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Commission des Thons de l'Océan Indien

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# Fisheries management

*IOTC ROS SFO TR1*



This module aims to provide Observers with the required knowledge on the:

- ✓ basic concepts of fisheries management,
- ✓ the usage of observer programs in fisheries management, and
- ✓ IOTC fisheries concepts relevant to scientific observer work

Candidates performance on this training module will be evaluated based on their understanding of the concept of target species; bycatch species; non-target species, retained catch, discarded catch, overfishing, FAD, associated and free school, improper for human consumption as defined by the IOTC.



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# Basic concepts of fisheries management and IOTC specificities

*IOTC ROS SFO TR1.1*

Category: Fisheries management

*[IOTC ROS SFO TRI]*



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## BASIC CONCEPTS OF FISHERIES MANAGEMENT

### What is a “Fishery”?

*A fishery is an organized effort by humans to catch fish or other aquatic species, an activity known as fishing.*

Depending on the scale, degree of sophistication of gears, and on the method of fishing used, fisheries can be subdivided into:



- *artisanal;*



- *semi-industrial; and*



- *Industrial fishing*





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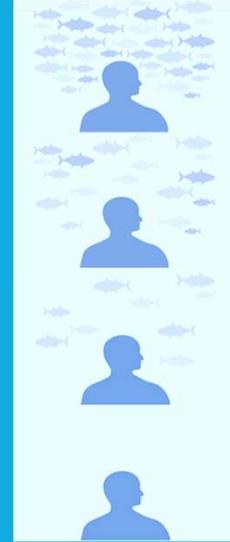


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## BASIC CONCEPTS OF FISHERIES MANAGEMENT

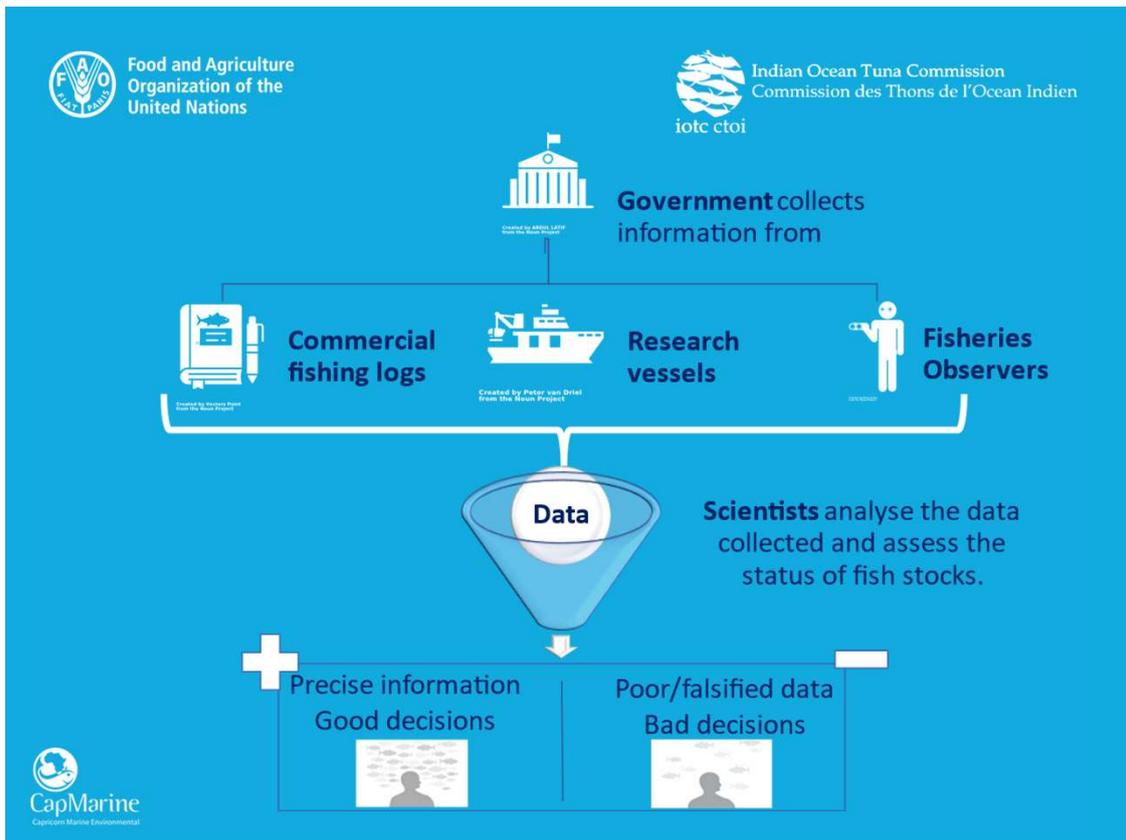
Initially it was assumed that fish was unlimited, this conducted to:

