Fishery monitoring

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- Welcome
- Fisheries and their importance
- What is fishery monitoring?
- Why conduct fishery monitoring?
- Types of monitoring
- Analysis
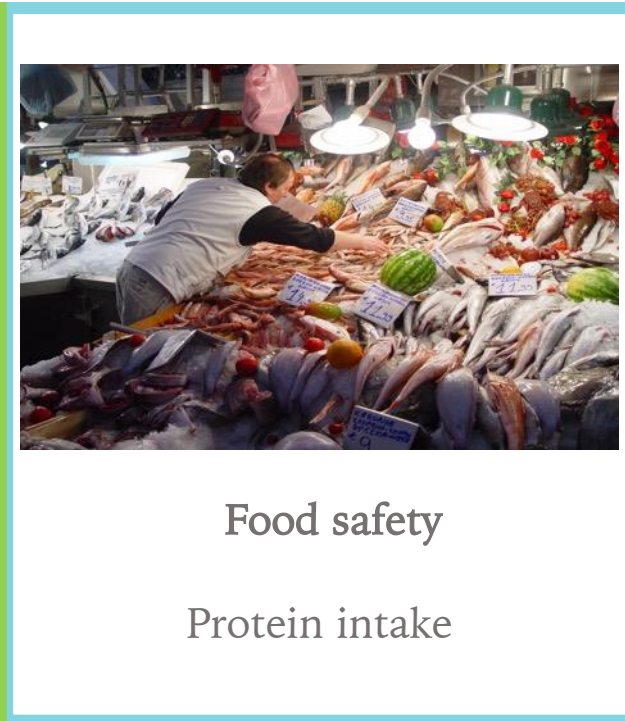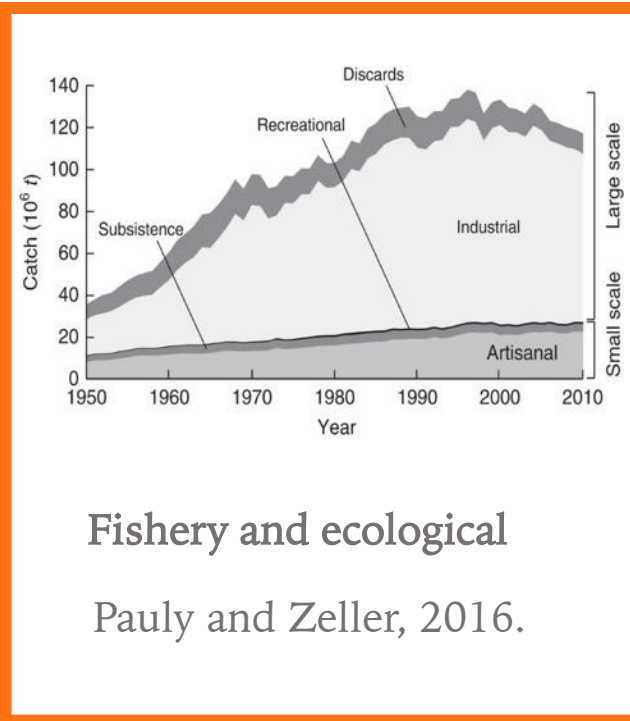- Survey results
- Case study
  - Puerto Libertad Clams fishery
  - El Rosario finfish fishery
- Discussion and questions

Fisheries are of great importance

Fishery and ecological

Pauly and Zeller, 2016.

Social

59.9 millon
people

Food safety

Protein intake

"Today many fisheries lack the implementation of monitoring, management and regulation programs"
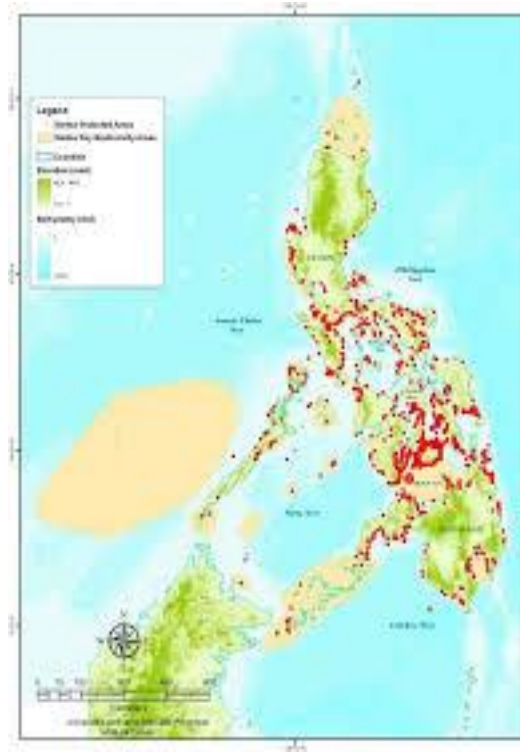(Díaz-Uribe et al., 2013; Álvarez et al. 2020)

Fishery monitoring in Marine Reserves

Increase in catch at the reserve boundary, suggesting a strong export function.

