



Food and Agriculture  
Organization of the  
United Nations



iotc ctoi

Indian Ocean Tuna Commission  
Commission des Thons de l'Océan Indien

# Collective Exercise on Work Protocols and Sampling Strategies for Tuna Purse-seine

## *IOTC ROS SFO TR16.1*

Category: Sampling strategies as a function of the IOTC fishery

*[IOTC ROS SFO TR16]*



CapMarine  
Capricorn Marine Environmental



# Exercise 1: Estimation of Catch and Catch Composition

## >> PROTOCOL 2 - UNSORTED CATCH / UN-ASSOCIATED SCHOOL

### Exhaustive Sample of Large Bycatch

N° of brails: 3 full + 2 ½ full + 4 ¼ full

Brail average weight: 5 t

**Estimate fishing event (set):**

- Target catch
- Catch composition (i.e. catch per species)
- Total catch

Species	No	Weight	Fate
Black Marlin	2	150Kg	Retained
Green Turtle	1	60Kg	Released
Oceanic White Tip Shark	3	250Kg	Released

### Sample of the Catch Obtained by Spill Method

Species	No	Weight	Fate
YFT	10	100Kg	Retained
BET	1	15Kg	Retained





## Exercise 1: Solution

$$\begin{aligned}\text{TARGET CATCH} &= [(N^{\circ} \text{ of brails} / \text{brail fullness}) \times (\text{Brail Av. Weight})] \\ &= [(3 \text{ full} + 2 \frac{1}{2} \text{ full} + 4 \frac{1}{4} \text{ full}) \times (5 \text{ t})] \\ &= 25 \text{ tons}\end{aligned}$$

1. Spp.	2. Fate	3. Sampling method	4. Number	5. Processing type	6. Weight value (v unit used)			7. Weight est. method
YFT	RET	Proportional (SPS)	NA	Round (RD)	22	Ton ✓	Kg	Brail (BR)
BET	RET	Proportional (SPS)	NA	Round (RD)	3	Ton ✓	Kg	Brail (BR)
TUG	DUD	Exhaustive (EXS)	1	Round (RD)	60	Ton	Kg ✗	Eye (EM)
OCS	DUD	Exhaustive (EXS)	3	Round (RD)	250	Ton	Kg ✗	Eye (EM)
BLM	RET	Exhaustive (EXS)	2	Round (RD)	150	Ton	Kg ✗	Eye (EM)

$$\begin{aligned}\text{TOTAL CATCH} &= \text{TARGET CATCH} + \text{BYCATCH} \\ &= 25,46 \text{ tons}\end{aligned}$$





## Exercise 2: Estimation of Catch and Catch Composition

### >> PROTOCOL 3 - SORTED CATCH/ASSOCIATED SCHOOL - CASE A

#### *Proportional sampling of small bycatch*

Species	N°	Weight (Kg)
<i>C. hippurus</i>	20	60
<i>A. thazard</i>	30	150
<i>E. affinis</i>	333	500
<i>C. maculatus</i>	150	40
<i>C. falciformis</i>	3	30

#### *Exhaustive sampling of large bycatch*

Species	N°	Weight (Kg)
Black Marlin	2	200
Stripped Marlin	3	200
Green turtle	1	60
Oceanic White tip shark	2	150
Manta Ray	1	150

**Estimate fishing event:**

**A. Bycatch species composition**

**B. Fill in set catch composition table**

Well No	Species	Tons
3	SKJ	36
4	YFT	22
5	YFT	42
6	BET	10

- Total estimated bycatch weight given by the Factory manager = 5000Kg



## Exercise 2 (continued)

### A. Calculate set bycatch species composition

- Calculate % of each species on the sample.
- Raise it to the total bycatch volume using value given by Factory Manager
- Cross-check if correct by adding weight per species. Total should correspond to the total bycatch value given by Factory Manager.

### B. Fill in set catch composition table

1. Spp.	2. Fate	3. Sampling method	4. Number	6. Weight value (√ unit used)			7. Weight est. method
					Ton	Kg	
					Ton	Kg	
					Ton	Kg	





## Exercise 2: Solution

### A. Calculate set bycatch species composition

Species	Sample (Kg)	% Spp on sample	Spp bycatch value	Unit
C. hippurus	60	8%	385	Kg
A. thazard	150	19%	962	Kg
E. affinis	500	64%	3205	Kg
C. maculatus	40	5%	256	Kg
C. falciformis	30	4%	192	Kg
Total	780	100%	5000	Kg





## Exercise 2: Solution (continued)

### C. Set catch composition

1. Spp.	2. Fate	3. Sampling method	4. Number	6. Weight value (√ unit used)			7. Weight est. method
SKJ	RET	Vessel estimates (VES)	NA	36	Ton		Vessel logbook
YFT	RET	Vessel estimates (VES)	NA	64	Ton		Vessel logbook
BET	RET	Vessel estimates (VES)	NA	10	Ton		Vessel logbook
C. hippurus	RET	Proportional (SPS)	NA	385		Kg	Calculation
A. yazard	RET	Proportional (SPS)	NA	962		Kg	Calculation
E. affinis	RET	Proportional (SPS)	NA	3205		Kg	Calculation
C. maculatus	RET	Proportional (SPS)	NA	256		Kg	Calculation
C. falciformis	DUS	Proportional (SPS)	NA	192		Kg	Calculation
Black Marlin	RET	Exhaustive (EXS)	2	200		Kg	Eye measurement
Stripped M.	RET	Exhaustive (EXS)	3	200		Kg	Eye measurement
Green turtle	DUD	Exhaustive (EXS)	1	60		Kg	Eye measurement
White tip S.	DUD	Exhaustive (EXS)	2	150		Kg	Eye measurement
Manta ray	DUD	Exhaustive (EXS)	1	150		Kg	Eye measurement





