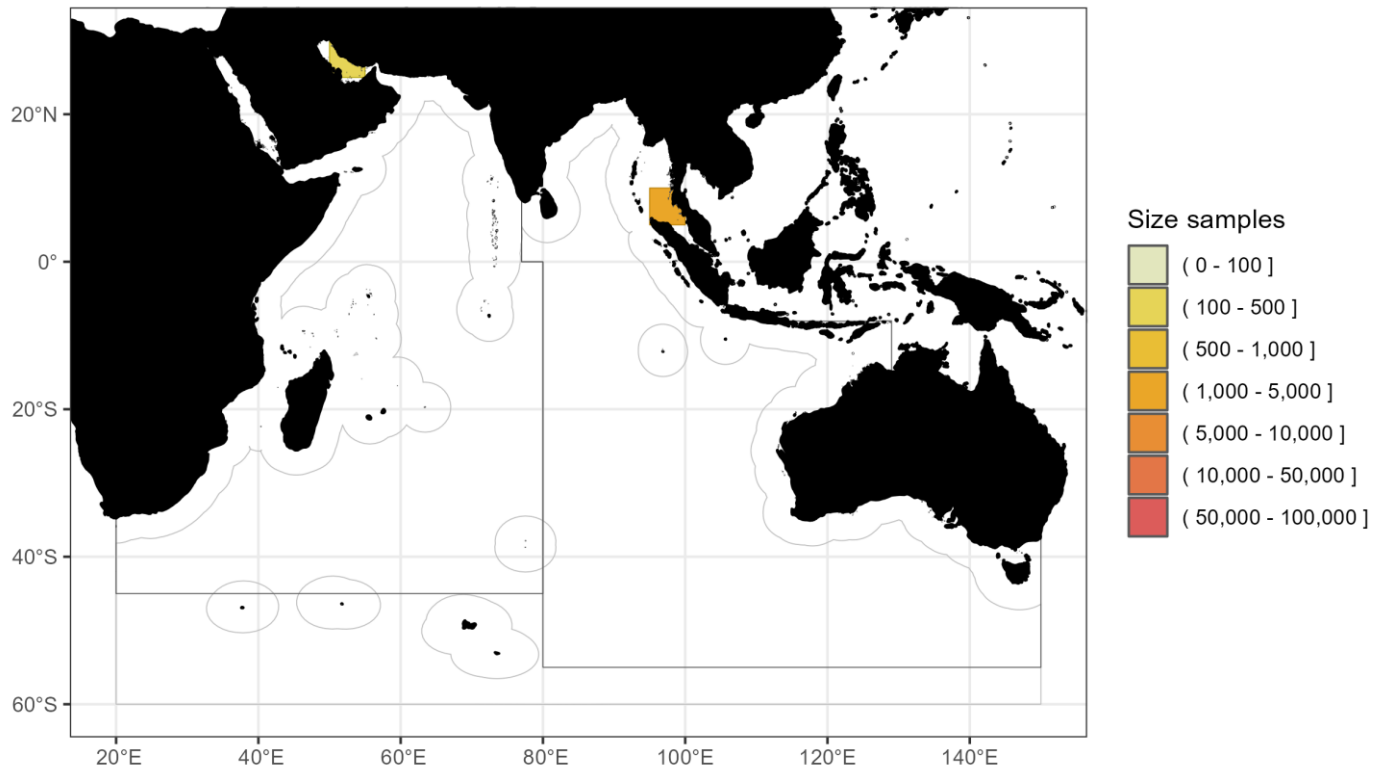
Gillnet fisheries

Figure 16: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in gillnet fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset
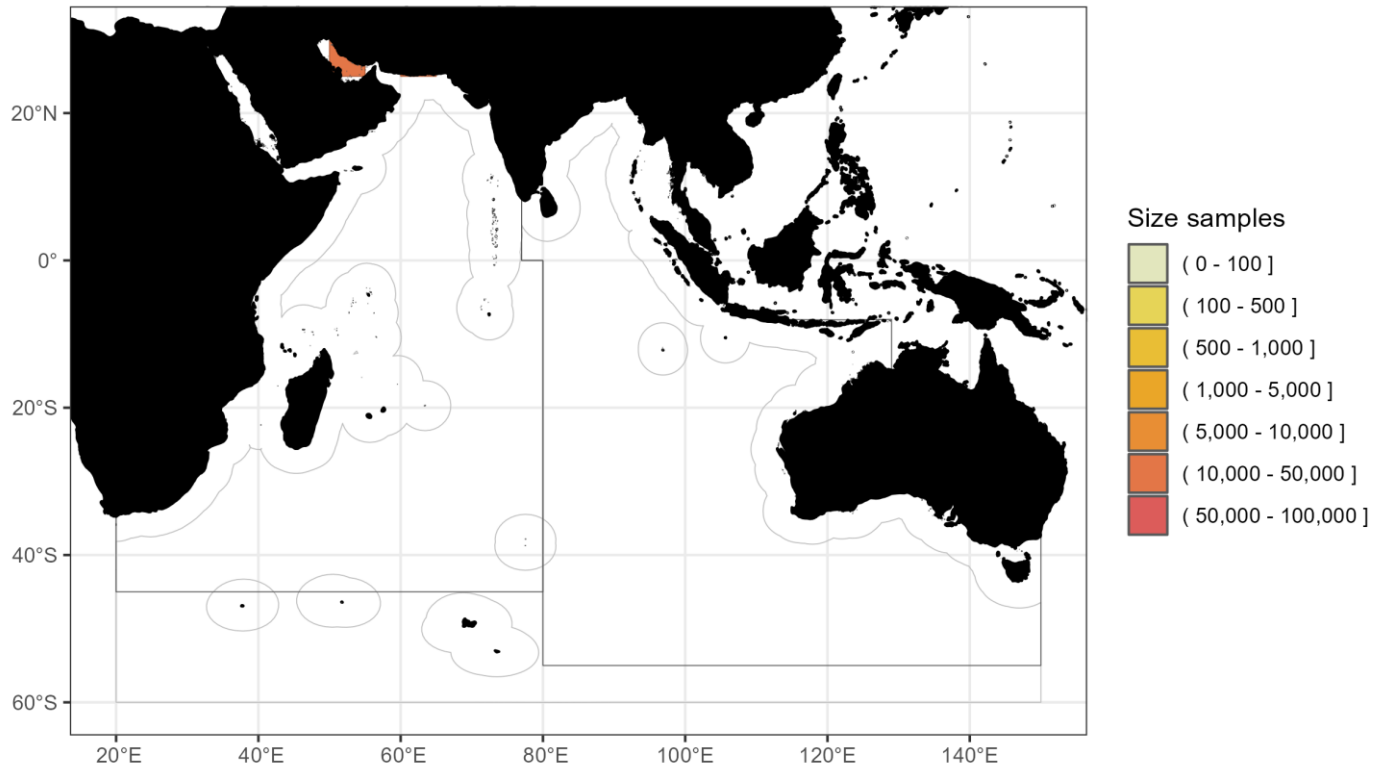
Line fisheries

Figure 17: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in line fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset

