UNCERTAINTY IN IOTC DATA FOR NERITICS: EXPLORING THE INTEREST OF CATCH RECONSTRUCTION FROM THE SEA AROUND US PROJECT

24TH IOTC WORKING PARTY ON NERITIC TUNAS - 08-12 JULY 2024

IOTC SECRETARIAT

PURPOSE

To provide participants at the 24th Session of the IOTC Working Party on Neritic Tunas (WPNT24) with some information on the catch reconstruction performed for large pelagic species through the Sea Around Us Project (Heidrich et al. 2023, Zeller et al. 2023) and to assess its relevance to the IOTC process.

THE IOTC CURRENT APPROACH TO DATA UNCERTAINTY

IOTC Estimates of IUU Catches

- Res. 15/02 mentions "*Estimates of the total catch by species, […], separated, whenever possible, by retained catches in live weight and by discards in live weight or numbers*"

- Form 1DI to report discards to the IOTC, expected to be raised to the total fishery

- Lack of information on discards in coastal fisheries, assumed negligible

- Regional Observer Scheme (ROS 22/04) for vessels recorded in the IOTC Record of Authorised Vessels

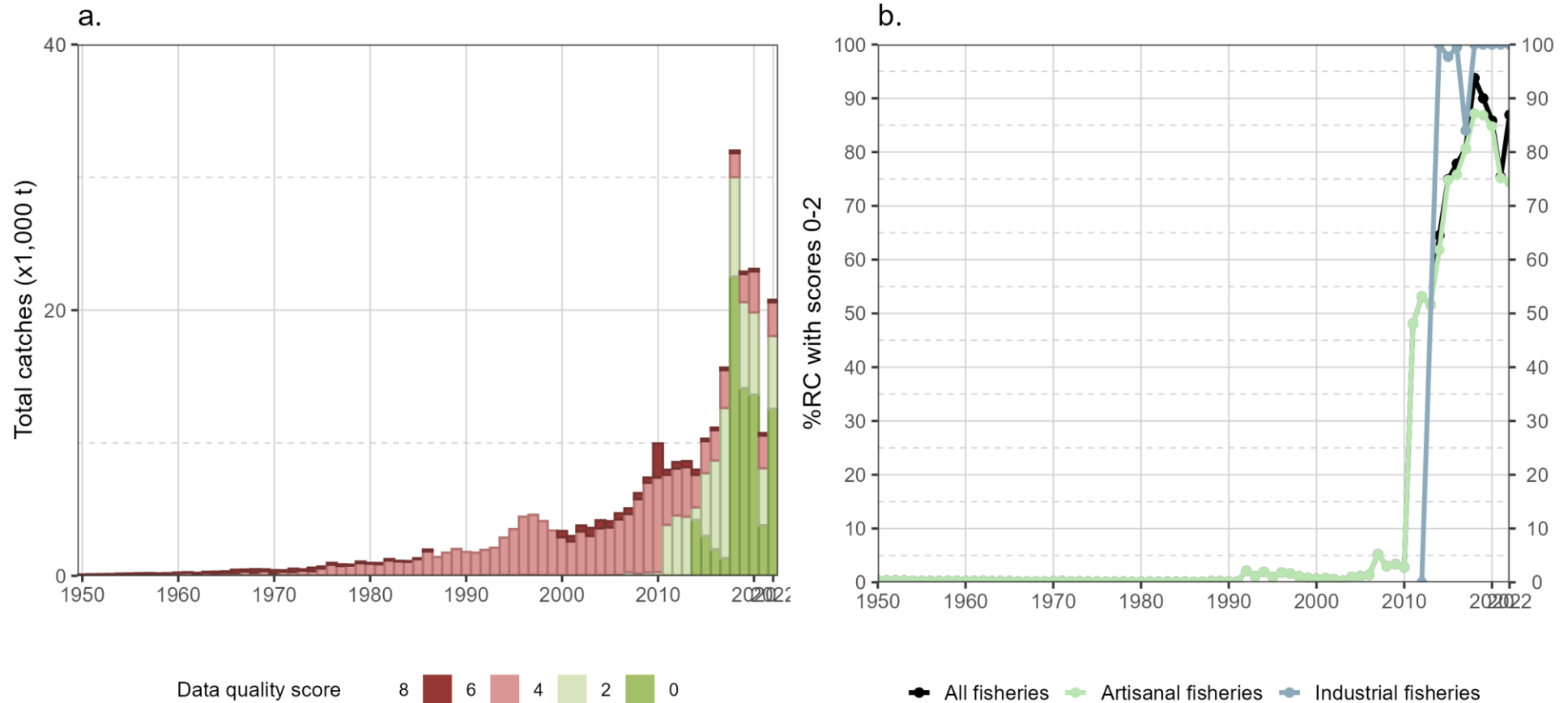- No routine estimation of IUU catches but some historical estimates

