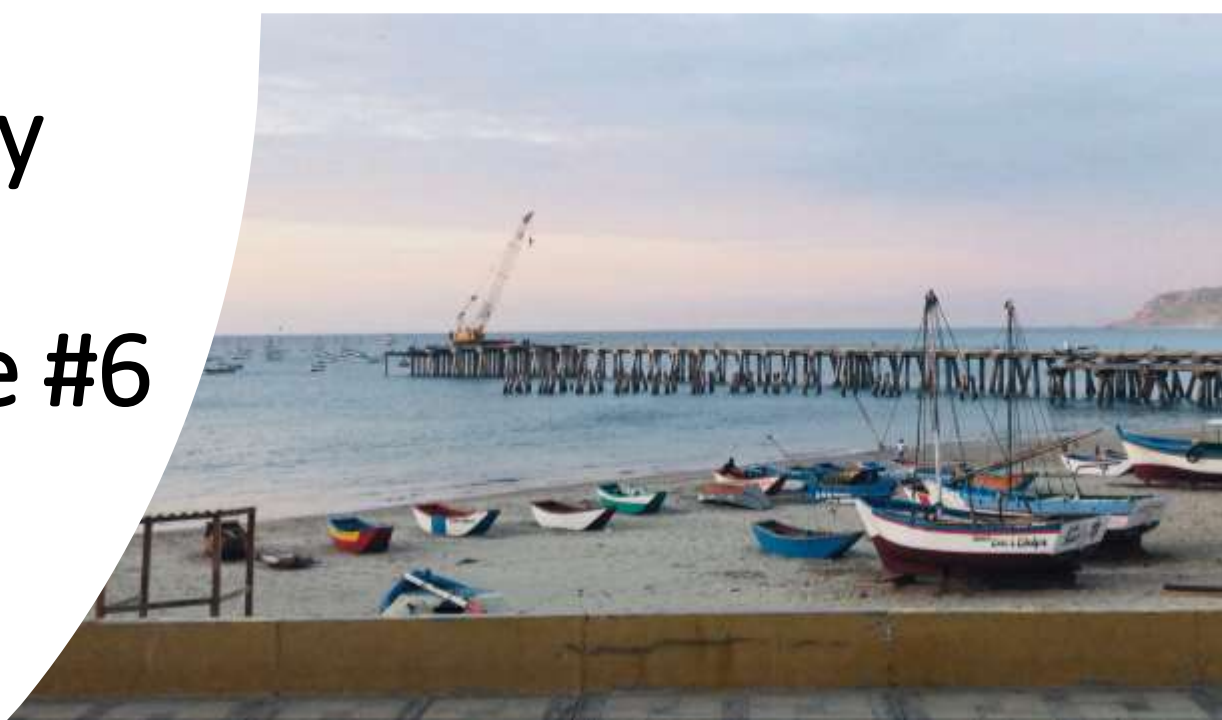


Goal setting for finfish management and harvest control measures for achieving fishery goals