By fishery

Purse seine fisheries

Figure 18: Availability of size-frequency data for longtail tuna as (left) absolute and (b) relative number of samples per year and type of purse seine fishery. Data source: standardized size-frequency dataset
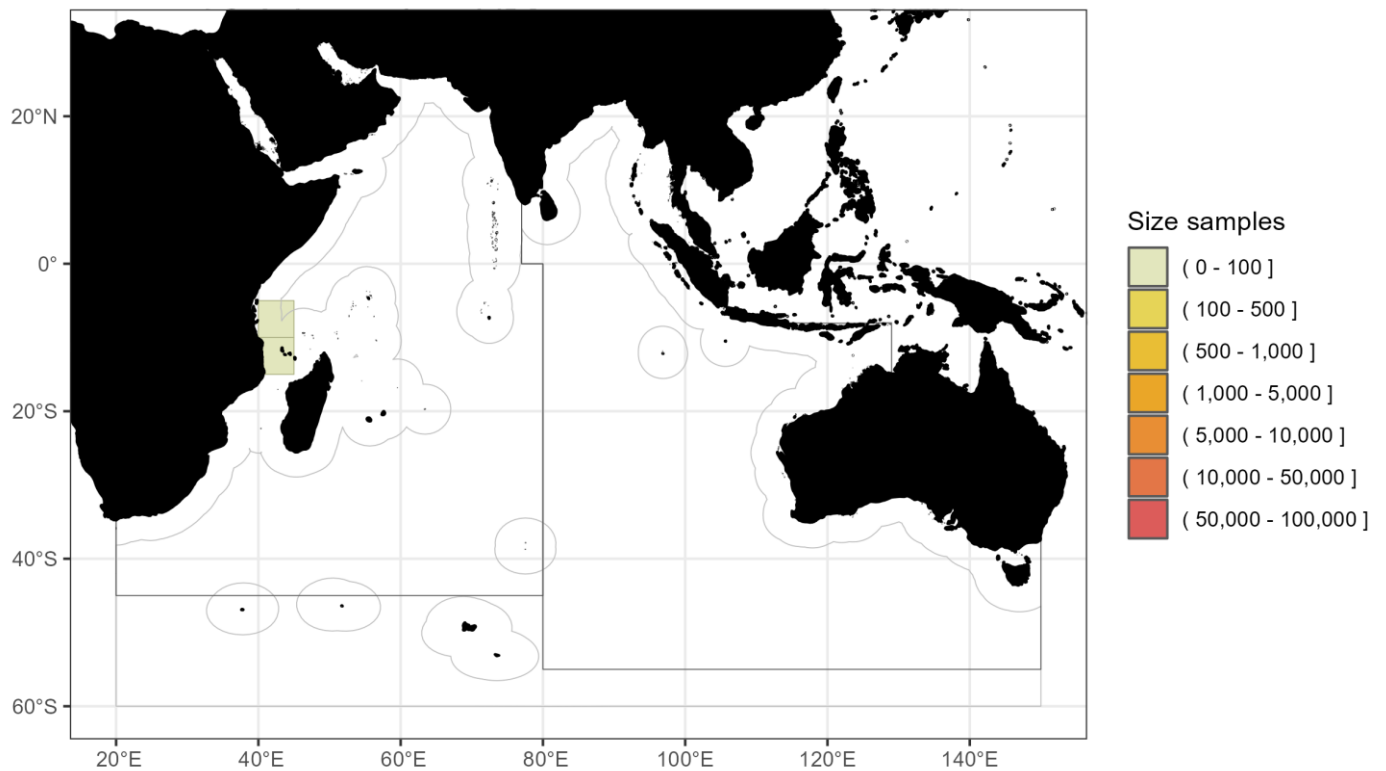

Figure 19: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in coastal and ringnet purse seine fisheries (Purse seine|Other) during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset

Gillnet fisheries

Figure 20: Availability of size-frequency data for longtail tuna as absolute number of samples per year in gillnet fisheries. Data source: standardized size-frequency dataset
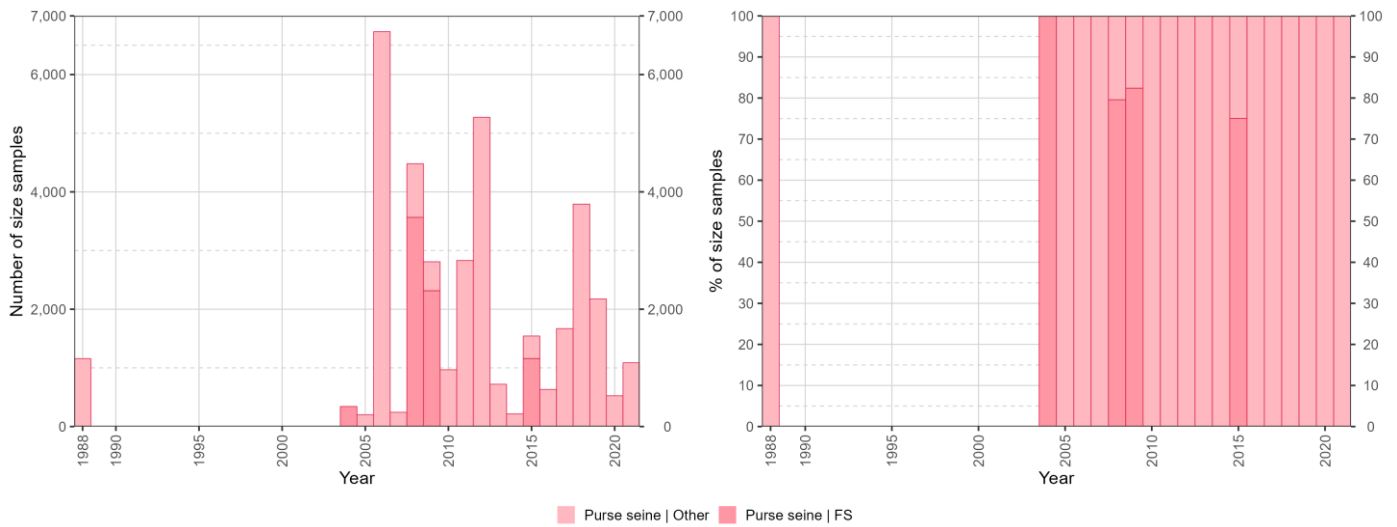
Line fisheries