SEVERAL CHECKING AND PROCESSING STEPS

i.   Feedback/Requests to CPCs following data submissions

ii. Estimates of unreported catches from previous year/FAO data

iii. Data processing for some fisheries after endorsement by the SC (e.g., Moreno et al. 2012)

iv. Breakdown of species and gears based on past observations and proxy fleets

v.   Estimates of unreported catches (IUU) for some fleets from sale slips, landings, or processing factories (e.g., Herrera 2002)

vi. Historical catch reconstruction in collaboration with CPCs (e.g., IOTC Secretariat 2019)

ASSESSING DATA REPORTING QUALITY

Data set	Criterion	By species	By gear
Retained catch	Fully available	0	0
	Partially available	2	2
	Fully estimated	4	4
Catch and effort	Available according to standards	0	0
	Not available according to standards	2	2
	Low coverage (<30% logbooks)	2	
	Not available	8	
Size frequency	Available according to standards	0	0
	Not available according to standards	2	2
	Low coverage (<1 fish per tonne caught)	2	
	Not available	8	

EXAMPLE OF DATA REPORTING QUALITY ASSESSMENT

THE SEA AROUND US PROJECT

SAUP CATCH RECONSTRUCTION METHODOLOGY

Flowchart illustrating the Sea Around Us Project 7-step fisheries catch data reconstruction approach (Zeller et al. 2016)

THE CASE OF INDIAN OCEAN TUNA FISHERIES

- Estimates focused on the **large-scale industrial sector**, i.e., vessels >15 m operating active and passive gears in High Seas and EEZ waters

- **Small-scale artisanal sector**: Vessels <15 meters operating solely in domestic waters and using fishing gear that is not actively moved through the water column using engine power

- Breakdown of IOTC catches between industrial and artisanal sectors based on vessel size, type of gear used, and area of operation

- Catches from small-scale fisheries addressed *separately* through country-specific catch reconstructions of domestic EEZ fisheries

# ESTIMATION FOR INDUSTRIAL FISHERIES

- Five gear groups: longline, purse seine, gillnet, pole-and-line, and other miscellaneous gears

- Literature and observer studies to estimate unreported landed and discarded catch for each gear group

- Estimation of catch rates and discard-to-landings ratios assumed constant over space and time periods defined by "anchor points"

- Taxonomic composition of the estimated unreported landings and discards mostly derived from reported catch composition

- Average values of under-reporting and discarding rates applied for missing strata

# ADDITION OF UNREPORTED LANDINGS AND DISCARDSS
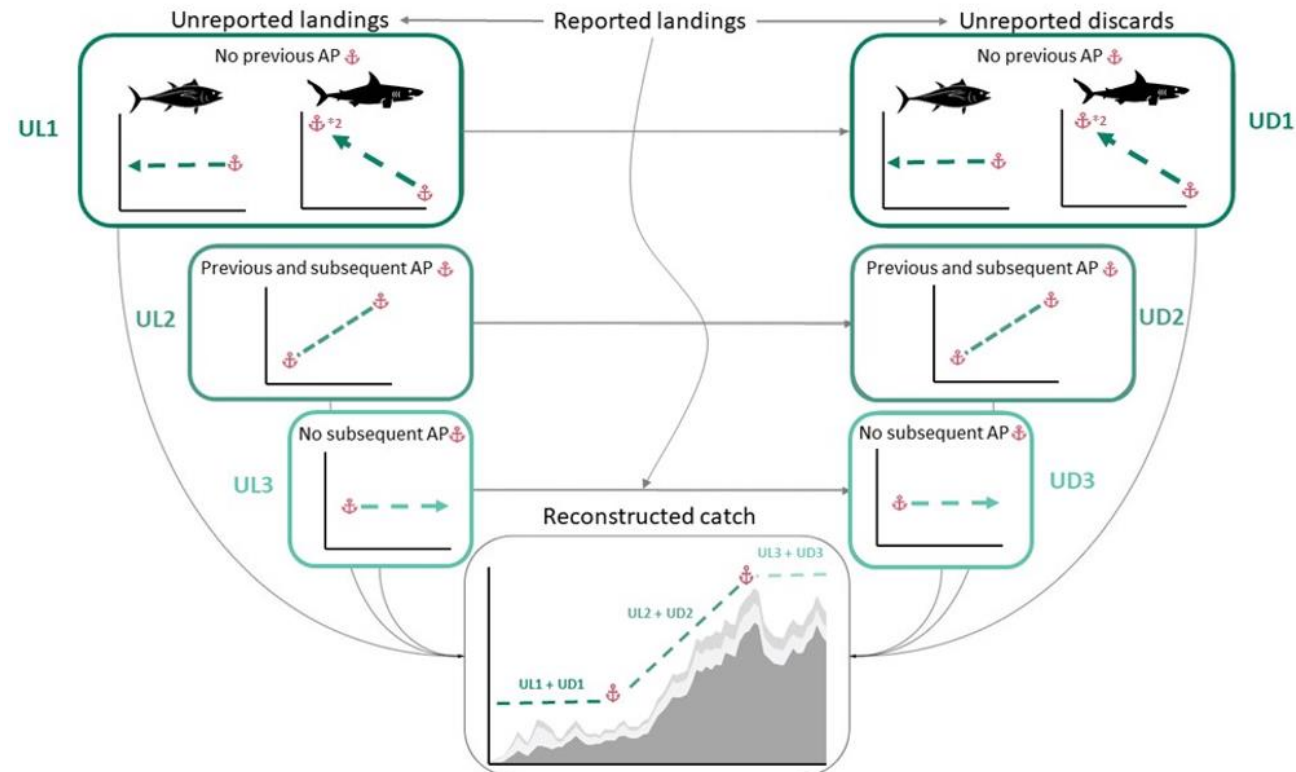
Total reconstructed industrial catches for the large pelagic fisheries in the Indian Ocean, 1950-2020. UL = unreported landings; UD = unreported discards; AP = anchor points (Heidrich et al. 2023)