## Exercise 3: Correcting the Discards / Bycatch Composition Estimations following Shifting

*Proportional sampling of small bycatch during shifting*

Species	N°	Weight (Kg)
<i>C. hippurus</i>	5	13
<i>A. thazard</i>	10	50
<i>E. affinis</i>	100	150
<i>C. maculatus</i>	30	10

Total estimated bycatch weight given by the Factory manager for the set in question= 5000Kg

When in possession of this data extrapolate the volume of each species present in the discards/bycatch sample to the total estimated discards/bycatch for the set given by the Factory Manager. Add it to the sample previously taken and estimate set discards/bycatch per species.

If the sample is exhaustive, don't extrapolate





## Exercise 3: Correcting Discards/Bycatch Composition following Shifting

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### *Exhaustive sampling of large bycatch*

Species	N°	Weight (Kg)
Black Marlin	2	200
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Manta Ray	1	150

Well No	Species	Tons
3	SKJ	36
4	YFT	22
5	YFT	42
6	BET	10

### *Proportional sampling of small bycatch during shifting*

Species	N°	Weight (Kg)
<i>C. hippurus</i>	30	80
<i>A. thazard</i>	10	50
<i>C. maculatus</i>	30	10



- Total estimated bycatch weight given by the Factory manager = 5000Kg



## Exercise 3 (continued)

### A. Re-calculate set bycatch species composition taking into account the sample collected during shifting.

- Combine samples
- Calculate % of each species on the combined sample.
- Raise it to the total bycatch volume using value given by Factory Manager
- Cross-check if correct by adding weight per species. Total should correspond to the total bycatch value given by Factory Manager.

1. Spp.	2. Fate	3. Sampling method	4. Number	6. Weight value (√ unit used)			7. Weight est. method
					Ton	Kg	
					Ton	Kg	
					Ton	Kg	





## Exercise 2: Solution

### A. Calculate set bycatch species composition

Species	Sample (Kg)	% Spp on sample	Spp bycatch value	Unit
C. hippurus	140	13%	667	Kg
A. thazard	200	19%	952	Kg
E. affinis	500	48%	2381	Kg
C. maculatus	180	17%	857	Kg
C. falciformis	30	3%	143	Kg
Total	1050	100%	5000	Kg





## Exercise 3 - Solution (continued)

1. Spp.	2. Fate	3. Sampling method	4. Number	6. Weight value (√ unit used)			7. Weight est. method
SKJ	RET	Vessel estimates (VES)	NA	36	Ton		Vessel logbook
YFT	RET	Vessel estimates (VES)	NA	64	Ton		Vessel logbook
BET	RET	Vessel estimates (VES)	NA	10	Ton		Vessel logbook
C. hippurus	RET	Proportional (SPS)	NA	667		Kg	Calculation
A. yazard	RET	Proportional (SPS)	NA	952		Kg	Calculation
E. affinis	RET	Proportional (SPS)	NA	2381		Kg	Calculation
C. maculatus	RET	Proportional (SPS)	NA	857		Kg	Calculation
C. falciformis	DUS	Proportional (SPS)	NA	143		Kg	Calculation
Black Marlin	RET	Exhaustive (EXS)	2	200		Kg	Eye measurement
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Green turtle	DUD	Exhaustive (EXS)	1	60		Kg	Eye measurement
White tip S.	DUD	Exhaustive (EXS)	2	150		Kg	Eye measurement
Manta ray	DUD	Exhaustive (EXS)	1	150		Kg	Eye measurement



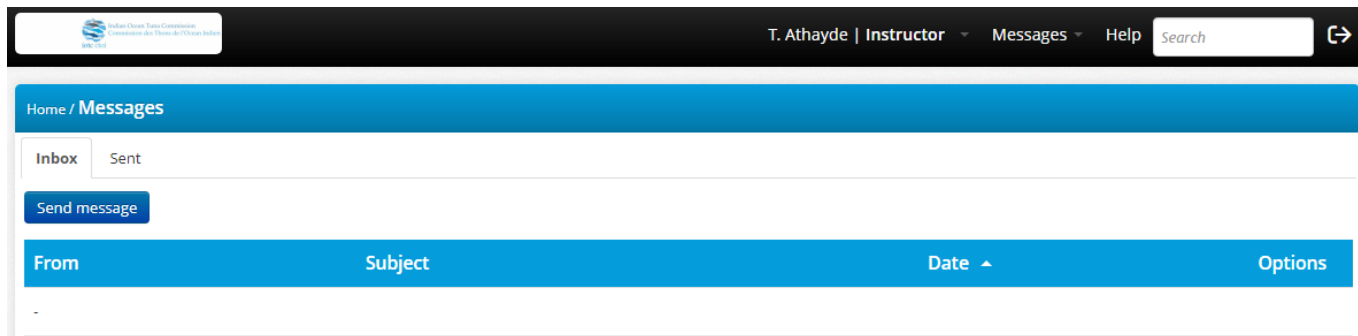


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# ANY QUESTIONS?



***send us a message via Talents LMS***



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