Figure 21: Availability of size-frequency data for longtail tuna as (left) absolute and (right) relative number of samples per year and line fishery type. Data source: standardized size-frequency dataset
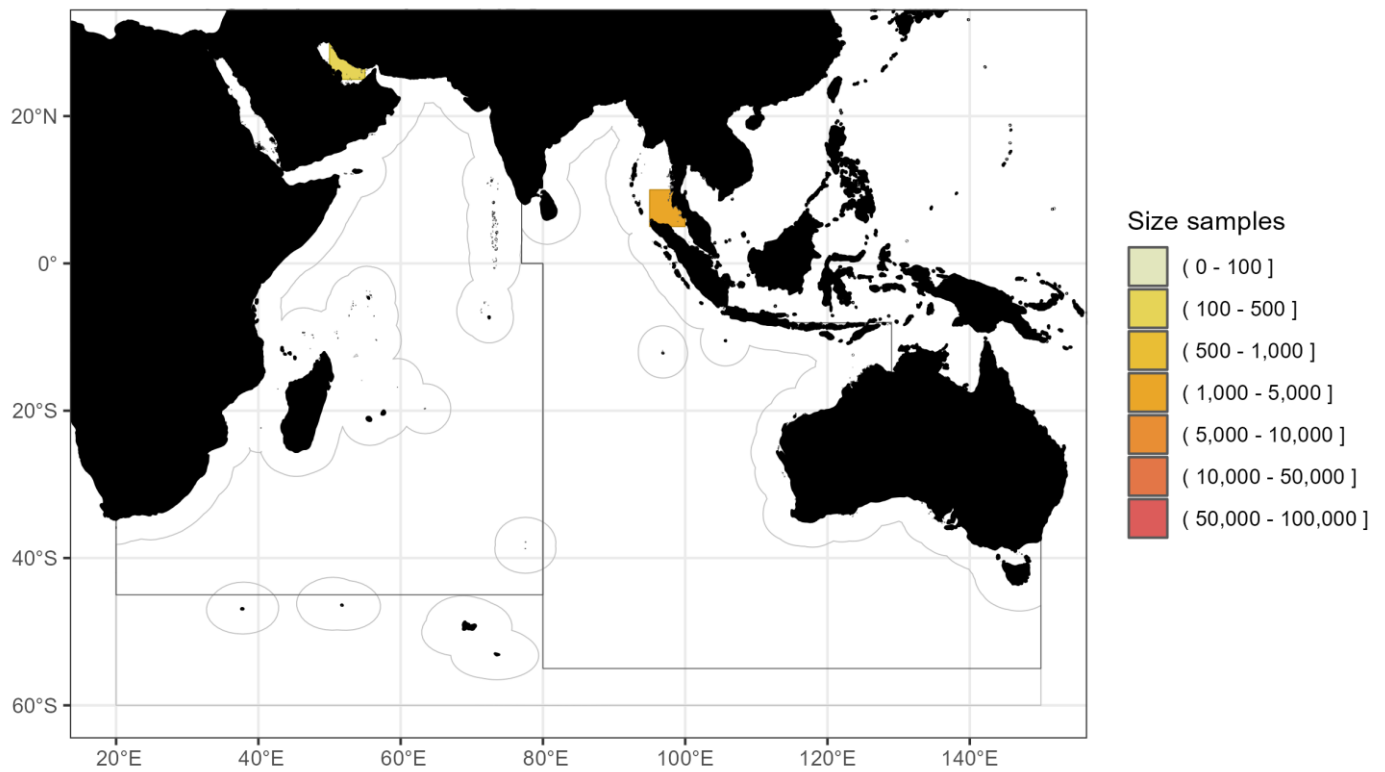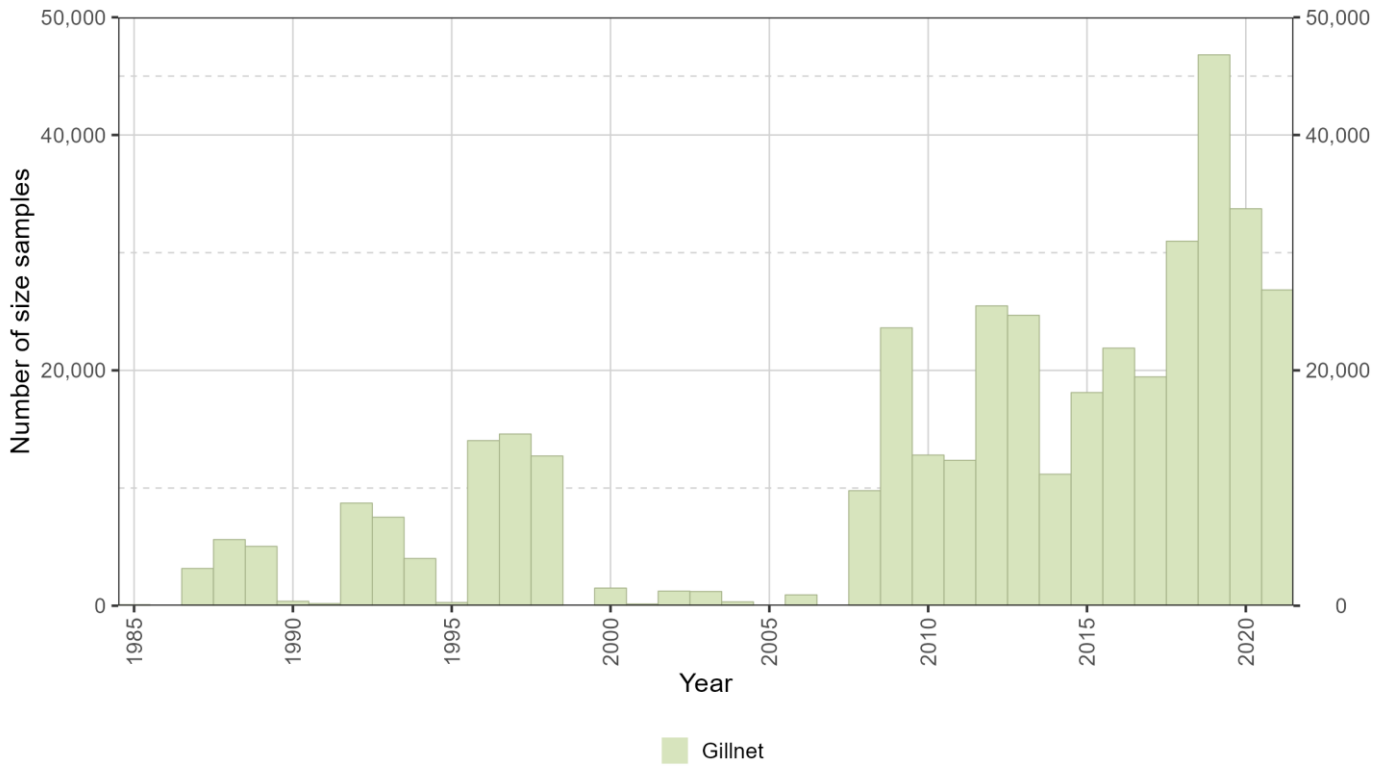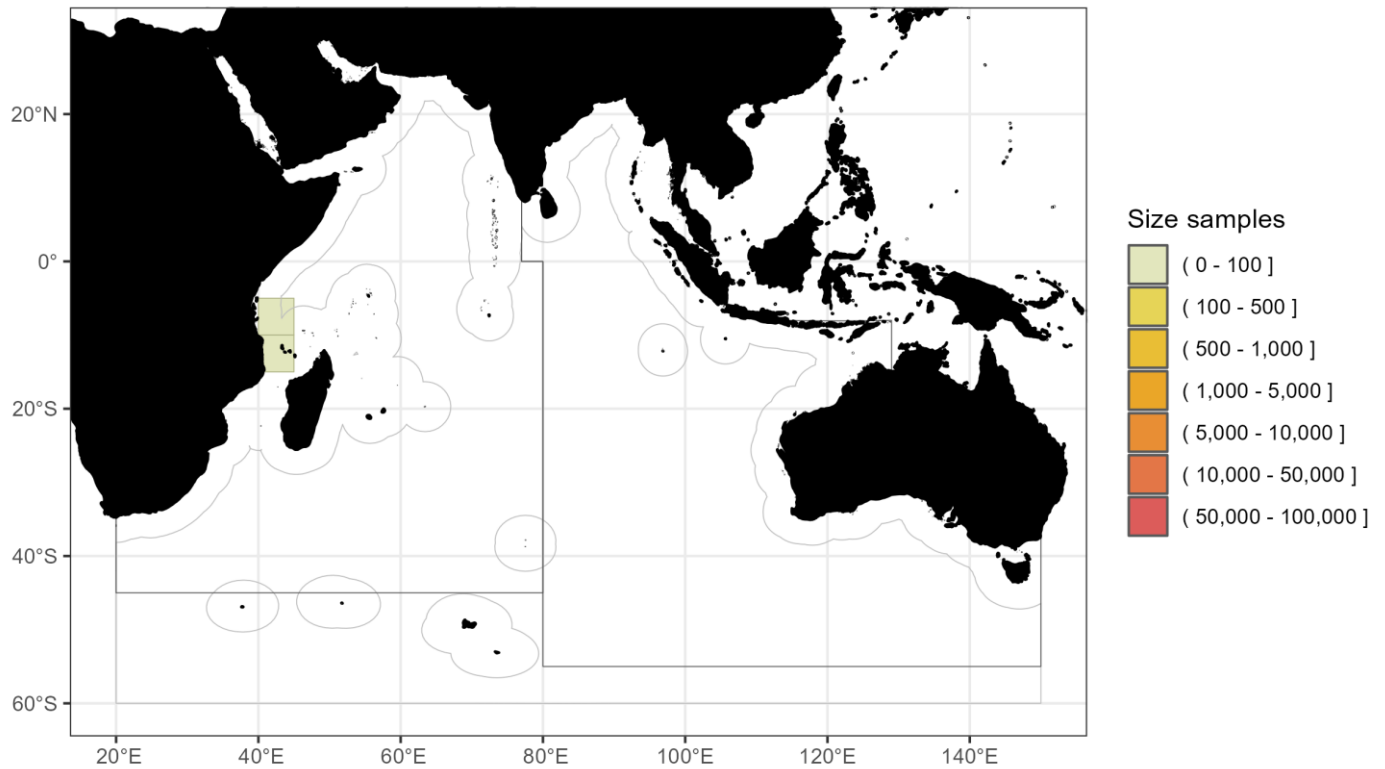
Figure 22: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in coastal longline fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset

