Bycatch management in IOTC fisheries

Sarah Martin and Umair Shahid Multi-taxa Bycatch Mitigation Workshop, August 2022 <u>IOTC-2021-WPEB17(AS)-24</u>





Bycatch CMMs: Objectives

1. Mortality reduction

- 2. Data improvements
- 3. Research needs



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

RESOLUTION 13/06 ON A SCIENTIFIC AND MANAGEMENT FRAMEWORK ON THE CONSERVATION OF SHARK SPECIES CAUGHT IN ASSOCIATION WITH IOTC MANAGED FISHERIES (will enter into force on 14 September 2013)

The Indian Ocean Tuna Commission (IOTC),

RECALLING IOTC <u>Resolution 05/05</u> concerning the conservation of sharks caught in association with fisheries managed by IOTC;

NOTING that the IOTC Working Party on Ecosystems and Bycatch (WPEB) recognised that full stock assessments on sharks may not be possible because of data limitations and that it is essential that some stock assessment evaluation should be carried out;

NOTING that the IOTC Scientific Committee advises that maintaining or increasing fishing efforts for certain shark species will probably result in further declines in biomass, productivity and CPUE;

NOTING that the ecological risk assessment (ERA) by fishing gears made by the IOTC Scientific Committee

Mortality reduction: retention bans Where can we still expect mortality?

Continued retention	Non-compliance Exemptions	Fn Fa
Discarding	At-vessel mortality Post-release mortality	Fc Fr

 $F = F_n + F_a + F_c + F_r + \varepsilon$

Noncompliance



Fleet	National ban
Comoros	2021? (N/A)
I.R. Iran	2010
Sri Lanka	2015
Indonesia	2014
India	2004
Maldives	2010
Seychelles	2014
Tanzania	2020
EU, Spain	2013
EU, France	2013
(Reunion)	
Pakistan	2016

Fleet	National ban
Indonesia	2012
Pakistan	2016
Madagascar	2014
Sri Lanka	2012
India	2004
Maldives	2010
EU, Portugal	2010
EU, France Reunion	2010
Seychelles	2014
EU, Spain	2010
South Africa	unknown
Tanzania	2020

Exemptions

Artisanal fisheries (vessels <24m operating exclusively in the EEZ)

Proportion of captures by artisanal fleets

- 17 fleets: 2000 2010 (Murua et al. 2013)
- 53 fleets: 2014 2016 (Garcia and Herrera, 2018)

Artisanal component of fishery	Oceanic	Bigeye
	whitetip	thresher
Murua et al., 2013	58.6 %	56.9 %
Garcia and Herrera, 2018	64.6 %	63.6 %

At-vessel mortality & Post-release mortality

Gear	Fishery	Ocean	AVM (%)	n	PRM (%)	n	Reference
Oceanic whitetip (Carcharhinus longimanus)							
LL	swordfish	Indian	58.9	17			(Poisson et al., 2010)
LL	swordfish	Indian	50	28			(Coelho, 2016)
LL	swordfish	Atlantic	27.5	131			(Beerkircher, Cortés and Shivji, 2002)
LL	swordfish	Atlantic	34.2	281			(Coelho et al., 2012)
LL	swordfish or tuna (mixed)	Atlantic	25.7	213			(Gallagher et al., 2014)
LL	Swordfish, tunas, dolphinfish. sharks	Atlantic	11	10847			(Dapp et al., 2016)
LL	tuna	Pacific	15	26			(Boggs, 1992)
LL	research LL vessel	Pacific	5.3	19	0	13	(Musyl et al., 2011)
LL	tuna	Pacific	33.6	33	8.3	24	(Hutchinson and Bigelow, 2019)
LL	tuna	Pacific			33.3	6	(Hutchinson and Bigelow, 2019)
LL	Tuna and swordfish	Indian Ocean			0	3	(Bach et al., 2019)
PS	tuna	Indian Ocean			8.3	12	(Bach et al., 2019)
Bigeye	thresher (Alopias supercilios	us)					
LL	swordfish/albacore	Mediterranean	0	1			(Megalofonou et al., 2005)
LL	swordfish	Atlantic	53.1	81			(Beerkircher, Cortés and Shivji, 2002)
LL	swordfish	Indian	68.4	19			(Coelho, Lino and Santos, 2011)
LL	swordfish	Atlantic	50.6	1061			(Coelho et al., 2012)
LL	swordfish or tuna (mixed)	Atlantic	51.7	367			(Gallagher et al., 2014)
LL	Swordfish, tunas, dolphinfish. sharks	Atlantic	17	13227			(Dapp et al., 2016)
LL	tuna	Pacific	28.9	28	12.5	24	(Hutchinson and Bigelow, 2019)
LL	research LL vessel	Pacific	25	12	0	3	(Musyl et al., 2011)
LL		Pacific			50	2	(Hutchinson et al., 2015)
LL	swordfish and tuna(mixed)	Indian			41	17	(Romanov et al., 2020)