CATCHES RECONSTRUCTED OVER 1950-2020
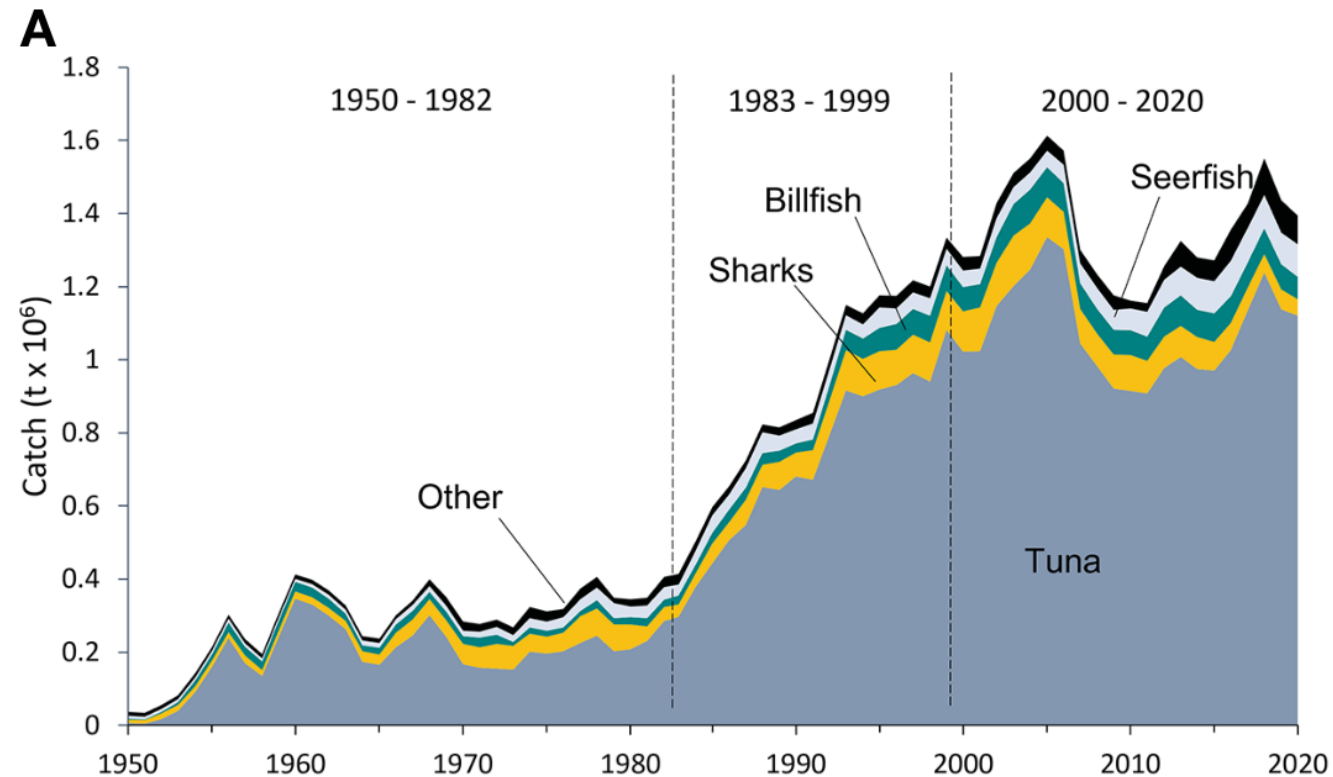
Total reconstructed large