Figure 23: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in handline fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset
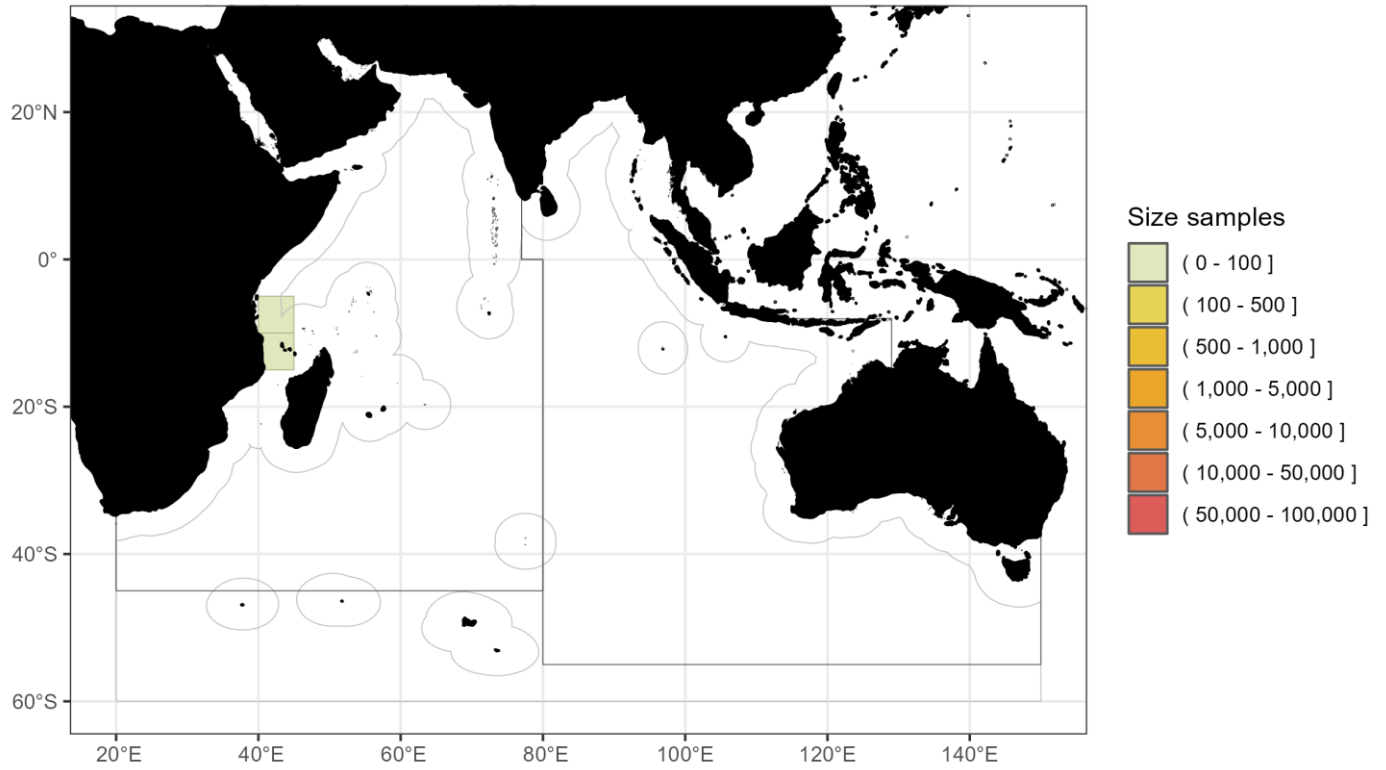
Figure 24: Spatial distribution (mean annual number of samples per 5-degree grid area) of available size-frequency data for longtail tuna caught in trolling fisheries during 2017-2021. Light grey solid lines delineate areas beyond national jurisdiction. Data source: standardized size-frequency dataset
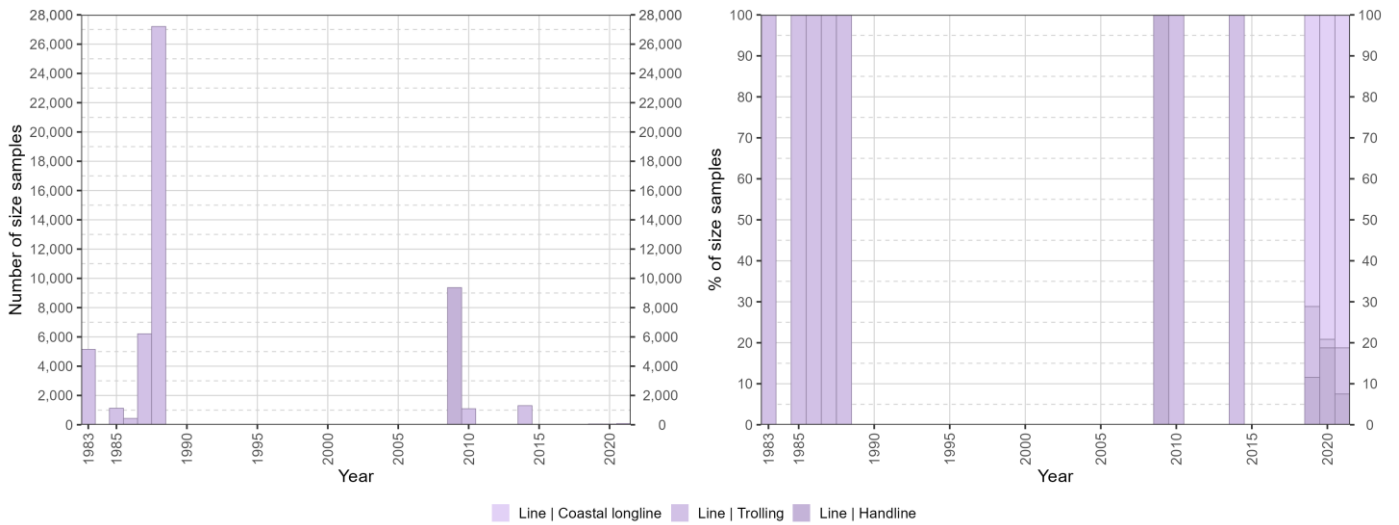
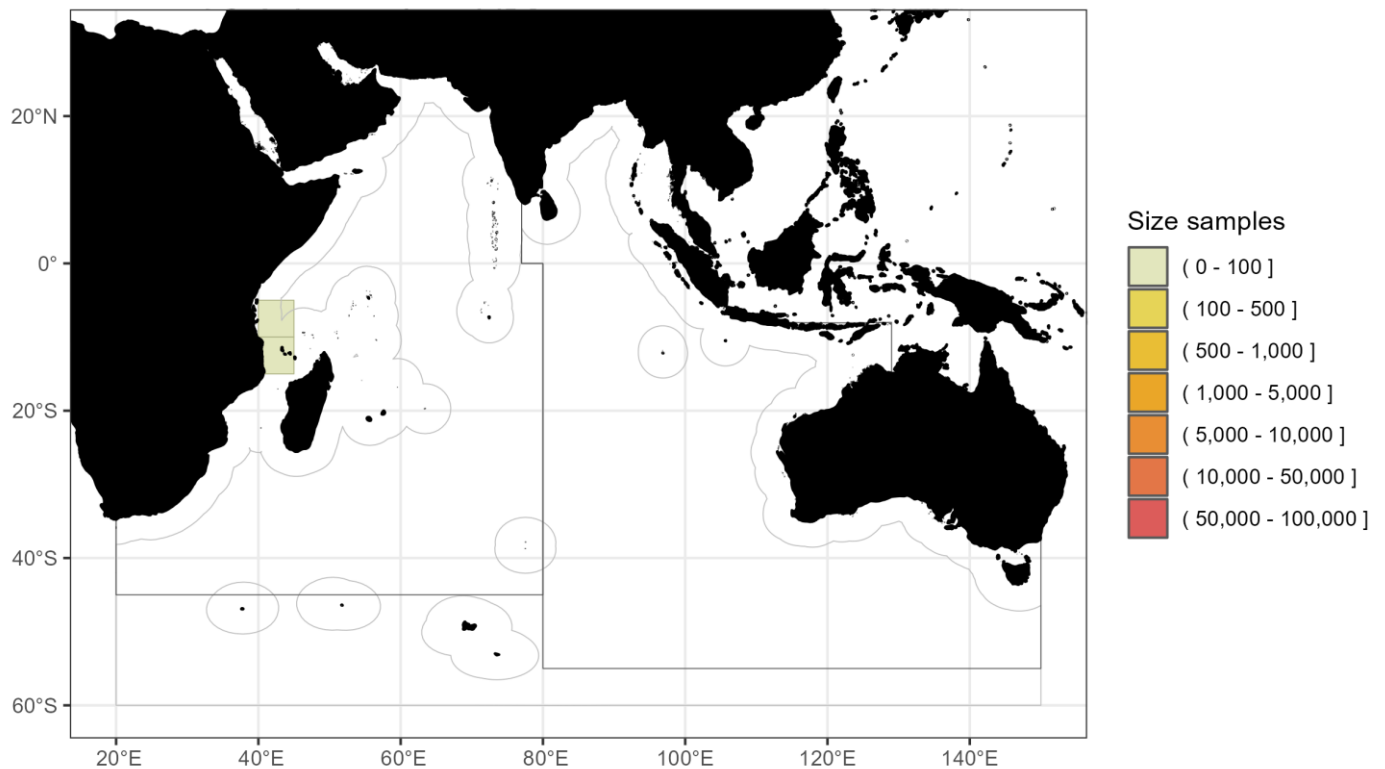## Other fisheries
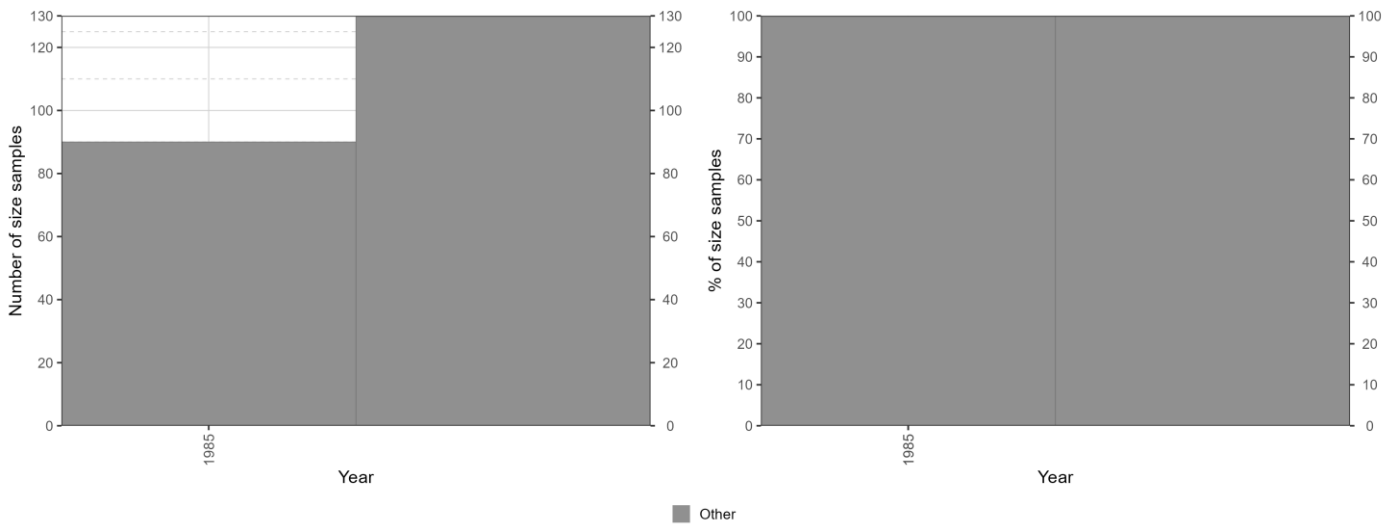
Figure 25: Availability of size-frequency data for longtail tuna as (left) absolute and (right) relative number of samples per year for 'other' fishery types (beach seine). Data source: standardized size-frequency dataset