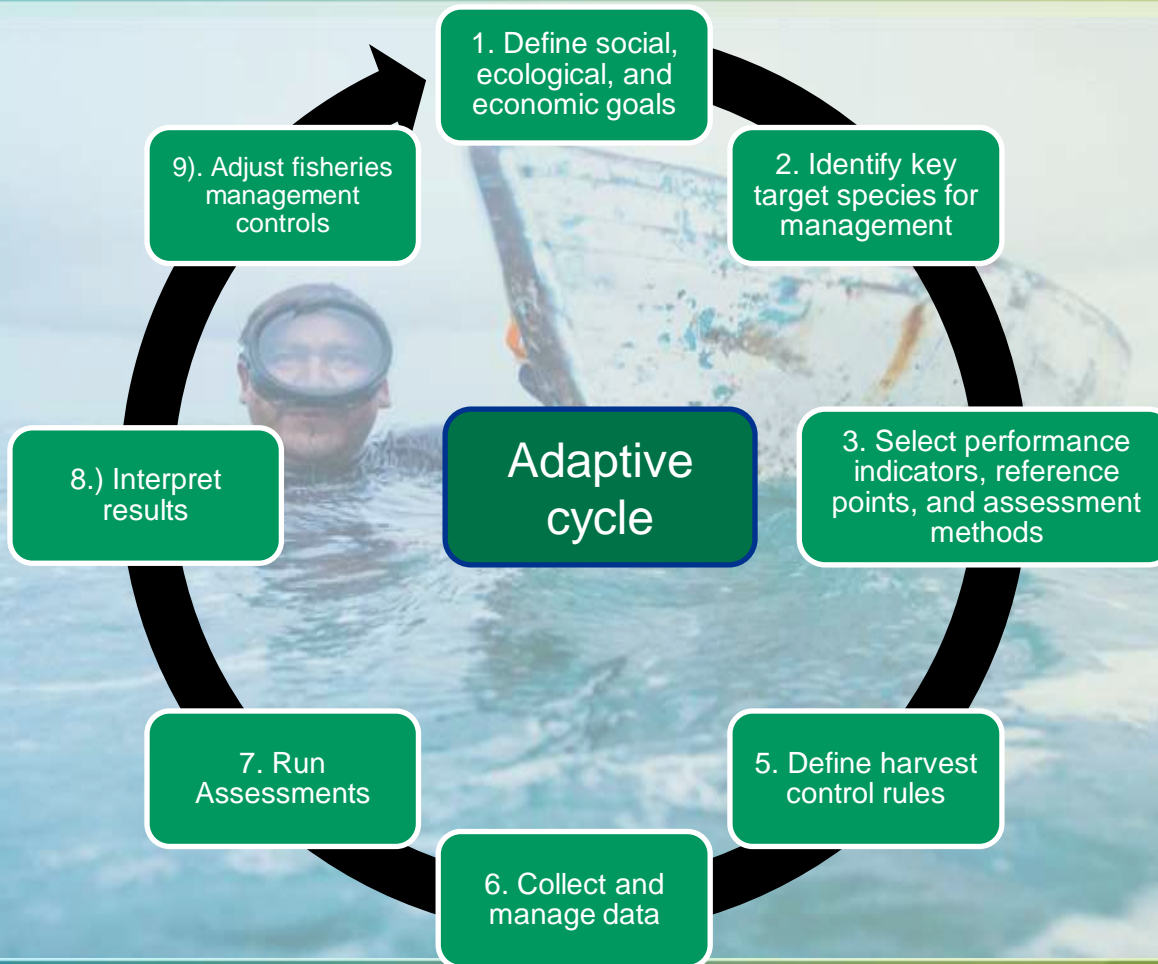
Training Module #6



- overview of goal setting and decision-making process;
- performance indicators & harvest control rules
- Multispecies goals and draft harvest control measures from March 2020



A multi-indicator adaptive fishery management framework



Key features of this framework

1. Define social, ecological, and economic goals

2. Identify key target species for management

3. Select performance indicators, reference points, and assessment methods

4. Define harvest control rules

5. Collect and manage data

6. Perform assessment methods

7. Interpret assessment results

8. Adjust fisheries management controls

- Process of designing the framework is collaborative and stakeholder-driven
- Harvest control rules are transparent and objective
- Uses multiple performance indicators
- Uses performance indicators appropriate for available resources and technical capacity
- Local stakeholder knowledge is incorporated during data interpretation

4. Harvest Control Rules

1. Define social, ecological, and economic goals

2. Identify key target species for management

3. Select performance indicators, reference points, and assessment methods

4. Define harvest control rules

5. Collect and manage data

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7. Interpret assessment results

8. Adjust fisheries management controls

Harvest Control Rule: Generally, what we want to do under certain scenarios in order to meet our goals
“Reduce fishing pressure”
“Don’t catch babies”

Harvest Control Measure: Actual mechanism through which we will accomplish the harvest control rule (e.g. catch limit, gear restriction, RBM)

Harvest Control Rules

Scientists and managers work with fishermen and other fishery actors to define harvest control rules.

These rules guide managers and tell them what to do in case the indicators are near or below targets and limits.