pelagic fisheries catches for the Indian Ocean by major species groups
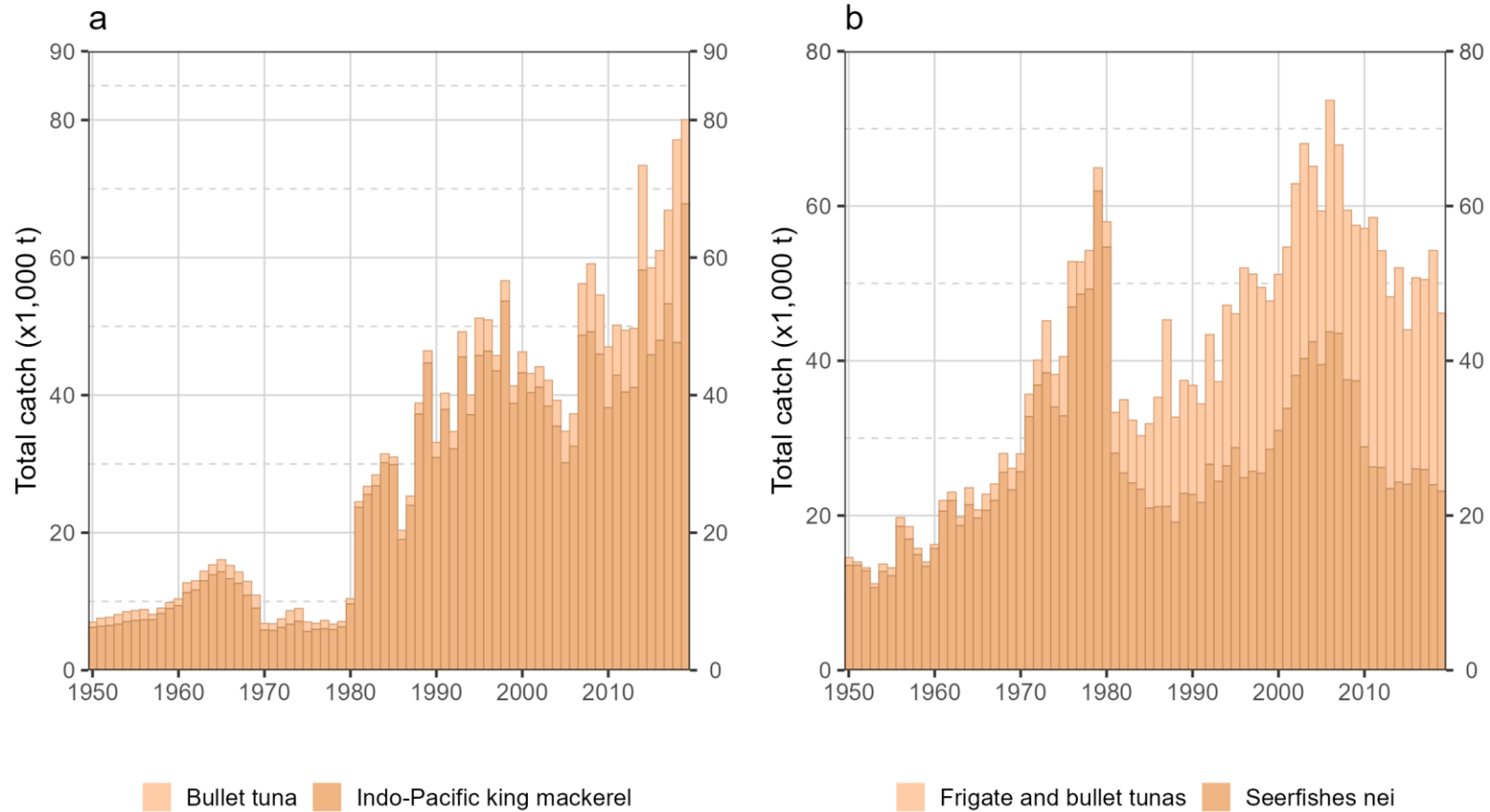