1. Overfishing
2. Smaller catches
3. Smaller fish
4. Impacts of fishing on the ecosystem
5. economic impacts
6. social effects



Unlike trees, which can be counted, fish are effectively invisible. Initially it was thought that the resources of the sea were unlimited and fishing was done without control. Over time, the reduction in catches and in the average size of the fish made it possible to highlight problems of:

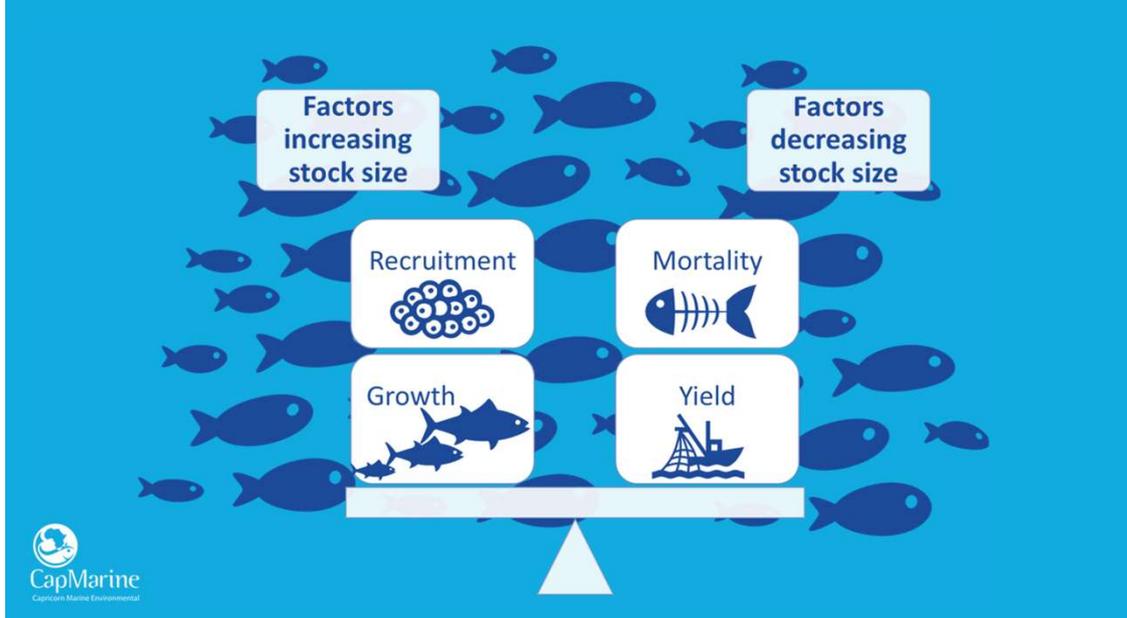
- overfishing;
- the impacts of fishing on the ecosystem; and
- economic and social impacts.



- In order to improve knowledge on the catches, size and distribution of fish populations, governments (Ministries of Fisheries), universities, public research, and private and international research companies collect information through the use of commercial fishing logs, research vessels, or the deployment of Fisheries Observers.
- Scientists use statistical methods and models to analyse the data collected and assess the status of fish stocks.
- These assessments require precise information since poor or falsified data can have an extremely serious impact on the management of a certain fishery and may lead to erroneous decisions in the implementation of Fishery Management.



## What is “Fishery Research”?



Fisheries studies allows us to understand factors that influence fish populations biomass positively such as recruitment and growth, or negatively such as natural mortality and yield (fishing mortality). Scientists use statistical methods and models to analyse the data collected and assess the status of fish stocks. Based on this studies governments create policies & regulations to manage fisheries and RFMOs (such as the IOTC) create conservation and management measures (CMM) to manage fisheries sustainably. These assessments require precise information. Poor or falsified data can have an extremely serious impact on the management of a certain fishery and may lead to erroneous decisions in the implementation of the rules of "Fishery Management".