Observing a decrease in catches farther away from the reserve.

Philippine Marine Reserve

Marine Reserve in Kenya

Have a better undestanding of what happens in a marine reserve (design, benefits, costs and ecological and social implementation)

Understand how the fishery affects the marine ecosystem

How?

Monitoring

Design and implement effective tools to achieve goals

What is monitoring?

Collection and analysis of repeated observations and/or measurements to evaluate changes and progress towards a common goal.

Monitoring features:
- Detailed
- Meticulous
- Precise
- Continuous

✓Successful monitoring close to the fishery.

Fishery monitoring allows to promote the bases to guide the sustainable management of marine resources – AIDA, 2015

To carry out a fishery monitoring program it is necessary to know

- The species to work with
- Taxonomy (common and scientific names)
- Biology and life history
- Differentiate between sexes
- Temporality
- Fishing season
- Normativity
- Communities conditions

**Incorporation of underwater monitoring data to observed changes in fisheries monitoring will help to determine spatial and temporal patterns of the resource of interest.

To carry out an effective fishery monitoring, the following material is needed:

Fishery monitoring is recorded in the fishing logbooks

The fishing logbook is one of the most used tools for recording systematic, real, and reliable information on the fisheries in a region.

✓ Generate a baseline of information

✓ Prepare fisheries management plans

✓ Facilitate decision-making process

Electronic

On paper

Fishing logbooks allow tracking and understanding specific characteristics of the fishery.

PESCADATA

What information does a logbook contain?

It depends on the information needed and the objectives of the fishery, country and fishing community, and management interests.

What is happening with the fish, clams, shark (or any marine resource) population and the dynamics of the fishery?

Fishing logbook examples

NOMBRE O RAZÓN SOCIAL DEL PERMISIONARIO O CONCESIONARIO								NÚMERO PERMISO O CONCESIÓN DE PESCA			VIGENCIA			MES	
RNP DE UNIDAD ECONÓMICA.								SISTEMA LAGUNARIO			FECHA DE ENTREGA				

Día	No. de Embarcaciones			No. de Artes de Pesca			Carnada		Captura en Kilogramos								
									Jaiba café, guerrera, verde o jaibón			Jaiba azul o cuata			Jaiba gigante, negra o guacho		
	Trampa	Aro	Otro	Trampa	Aro	Otro	Trampa	Aro	Trampa	Aro	Otro	Trampa	Aro	Otro	Trampa	Aro	Otro
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	

Fishing logbook examples

APENDICE NORMATIVO "C"
BITACORA DE LA PESQUERIA DE TIBURON FLOTA MENOR

Bitácora de la Pesquería de Tiburón Flota Menor
Océano Pacífico
Informe General de Pesca por Mes

SAGARPA
SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

Comisión Nacional de Acuacultura y Pesca
Dirección General de Ordenamiento Pesquero y Acuícola
SAGARPA-BP-013

INFORMACIÓN DE REGISTRO   **FECHA DE INFORME** _____   **INFORMACIÓN OPERATIVA**

NOMBRE O RAZÓN SOCIAL DEL PERMISIONARIO O CONCESIONARIO	PUERTO BASE O SITIO DE DESEMBARQUE	VIAJES DE PESCA No.	VIAJES DE PESCA CON PALANGRE No.
PERMISO O CONCESIÓN DE PESCA No.	EMBARCACIONES CON REGISTRO DE PRODUCCIÓN EN EL MES No.	VIAJES CON RED No.	VIAJES CON RED Y PALANGRE No.

INFORMACIÓN TÉCNICA Y PRODUCCIÓN CON RED

TIPO DE RED	SUPERFICIE	FONDO	NÚMERO DE REDES	LONGITUD DE LA RED	TAMAÑO DE MALLA	No. DE LANCES EFECTUADOS/MES
MODELO				m	milímetros	
MALLA DE CAIDA			CAPTURA EN REDES/MES TOTAL	TIBURONES CAPTURADOS	CAPTURA DE TIBURÓN Kg	CAPTURA DE OTRAS ESPECIES TOTAL Kg

INFORMACIÓN TÉCNICA Y PRODUCCIÓN CON PALANGRE

TIPO DE PALANGRE	SUPERFICIE	FONDO	No. DE PALANGRES	LONGITUD DE LÍNEA MADRE	ANZUELOS No.	TIPO	TAMAÑO
MODELO							
				m			
LANCES EFECTUADOS/MES			CAPTURA EN PALANGRES/MES TOTAL	TIBURONES CAPTURADOS No.	CAPTURA DE OTRAS ESPECIES Kg		