Temporal patterns and trends in size distributions
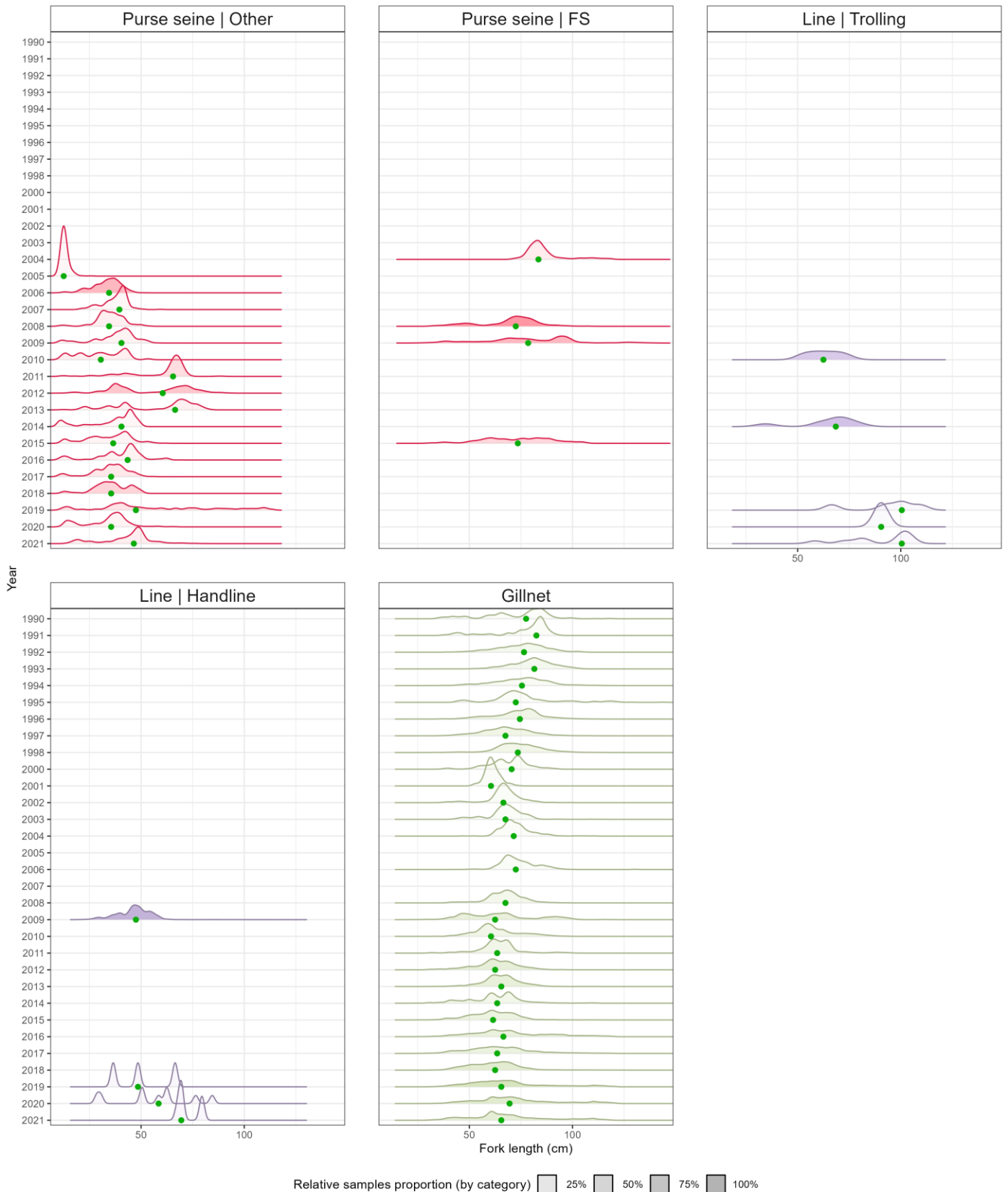
Figure 26: Relative size distribution (fork length; cm) of longtail tuna caught in coastal and ringnet purse seine fisheries (Purse seine|Other), gillnet fisheries, and other fisheries (beach seine). Fill intensity is proportional to the number of samples recorded for the year, while the green dot corresponds to the median value. Data source: standardized size-frequency dataset