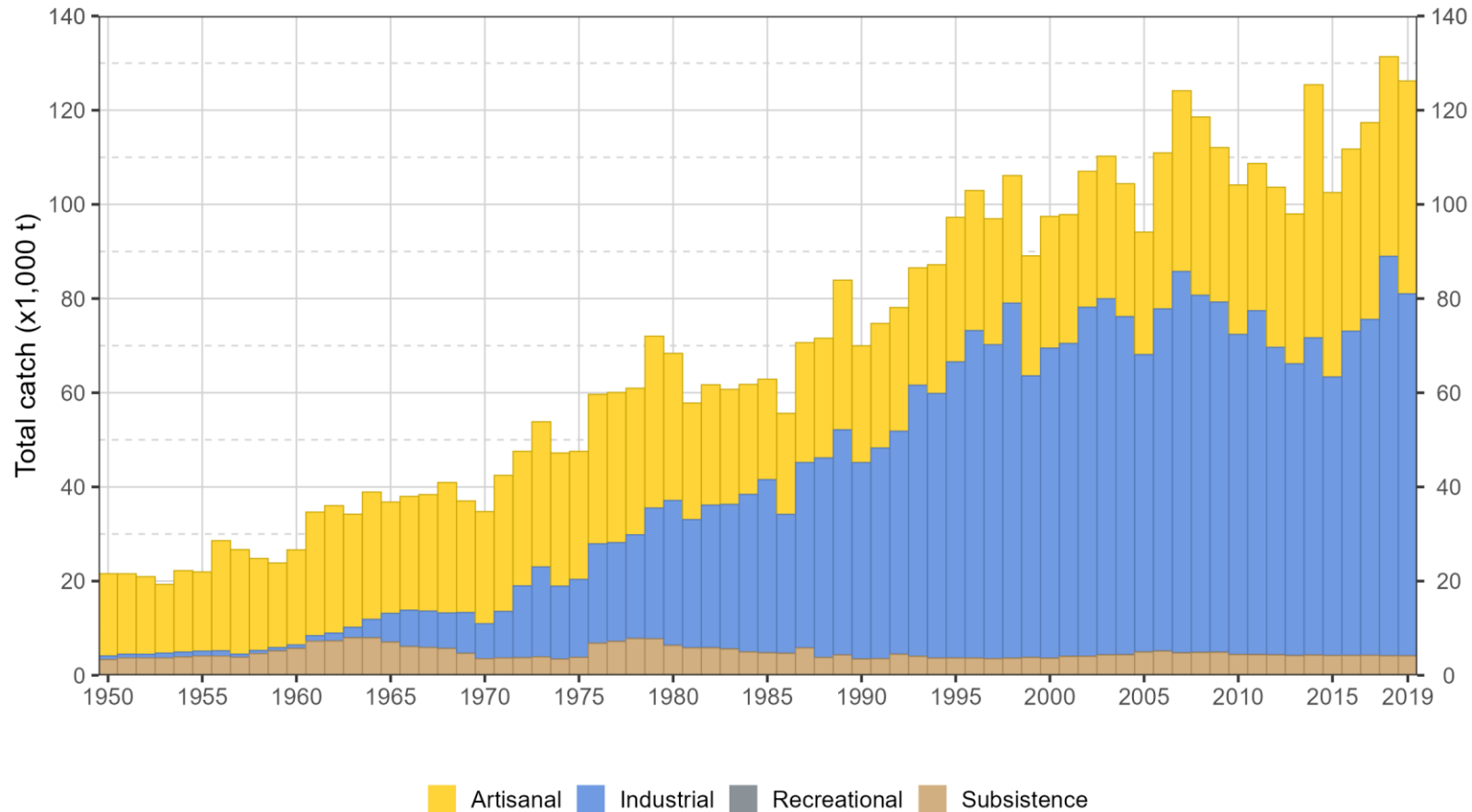# SUBSTANTIAL UNREPORTED LANDINGS AND DISCARDS