OBSERVACIONES

RESPONSABLE DE LOS DATOS ASENTADOS EN ESTE DOCUMENTO

TIBURONES Y ESPECIES AFINES

ESPECIE	PRODUCCIÓN No.	(Kg)
ZORRO, COLUDO, PERRO, JUDÍO		
GRILLO		
AZUL		
MAKO		
MARTILLO, CORNUDA, BARROSA, CHICOTERA		
AMARILLO, LIMÓN		
VOLADOR, PUNTAS NEGRAS		
THRESHER, COLUDO PINTO		
ALETA DE CARTÓN, SEDOSO, PILOTO, TUNERO		
ALETA BLANCA		
COYOTE, COYOTITO		
CHATO, TORO		
ESPINOZO		
MAMÓN, CRISTALINO		
ÁNGEL, ANGELITO		
GAMBUZO, PRIETO		
BIRONCHE, PAJARITO		
OTROS TIBURONES		
SUBTOTAL		

MANTAS Y RAYAS / OTRAS ESPECIES

ESPECIE	PRODUCCIÓN No.	(Kg)
DIABLITO, GUITARRA, DIABLO		
DIABLO, BANDAJO, GUITARRÓN		
RAYA ELÉCTRICA, TEMBLADERA		
RAYA ESPINOZA		
RAYA DE ESPINA		
RAYA DE LATIGO		
RAYA MARIPOSA		
RAYA ÁGUILA, CHUCHO, CHUCHO PINTO		
GAVILÁN, CAB. DE VACA		
TECOLOTILLO		
SUBTOTAL		
PEZ VELA		
MARLIN		
PEZ ESPADA		
DORADOS		
ATÚN ALETA AMARILLA		
ATÚN ALETA AZUL		
ALBACORA		
BONITO BARRILETE		
SUBTOTAL		

TOTAL _____

RECEPCIÓN DE BITÁCORA OFICINA FEDERAL DE SAGARPA

OFICINA QUE RECIBE	FECHA DE RECEPCIÓN

Fishing logbook examples

¿A qué profundidad pescó?	Min.	Máx.	Tipo de fondo		
¿Qué arte de pesca utilizó?	Línea *(escribir el número de anzuelo con el que se pesca)*		Trampa *(escribir el número de trampas, el tamaño de la malla y de la boca de la trampa)*		Otro *(escribir si se usó otro método)*
	Anzuelo #: ¿Cuántos?:		¿Cuántas?: Tamaño boca: Tamaño malla:		
Método	☐ Fondo		☐ Media agua		☐ Aboyado
Carnada	Especie:		Kg:		Precio/kg:
GASTOS	Consumo de Gasolina		Otros Gastos		
	Litros: Precio/Litro ($):		¿Qué?		Precio $
Observaciones					

The three types of fishery monitoring are:

1) Biological monitoring

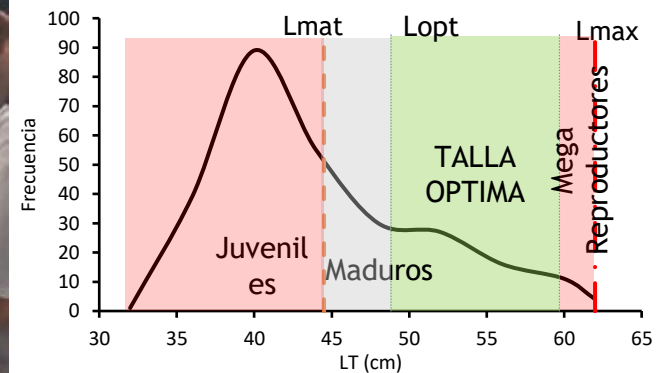2) Fishery monitoring

3) Economic monitoring

1) Biological monitoring

Resource biology:

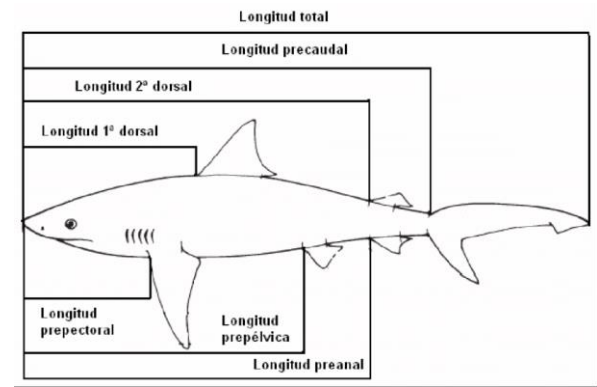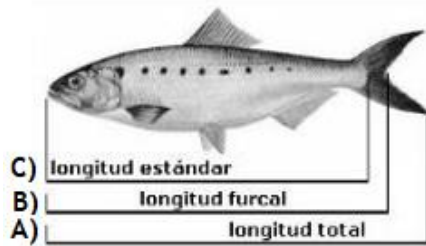✓ **Sizes**

✓ **Weight**

✓ **Sex**

✓ Sexual maturity

✓ Tissue and otolith samples

✓ Feeding Habits

Obtain information on the life history of the species and its population.