Size distribution by fishery and fleet

Purse seine fisheries (other)

Figure 27: Relative size distribution of longtail tuna (fork length; cm) caught in coastal purse seine and ringnet fisheries (Purse seine|Other) by year and main fleet. Data source: standardized size-frequency dataset
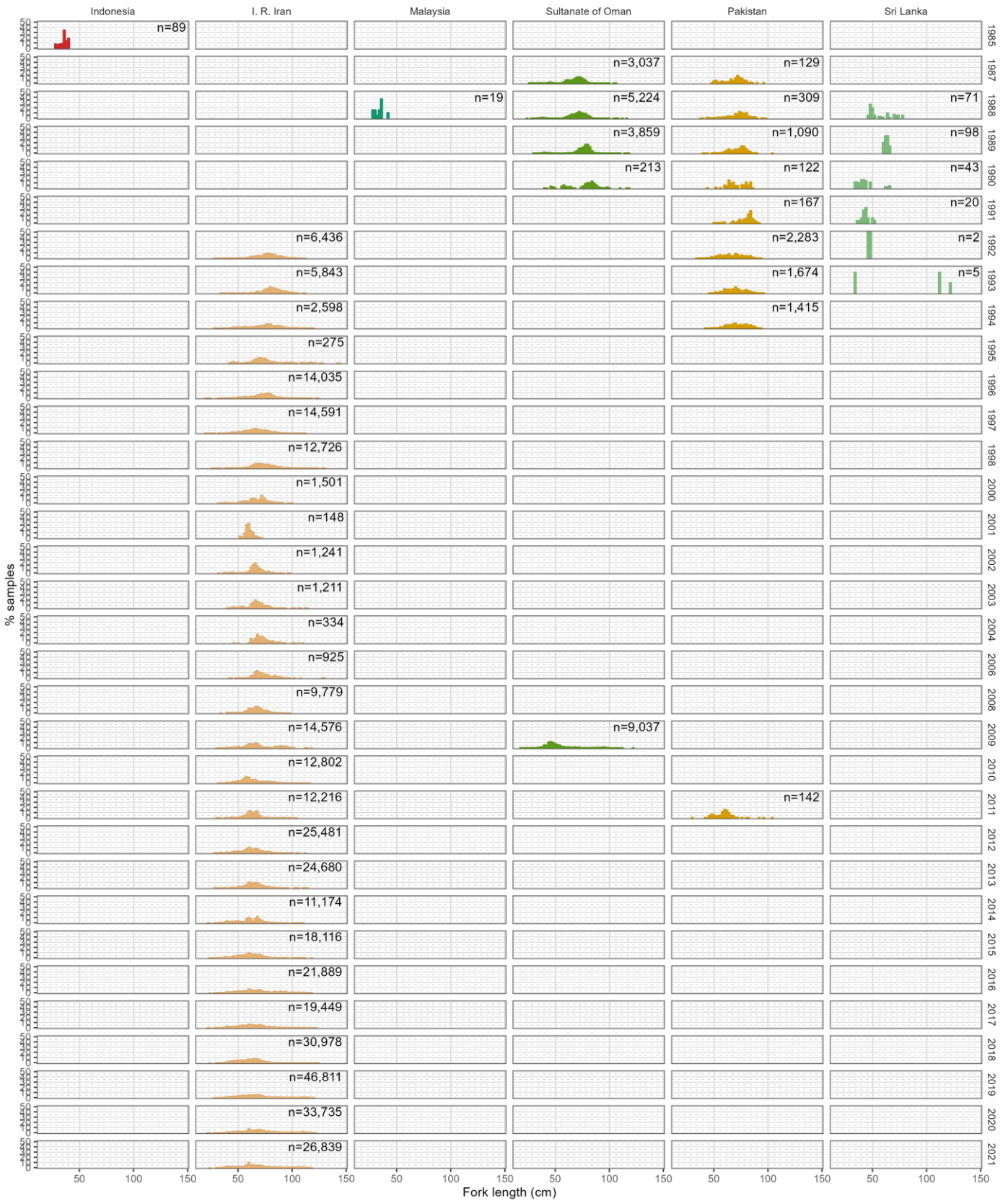
Gillnet fisheries