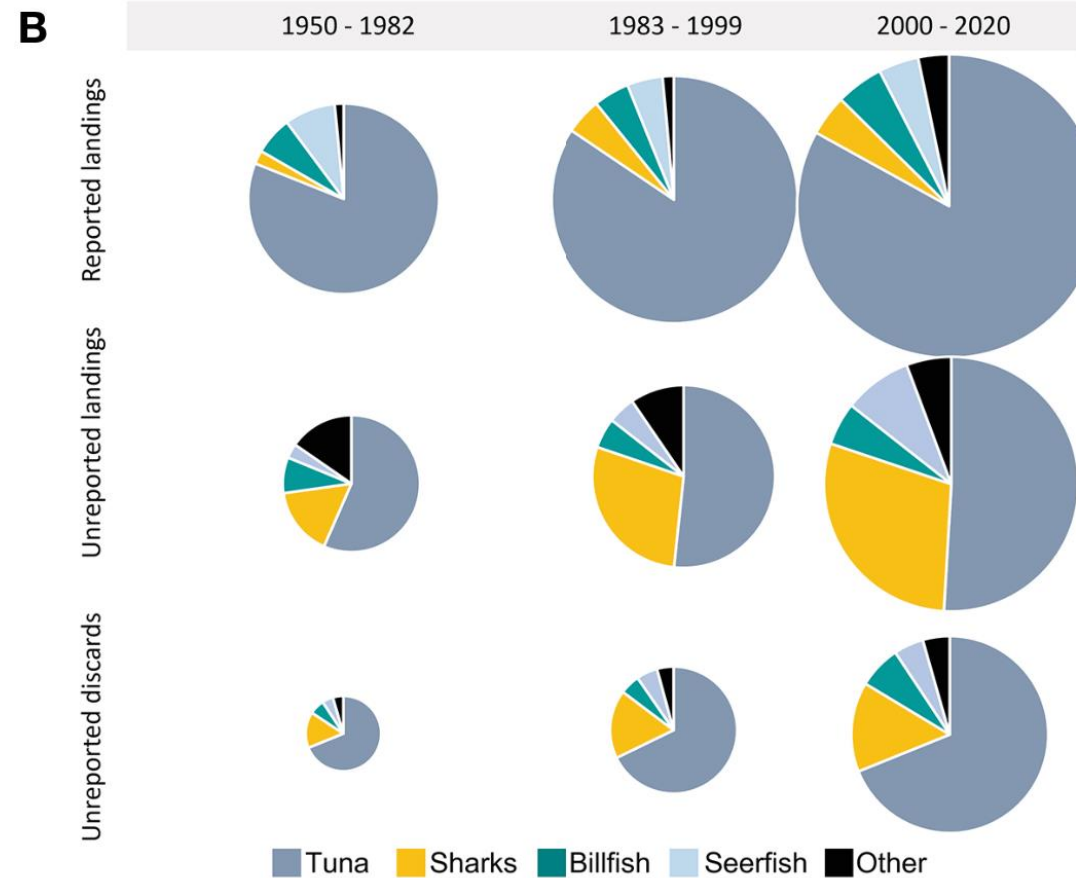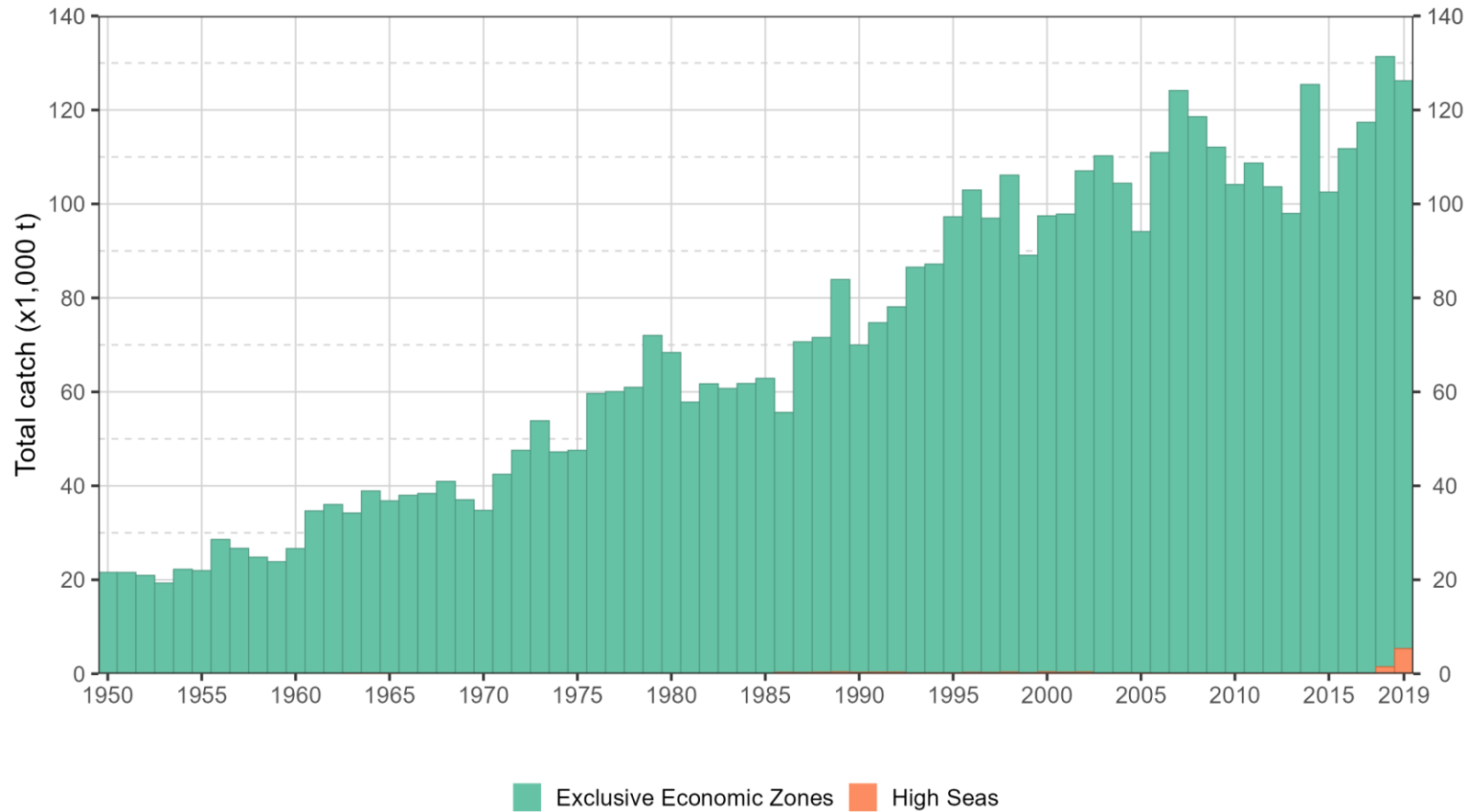
THE CASE OF NERITIC TUNAS AND SEERFISH