Measurements by species group

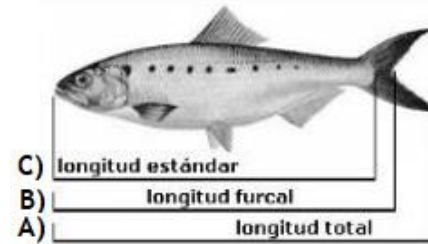| Length	Group	Description
Total length (A)	Fishes	It is measured from the tip of the snout to the longest lobe of the fish's tail fin.
Furcal length (B)	Fishes	It is measured from the tip of the snout to the fork that forms between the lobes of the caudal fin of the fish.
Standard length(C)	Fishes	It is measured from the tip of the snout to the last vertebra of the spine or just where the tail of the fish begins.
Shell height (D)	Bivalve mollusks	The greatest measure in the anteroposterior direction; approximately parallel to the axis of the hinge.
Shell length (E)	Bivalve mollusks	The greatest measure in the dorsoventral direction; approximately perpendicular to the axis of the hinge and at right angles to the length.
Shell width (F)	Bivalve mollusks	The largest measurement at right angles to the plane of the two previous measurements.
Mantle length (G)	Cephalopod mollusks	It is measured from the tip of the cone to where the "cylinder" or mantle of the cephalopod body ends.
Weight or mass	Fishes, bivalve mollusks and cephalopods	The weight of each of the organisms measured is recorded paying special attention to the unit of measurement (kilograms or grams) and making reference to whether the organism is whole or is missing any part of the body (eg viscera).

Data population

Total capture (Kg):_____ No. of total individuals: _____
Fill the sheet with a minimum of 10 individuals, whenever possible.

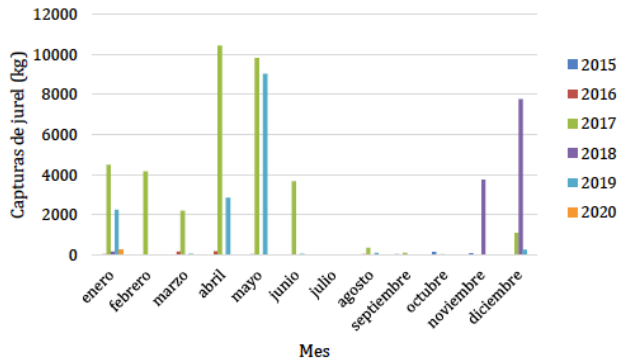| #	Species	Total length (cm)	Weight (Kg)	Observations (Whole, gutted, ..)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

C) longitud estándar
B) longitud furcal
A) longitud total

2) Fishery monitoring

✓ Fishing Day

✓ Catches (target and incidental)

✓ Fishing zones
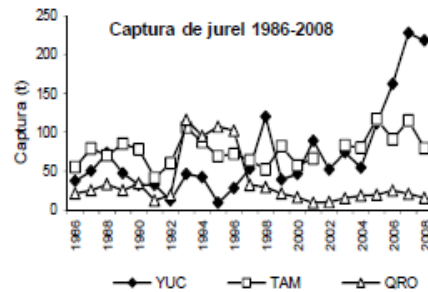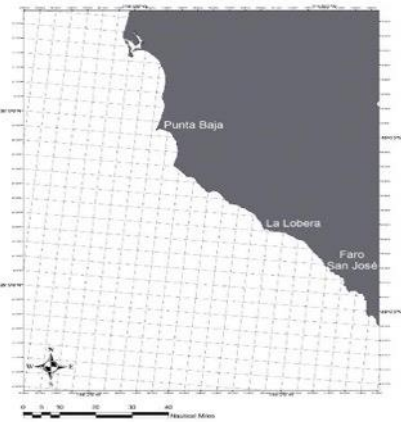
✓ Depth

✓ Effort (cost, time, etc.)

✓ Fishing gear

Amount of the resource captured and dynamics of the fishery

Example of fishery monitoring
Fishing zones: Why is important to collect information?
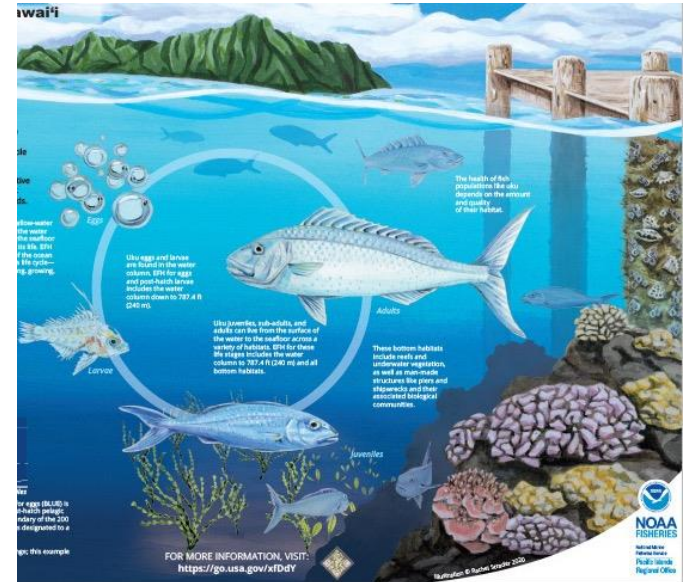
Capturing information on the variability of the use of the sea and its resources, in space and time, is important for planning.
– Kittinger et al., 2014.