Figure 28: Relative size distribution of longtail tuna (fork length; cm) caught in gillnet fisheries by year and main fleet. Data source: standardized size-frequency dataset

Uncertainties in geo-referenced size-frequency data

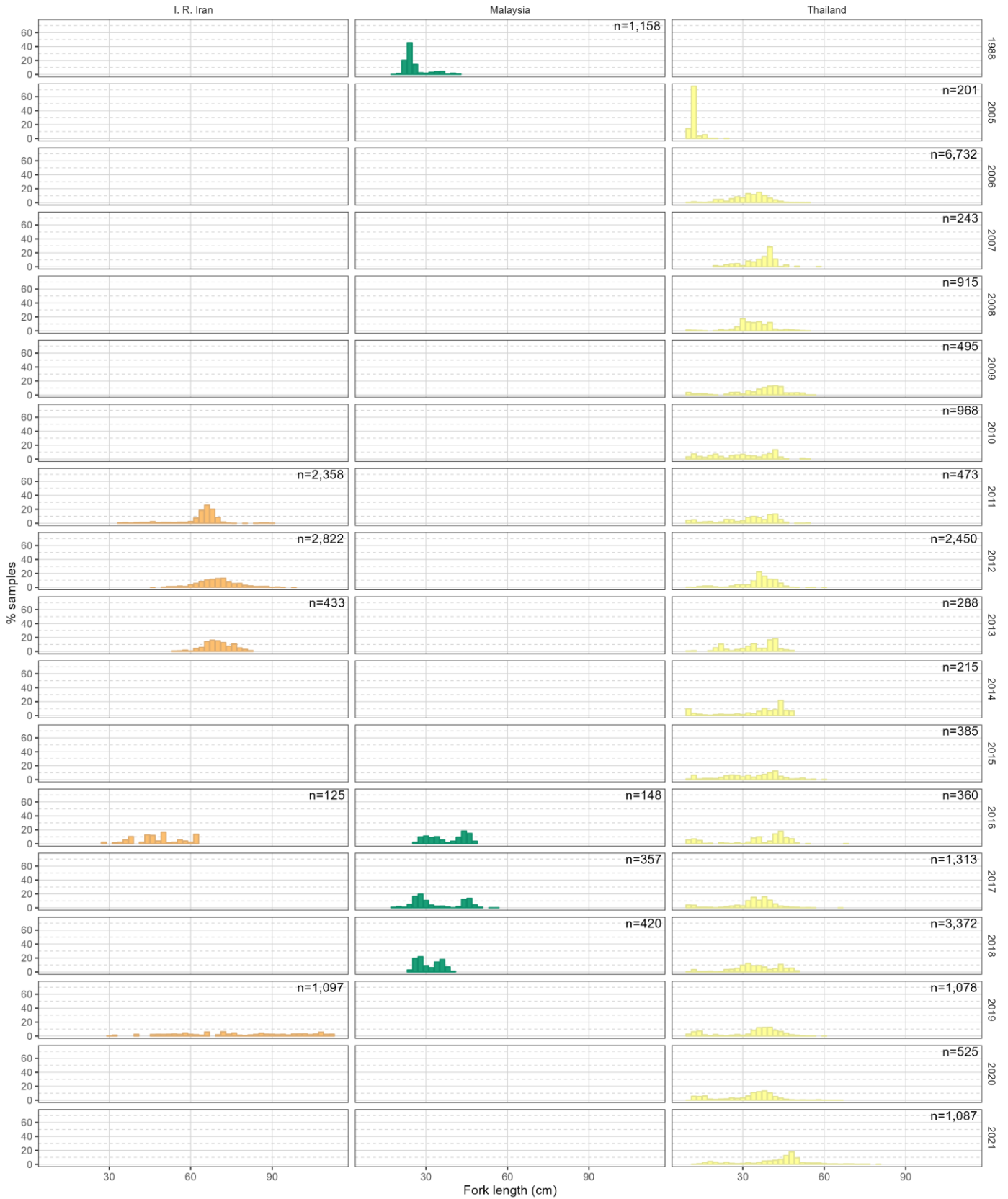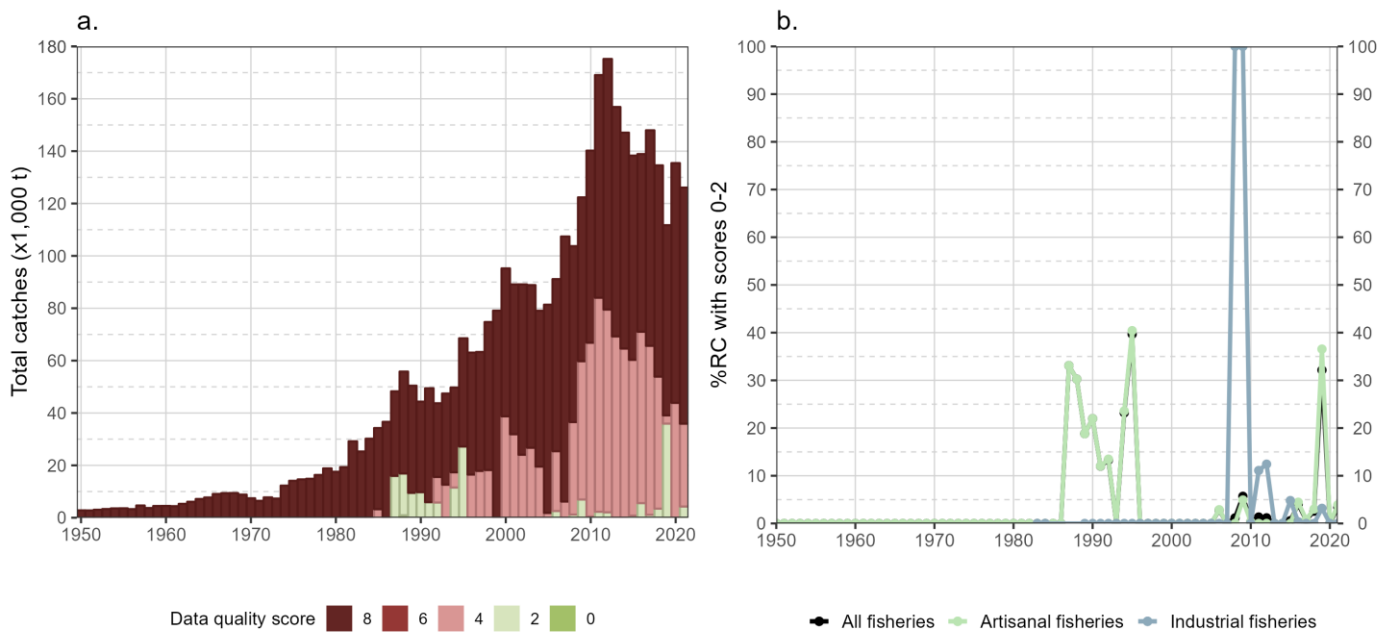Figure 29: Annual time series of (a) cumulative retained catches (metric tonnes; t) estimated by quality score and (b) contribution of retained catches with corresponding geo-referenced size-frequency data reported to the IOTC Secretariat in agreement with the requirements of Res. 15/02 to all retained caches (percentage; %) of longtail tuna for all fisheries and by type of fishery, for the period 1950-2021