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## BASIC CONCEPTS OF FISHERIES MANAGEMENT

### What is “Fisheries Science”?

*It's the academic discipline of understanding and managing fisheries. It focuses on the different modes of exploitation and management of living species in all aquatic environments.*

It takes into consideration:

- the availability of fish to catch (*overfishing*);
- development of *sustainable fisheries*;
- the *management of the resource* or even its restoration;
- *fisheries management* (economic impact) and
- the *impact of fishing on the environment*, such as by-catch.



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## BASIC CONCEPTS OF FISHERIES MANAGEMENT

### What is "Fisheries Management"?

*Fisheries management involves regulating when, where, how, and how much fishermen are allowed to catch to ensure that there will be fish in the future.*



POLICIES and REGULATIONS tools for managing fisheries can include:

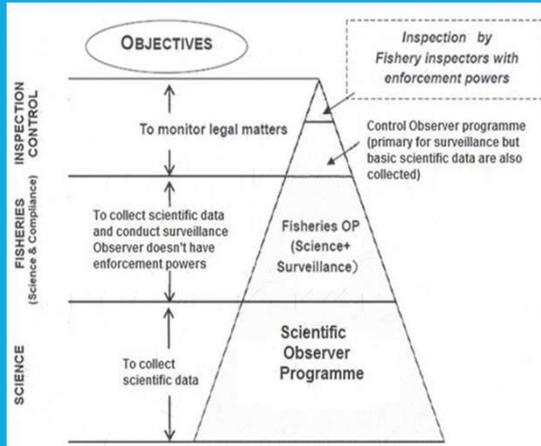
- Authorized gear
- Zone and / or period closures
- Size limitation
- Landing obligation
- Quotas
- Capacity limitations
- Bycatch solutions or reduction measures
- Economic measures



Fisheries management is often referred to as a governmental system of management rules based on defined objectives and a mix of management means to implement these rules. In most countries, fisheries departments are responsible for fisheries management within their "Exclusive Economic Zone" (EEZ) and use POLICIES and REGULATIONS as tools for managing their fisheries. International agreements are also required to regulate fisheries taking place in areas outside national control known as high seas areas. These are undertaken by Regional Fisheries Management Organisations (RFMOs).



# OBSERVER PROGRAMS IN FISHERIES MANAGEMENT



## Observer Programmes include:

- 1) Control programmes
- 2) Fisheries programmes (science and compliance)
- 3) Scientific programmes.



There are some fundamental differences in the objective and legislative mandate of each of these programmes that include differences in the role, appointment, training, responsibilities and tasks on-board between compliance officers/inspectors, controllers, fisheries observers (science and surveillance) and scientific observers.



## Control Programmes

**Objective:** enforce fishery governance and monitor fisheries from a legal aspect.

**Inspection programmes** - reporting on adherence to compliance measures stipulated in licence conditions.

**Control programmes** - collect control data and fisheries data.

### Controllers

1. Power to prosecute
2. Discourage illegal fishing
3. Monitor IUU fishing
4. Sworn under oath during appointment
5. Collect specific evidence that can lead to prosecution



Fisheries Inspectors (also called compliance officers) and controllers are appointed by the countries fisheries authorities and have a legal mandate to enforce the fisheries laws of the country. Inspectors are also referred to as Fishery Control Officers (FCO) and are not therefore defined as Observers herein. Compliance observers (also called controllers) are deployed onto vessels for the duration of the trip to report on adherence to compliance measures stipulated in licence conditions, and also collect fisheries data. *Controllers* generally do not have the power to arrest a vessel at sea and have it return to port.

Note that Observers to be deployed in the context of the IOTC ROS are not expected to fill a role of compliance, however they may be asked to observe compliance matters.



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## Fisheries Observers Programmes (Science & Compliance)

**Objective:** collect fisheries information at sea (mainly catch and effort), can also collect information on fishery impacts on other marine fauna.

### Fisheries observers

1. Collect independent fisheries information data at sea (mainly catch and effort)
2. Monitoring and reporting on the environmental impacts of the fishery
3. Have no powers to enforce or arrest



Fisheries Observers are independent specialist, deployed on-board commercial fishing vessels in accordance with a national or regional mandated. ). Fisheries Observers do not have any powers to enforce or arrest. While they may report on compliance issues, they have no legal mandate to enforce these. Fisheries Observers have the primary objective to collect fisheries information at sea (mainly catch and effort). Additional tasks often include monitoring and reporting on the environmental impacts of the fishery on other marine fauna such as bycatch, seabird, marine mammals and, Endangered, Threatened and Protected (ETP) species.