Biological processes

✓ Aggregations

✓ Different populations

✓ Define priority areas

✓ Know the availability of the resource

Fishing effort

621 trips

$537
Earnings
fisher / trip
(mexican peso)

3 fishers
per boat

14 in
25 in
14 in
2 x 2
24 in

The amount of fishing equipment used in a certain period of time (number of hooks, hours per day, traps, expenses, number of fishing trips, etc.).

The number of fish caught per the amount of effort expended = CPUE

3) Economic monitoring

✓ Expenses
    ✓ Ice
    ✓ Gasoline
    ✓ Bait
    ✓ Oil
    ✓ Foods

✓ Profits

✓ Price on the beach

Allows information on the profitability of the fishery (business) to be obtained

Preparing databases of the fishing logbooks is important for the analysis of the fishery
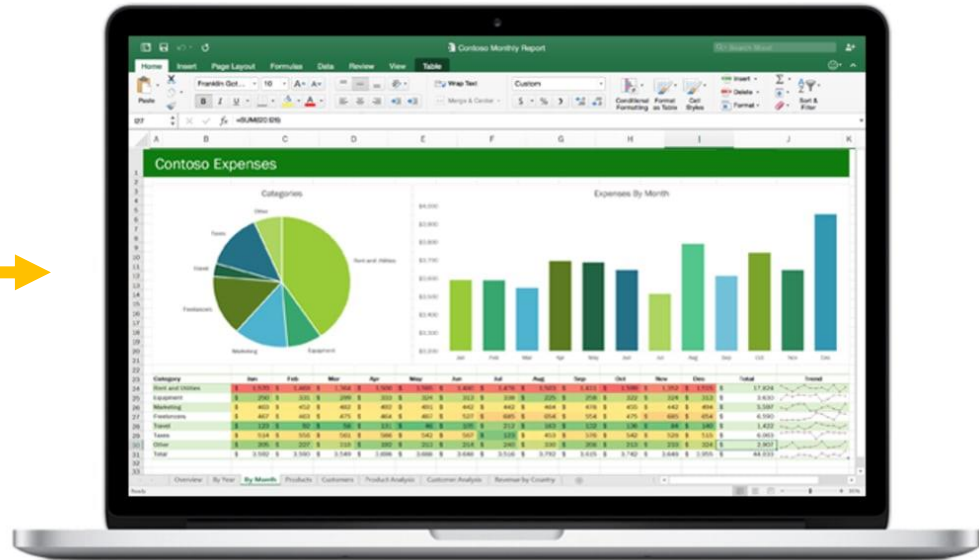
- Evaluate the entire activity in detail

- Identify errors

- Useful for management within fishing cooperatives

- Information collection

- Obtain statistics from the data of the fishing logbooks

- "Information secured"