	OCS	BTH
At-haulback mortality	0.12 (0.11 - 0.13)	0.21 (0.20 - 0.21)
Post-release mortality	0.09 (0.02 - 0.16)	0.24 (0.13 - 0.37)

How much mortality reduction can we expect from CMMs 13/06 & 12/09?



^[1] Murua et al., 2013 ^[2] Garcia and Herrera, 2018

Whale sharks (13/05) *Rhincodon typus*

	GN	PS	LL
Threat level/interactions	high	high	low
Non-compliance	?	?	?
Exemption	artisanal	artisanal	artisanal
AVM	high	low	-
PRM	-	low	-
Mitigation measures	no	yes	no



Key area for improvement

Develop mitigation methods for gillnets

Turtles (12/04)

	GN	PS	LL
Threat level/interactions	high	low	high
Non-compliance	?	?	?
Exemption	artisanal	artisanal	artisanal
AVM	low	low	low
PRM	can be high	can be high	can be high
Mitigation measures	some (19/01)	some	no



Key area for improvement

Implement best practice handling and release methods

Cetaceans (13/04)

	GN	PS	LL
Threat level/interactions	very high – small cetaceans	low - accidental setting on large whales	low - depredation
Non-compliance	?	?	?
Exemptions	artisanal	artisanal	artisanal
AVM	high	low	-
PRM	-	low	-
Mitigation measures	some (19/01)	yes	no



Key area for improvement

Development of mitigation measures for gillnets

Mobulids (19/03)

	GN	PS	LL
Threat level/interactions	high	low	medium
Non-compliance	?	?	?
Exemptions	subsistence	subsistence	subsistence
AVM	high	medium	low
PRM	-	-	-
Mitigation measures?	some	some	some



Key areas for improvement

- Development of mitigation measures for gillnets and purse seine fleets
- Evaluate best practice handling and release methods through tagging

Recommendations: mortality reduction

- Consider the ecological and biological traits of species
- Support retention bans with mitigation measures
- Develop approaches to reduce AVM and PRM rates
- Consider exemptions more closely
- Performance standards
- Precautionary approach

Recommendations: ecosystem considerations

Multi-taxa approaches

- Mitigation measures
- Gillnet fisheries

Social and economic impacts

- Review to determine scale of impacts
- Other solutions to mitigate disproportionate impacts

Recommendations: management approaches (Squires et al. 2021) Direct top-down management

Performance standards create best incentives

Market based measures

Strong incentives but industrial focus

Intrinsic motivation

- Can be successful for small-scale and industrial fleets
- Active involvement of fishers

Hybrid of approaches

Recommendations: data reporting & research

- Increase consistency in CMM data requirements
- Review and update the list of bycatch species in Res.15/01
- Develop finer-scale classifications of artisanal fisheries (e.g. FAO, 2020)