## Scientific Observer Programmes

**Objective:** collect scientific data required for fisheries management (catch, bycatch, discards, effort information and biometrics).

### Scientific observers

1. Collect scientific independent data for fisheries management
2. Accurate data on catch, bycatch, discards and effort
3. Biometric sampling: length-frequency, weight, sex, maturity stage
4. Biological sampling: collection of samples (stomach content, otoliths, etc.)

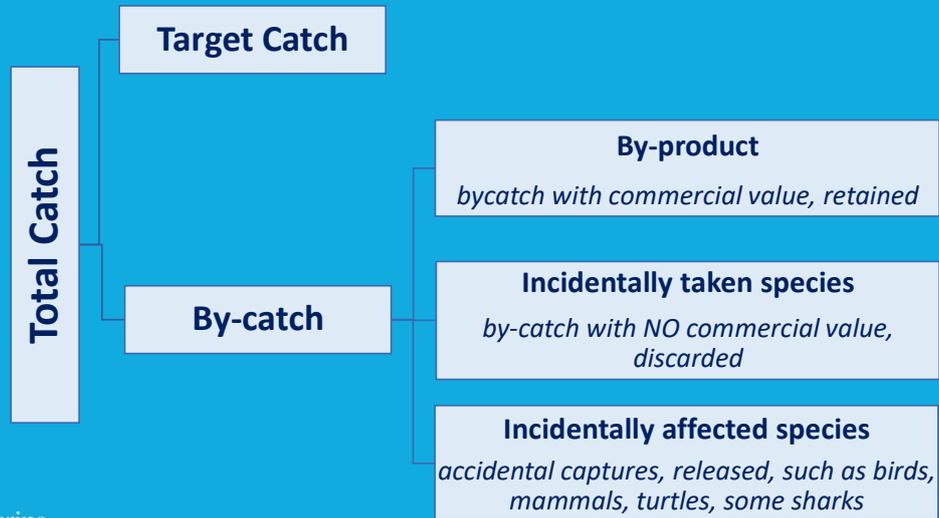


Scientific Observers strictly collect scientific data required for fisheries management. A scientific Observer also records catch, bycatch, discards and effort information but in addition, conducts biometric and biological sampling.

The accuracy of data collected by Scientific Observers is of paramount importance to the success of good fisheries management. Inadequate or falsified data are at the root of poor fisheries management measures and can have a very serious impact on decisions made by scientists on fisheries management. Thus, falsifying data is much more serious than not recording it.



## IOTC FISHERIES CONCEPTS RELEVANT TO OBSERVER WORK



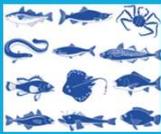
Certain fisheries concepts vary from country to country and sometimes even in country, from one organisation to another. Here we list IOTC fisheries concepts relevant to Scientific Observer.



## TARGET and BYCATCH SPECIES



**Target species :** A species that is, or has been, specifically targeted and is, or has been, a significant component of a fishery. The target species will be listed in the permit provided by its flag.



**Bycatch species:** All species, other than the 16 species listed in Annex B of the IOTC Agreement, caught or interacted with by fisheries for tuna and tuna-like species in the IOTC area of competence.

Includes those non-IOTC species which are (a) retained (by-product), (b) incidentally taken and returned to the sea (discarded); or (c) incidentally affected.





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## BYCATCH SPECIES



**By-product:** Bycatch with commercial value. These can be sent to the kitchen, prepared by crew members, given to dockers, discarded, sold to specialized companies.



### **Incidentally taken species**

Bycatch of no commercial value, no commercial interest, not marketable for reasons of size (immature, juvenile), prohibited from fishing, or from being hauled on-board.



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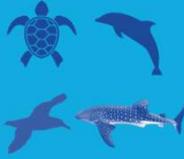
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## BYCATCH SPECIES



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**Incidentally affected species:** Bycatch species that accidentally interact with gear in the fishery, that are not taken but released to the sea (cetaceans, turtles, birds, etc.). Some of these species may be considered protected, endangered or threatened (PET).