Information obtained from fishery monitoring
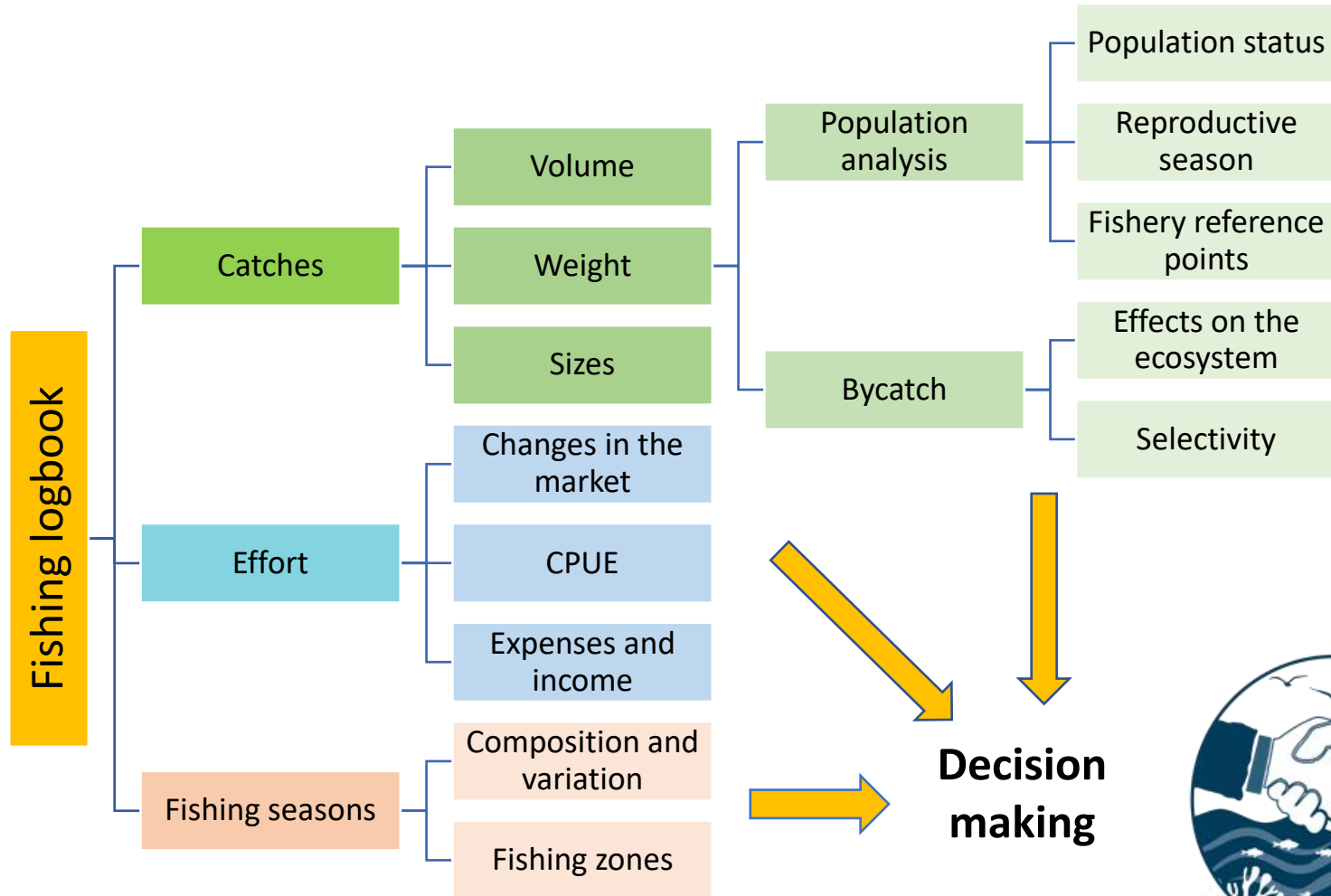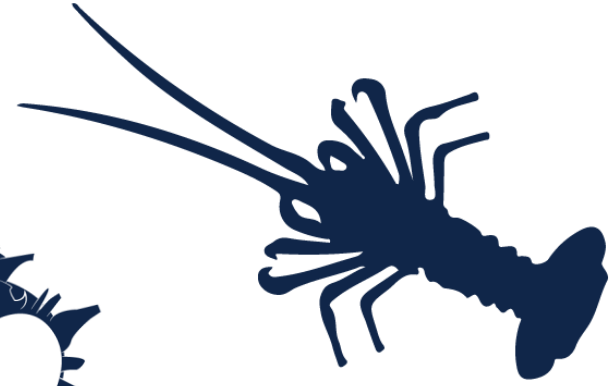
And, how can it help us?

Fishery monitoring: base line

Is the current management of the fishery effective?