References

Bleeker P (1851) Over Eenige Nieuwe Geslachten En Soorten van Makreelachtige Visschen van Den Indischen Archipel. Natuurkundig tijdschrift voor Nederlandsch Indië 1:341–372.

IOTC (2023) Review of the statistical data available for Indian Ocean neritic tuna and seerfish species under IOTC management. IOTC, Virtual meeting, 03-07 July 2023, p 39

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Appendix

Appendix I: Taxonomy

Rank	Taxon
Kingdom	*Animalia*
Subkingdom	*Bilateria*
Infrakingdom	*Deuterostomia*
Phylum	*Chordata*
Subphylum	*Vertebrata*
Infraphylum	*Gnathostomata*
Superclass	*Actinopterygii*
Class	*Teleostei*
Superorder	*Acanthopterygii*
Order	*Perciformes*
Suborder	*Scombroidei*
Family	*Scombridae*
Subfamily	*Scombrinae*
Tribe	*Thunnini*
Genus	*Thunnus*
Subgenus	*Thunnus (Neothunnus)*
Species	*Thunnus tonggol*

Appendix II: Changes in best scientific estimates of retained catches from previous WPNT

Table 4: Changes in best scientific estimates of annual retained catches (metric tonnes; t) of longtail tuna by fleet, fishery group, and main Indian Ocean area, limited to absolute values higher than 10 t

Year	Fleet	Fishery group	Area	Current (t)	Previous (t)	Difference (t)
2020	ARE	Gillnet	Western Indian Ocean	1,193	1,363	-170
		Line	Western Indian Ocean	191	218	-27
	IRN	Gillnet	Western Indian Ocean	51,482	53,810	-2,328
		Line	Western Indian Ocean	4,655	2,328	2,327
	SAU	Line	Western Indian Ocean	29	108	-79
		Purse seine	Western Indian Ocean	9	85	-76
2019	ARE	Gillnet	Western Indian Ocean	1,078	742	336
		Line	Western Indian Ocean	172	118	54
	IRN	Gillnet	Western Indian Ocean	46,435	47,984	-1,549
		Line	Western Indian Ocean	2,119	568	1,551
	SAU	Gillnet	Western Indian Ocean	7	24	-17
		Line	Western Indian Ocean	12	117	-105
		Purse seine	Western Indian Ocean	5	92	-87
2018	ARE	Gillnet	Western Indian Ocean	837	733	104
		Line	Western Indian Ocean	134	117	17
	IRN	Gillnet	Western Indian Ocean	59,436	59,503	-68
	SAU	Gillnet	Western Indian Ocean	11	25	-13
		Line	Western Indian Ocean	20	119	-100
		Purse seine	Western Indian Ocean	6	94	-88
2017	ARE	Gillnet	Western Indian Ocean	596	776	-180
		Line	Western Indian Ocean	95	124	-29
	IDN	Baitboat	Eastern Indian Ocean	94	75	19
		Gillnet	Eastern Indian Ocean	12,971	10,391	2,580
		Line	Eastern Indian Ocean	11,973	9,591	2,382
		Other	Eastern Indian Ocean	5,518	4,421	1,098
	IRN	Line	Western Indian Ocean	1,605	1,665	-60
	SAU	Gillnet	Western Indian Ocean	14	30	-16
		Line	Western Indian Ocean	26	146	-120

Year	Fleet	Fishery group	Area	Current (t)	Previous (t)	Difference (t)
		Other	Western Indian Ocean	1	12	-11
		Purse seine	Western Indian Ocean	10	115	-105
2016	ARE	Gillnet	Western Indian Ocean	891	776	115
		Line	Western Indian Ocean	142	124	18
	IRN	Gillnet	Western Indian Ocean	54,560	54,596	-36
	SAU	Gillnet	Western Indian Ocean	17	30	-13
		Line	Western Indian Ocean	36	146	-110
		Purse seine	Western Indian Ocean	16	115	-99
2015	ARE	Gillnet	Western Indian Ocean	1,186	776	410
		Line	Western Indian Ocean	189	124	65
2014		Gillnet	Western Indian Ocean	1,292	776	516
		Line	Western Indian Ocean	206	124	82
	IDN	Gillnet	Eastern Indian Ocean	11,136	11,155	-19
		Line	Eastern Indian Ocean	10,279	10,296	-18
	IRN	Gillnet	Western Indian Ocean	60,754	60,771	-17
		Purse seine	Western Indian Ocean	140	170	-30
2013	IDN	Gillnet	Eastern Indian Ocean	12,641	12,248	394
		Line	Eastern Indian Ocean	11,669	11,305	364
		Other	Eastern Indian Ocean	5,378	5,211	168
	IRN	Gillnet	Western Indian Ocean	62,677	62,704	-27
2012	IDN	Gillnet	Eastern Indian Ocean	10,821	10,731	90
		Line	Eastern Indian Ocean	9,988	9,905	83
		Other	Eastern Indian Ocean	4,603	4,565	38
	IRN	Gillnet	Western Indian Ocean	71,227	71,242	-15
		Line	Western Indian Ocean	2,971	2,884	87
2011	QAT	Gillnet	Western Indian Ocean	438	479	-41
2010	IDN	Gillnet	Eastern Indian Ocean	10,540	10,474	66
		Line	Eastern Indian Ocean	9,729	9,668	61
		Other	Eastern Indian Ocean	4,484	4,456	28