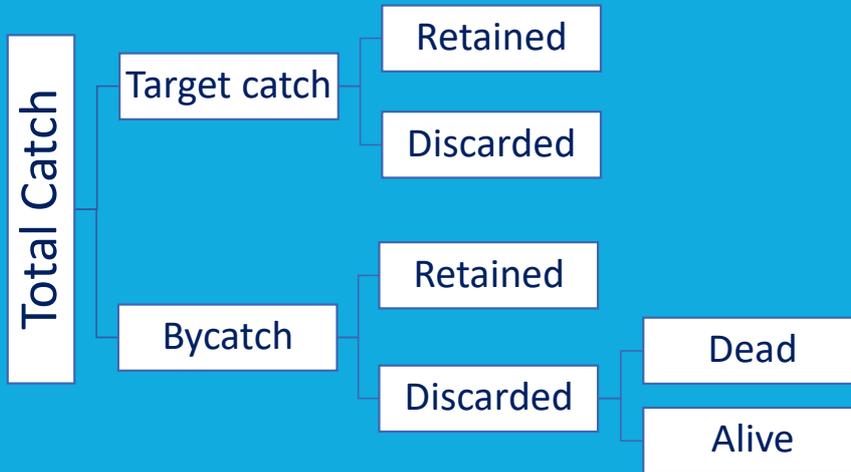
**IOTC Species of Special Interest (SSI):** Include all cetacean, seabirds and turtles, shark species with a retention ban (whale sharks, oceanic white tip and thresher sharks), and certain billfish species (striped, black and blue marlin and Indo-Pacific sailfish).

### **IOTC Species of Special Interest (SSI)**

Species of Special Interest include all marine turtles, all marine mammals, all seabirds, shark species with a retention ban: whale sharks (Res 13/05), oceanic white tip sharks (Res 13/06) and thresher sharks (Res 12/09.); and billfish species included in Res 18/05: striped, black and blue marlin and Indo-Pacific sailfish (IOTC–2018–SC21–R[E]).



## IOTC FISHERIES CONCEPTS





## RETAINED CATCH versus DISCARDED CATCH



### Retained catch

Any part of the catch (target or bycatch) that is retained on-board. It can be sent to the kitchen, prepared by crew members, given to dockers or sold to specialized companies.

### Discards

Any part of the catch (target or bycatch) that is returned to the sea, whether dead or alive.





## FISH AGGREGATING DEVICE (FAD)



### Fish aggregating device (FAD)

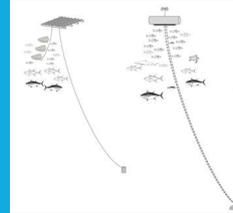
Anchored, drifting, floating, swimming or submerged object or group of objects, of any size, that has or has not been deployed, that is living or non-living, including but not limited to buoys, floats, netting, webbing, plastics, bamboo, logs, whales and whale sharks that fish may associate with.



## FISH AGGREGATING DEVICE (FAD)

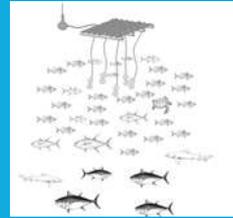
### AFAD

Anchored Fish Aggregating Device (AFAD). Any 'FAD' which is anchored to the substratum.



### DFAD

Drifting fish aggregating device (DFAD). Any 'FAD' which is not anchored to the substratum, but left to drift freely in ocean currents.





## FREE SCHOOL VS ASSOCIATED SCHOOL

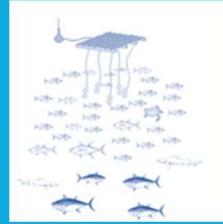
### Free-school

A school of fish which are not associated with any object (FAD).



### Associated school

A school of fish which is associated with an object (FAD).





## UNFIT FOR HUMAN CONSUMPTION



Unfit for  
human  
consumption



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### Unfit for human consumption

- Fish that is meshed or crushed
- Fish that is damaged due to depredation
- Fish that has died and spoiled where a gear failure has prevented both the normal retrieval of the gear and catch, and efforts to release the fish alive.

### Unfit for human consumption DOES NOT include fish

- considered undesirable in terms of size, marketability, or species composition
- spoiled or contaminated as the result of an act or omission of the crew of the fishing vessel.



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# ANY QUESTIONS?



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