Yes

No

Continue with current practices

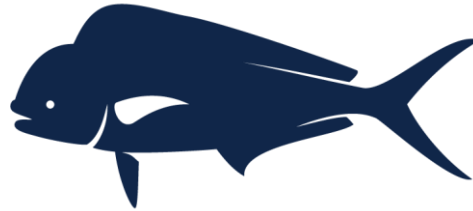Regulation

Normativity

Governance

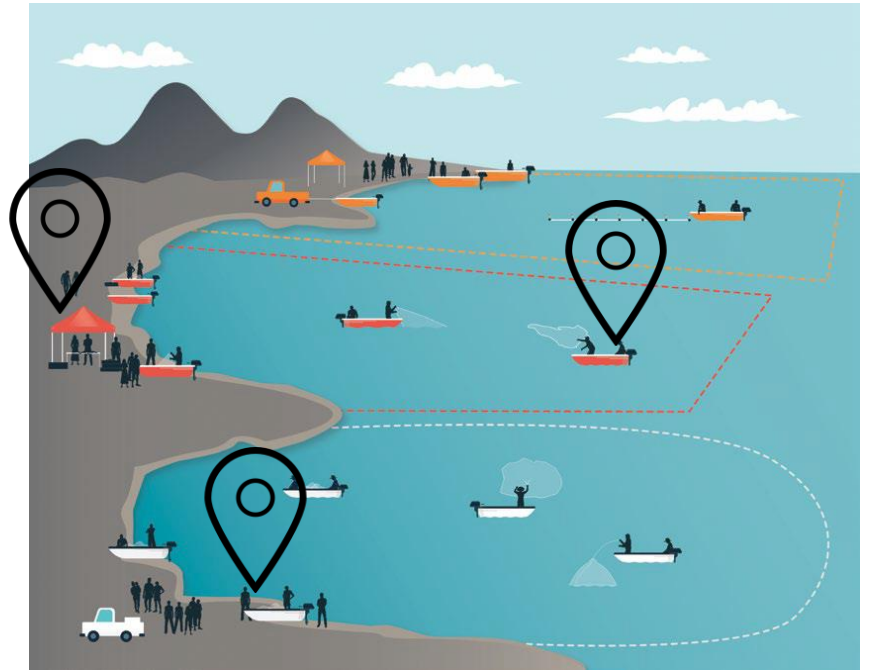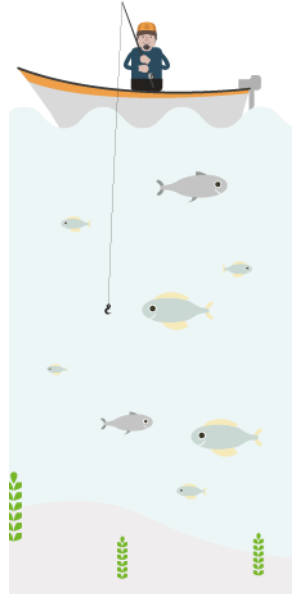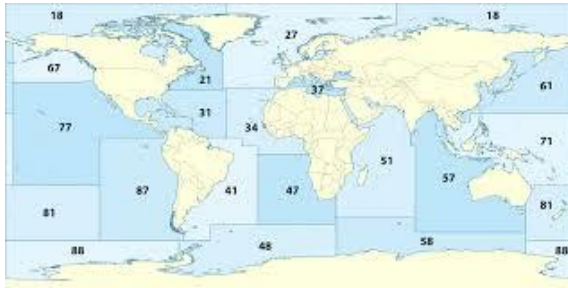Design measures that lead to sustainable fishing
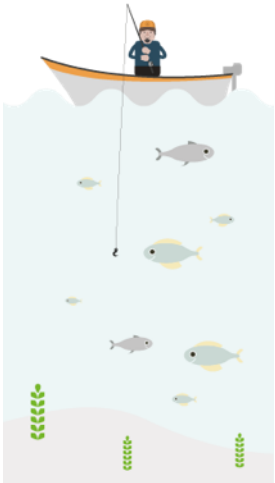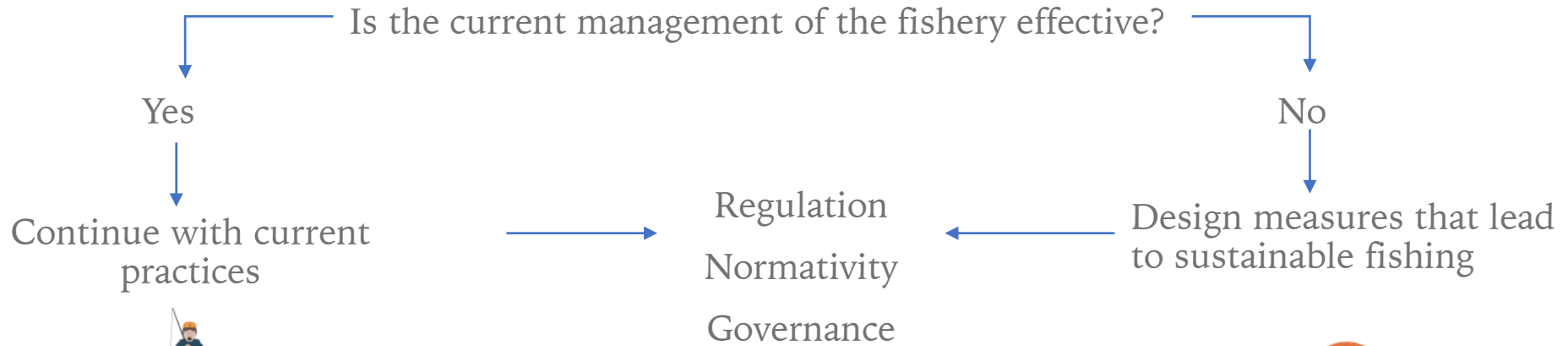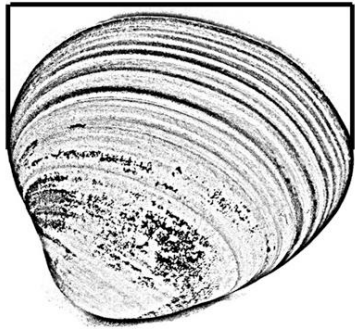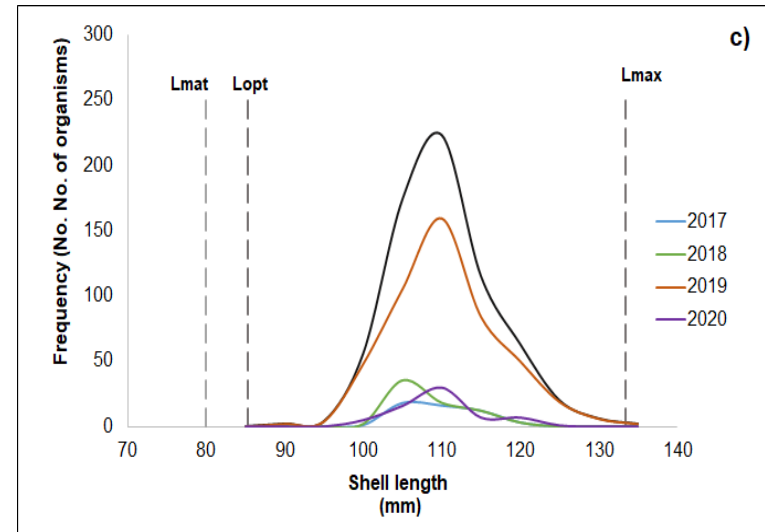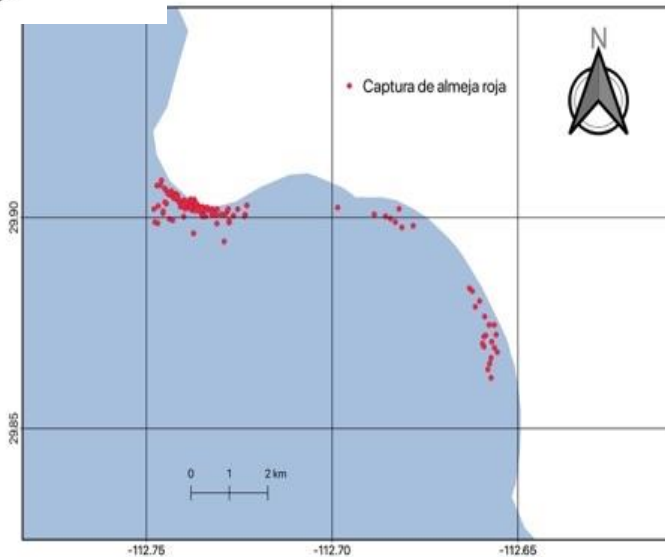
Surveys