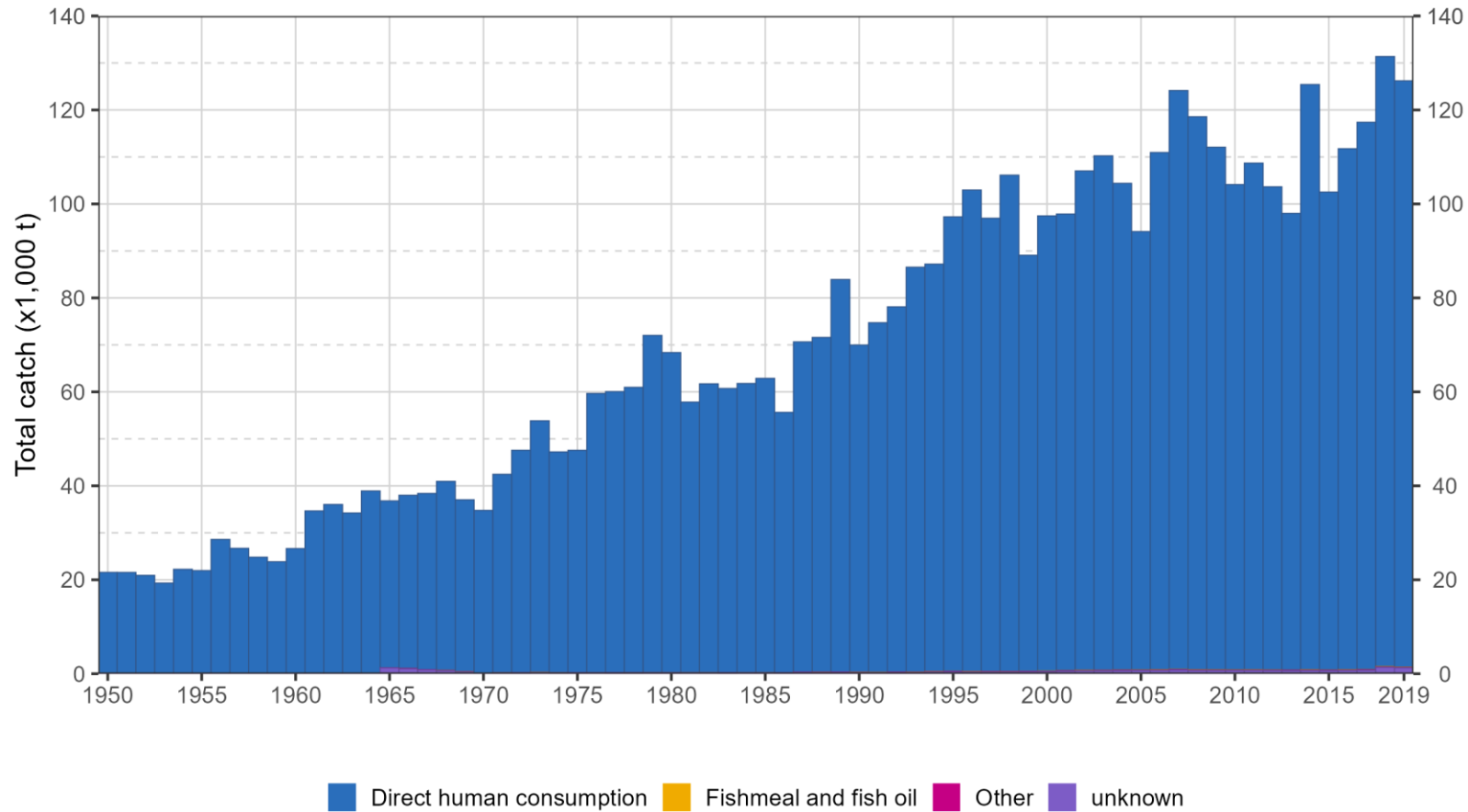# NERITIC CATCH DATA BY TAXON
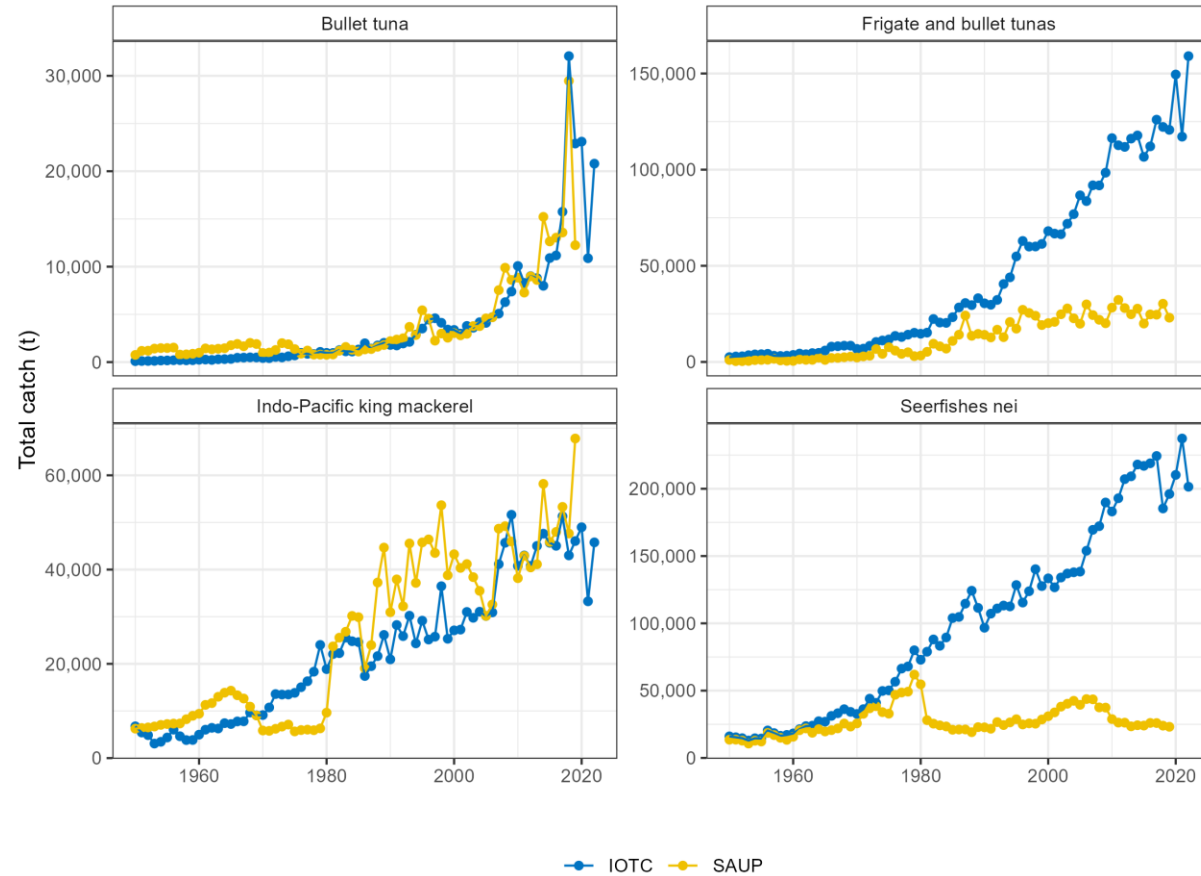
NERITIC CATCH DATA BY FISHING SECTOR