16 organizations (81% NGO, 12% Government)

Surveys

Puerto Libertad clam fishery

| Year	Golden callista (*Megapitaria aurantiaca*)	
	Cuota	Catch
2015	30,000	8,430
2016	9,000	8,209
2017-2108	40,000	16,790
2018-2019	40,000	33,877
2020	30,138	7,975

El Rosario finfish fishery

Ocean whitefish (*Caulolatilus princeps*), California sheephead (*Semicossyphus pulcher*), Barred sandbass (*Paralabrax nebulifer*), Rockfishes (*Sebastes constellatus*) and (*S. miniatus*).
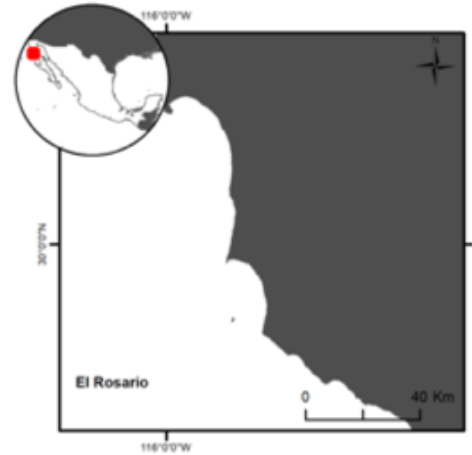
✓ The implementation of fishery monitoring is a process.

✓ The process is different in each case.

✓ Common decision: assign a person in charge of carrying out fishery monitoring.

✓ Empowerment by cooperatives.

✓ Greater knowledge and control over fishing.
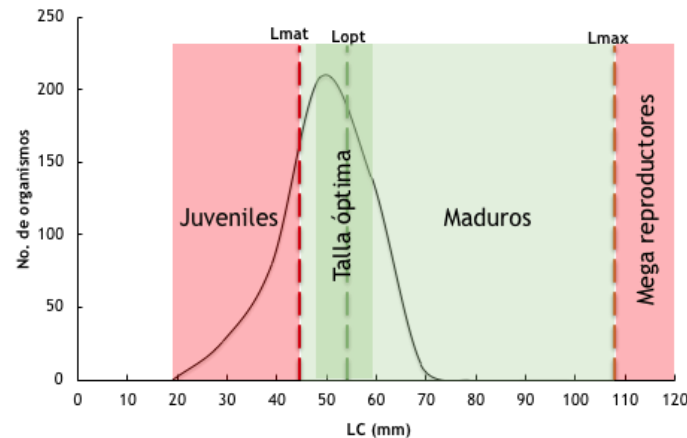
Recommendationes

- The format of the fishing logbooks must be designed in collaboration (fishers, CSO, academia, government).

- Fishing logbooks must be completed each fishing day.

- The organisms must be measured at random, taking small and big organisms.

- This activity will be carried out by the fishers in each boat, previously chosen, being responsible for taking the data.

- The chosen fishers will be responsible for collecting the weekly fishing logbooks, to be delivered to the organization in charge (government/academia/CSO).

- Ideally, the fishers should be responsible for digitizing the information, if this is not possible, the government/academia/CSO will help in this activity and subsequent analysis of the information.

Thank you!

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