NERITIC CATCH DATA BY AREA TYPE

NERITIC CATCH DATA BY END USE TYPE

SUBSTANTIAL DIFFERENCES FOR KING MACKEREL

SOME CONCERNS ABOUT THE SAUP APPROACH

- No interaction with IOTC Secretariat and blatant errors in the manuscript (e.g., IOTC area, definitions)

- Data only provided for BLT and GUT and unclear about aggregates

- Major assumptions in SAUP catch reconstruction, e.g., species composition of discards similar to landings

- Several key publications and reports on bycatch and discards not used/mentioned in their publication

- Difficult to access the data and scripts producing the datasets, questioning transparency and reproducibility

- Lack of staff and concerns about future updates

IMPROVING AND DISSEMINATING DISCARD ESTIMATES

- Improved quality of discard estimates in industrial fisheries over time in relation with national and regional fisheries observer programs

- Some discard data now made available by ICCAT and WCPFC

- Data on discards need to be disseminated as a new dataset building on Form 1DI

- Develop and implement standard assessment of discards estimates through surveys with fishers in coastal fisheries

TOWARDS DATA QUALITY ASSESSMENT

Table 1. Data reliability 'scores' for evaluating the quality of time-series of reconstructed catches, with their approximate confidence intervals (IPCC criteria from fig. 1 of Mastrandrea *et al.* 2010).

Score	Data reliability	Uncertainty	Corresponding IPCC criteria
4	Very high	±10%	High agreement and robust evidence
3	High	±20%	High agreement and medium evidence *or* medium agreement and robust evidence
2	Low	±30%	High agreement and limited evidence *or* medium agreement and medium evidence *or* low agreement and robust evidence.
1	Very low	±50%	Low agreement and low evidence

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Zeller D, Ansell M, Andreoli V, Heidrich K (2023) Trends in Indian Ocean Marine Fisheries Since 1950: Synthesis of Reconstructed Catch and Effort Data. Marine and Freshwater Research 74:301–319.

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