“IF we find that our fishery is doing X, then we will do Y”

Examples:

- If all indicators show that stock is abundant and productive, fishing mortality can remain the same
- If all indicators show that stock is in decline, fishing mortality will be reduced by X% (depending on severity)

What are fisheries management measures

Direct Measures:

- **How much:** Catch limits

Indirect Measures

- **Who:** Licenses
- **Where:** Spatial closures
- **When:** Seasonal closures
- **How:** Effort Controls; Gear Restrictions
- **What:** Size and sex-specific regulations

1. Define social, ecological, and economic goals

2. Identify key target species for management

3. Select performance indicators, reference points, and assessment methods

4. Define harvest control rules

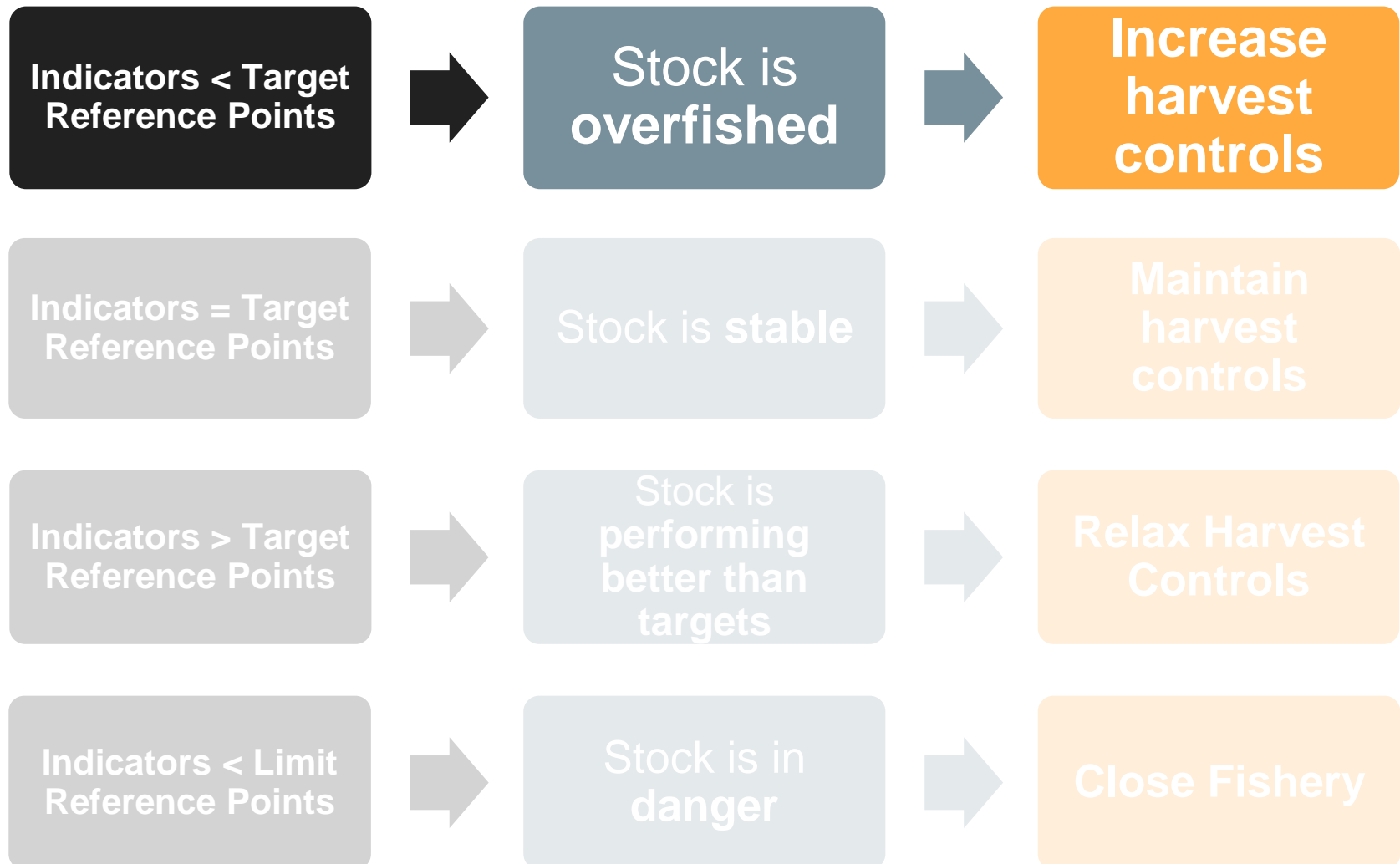
5. Collect and manage data

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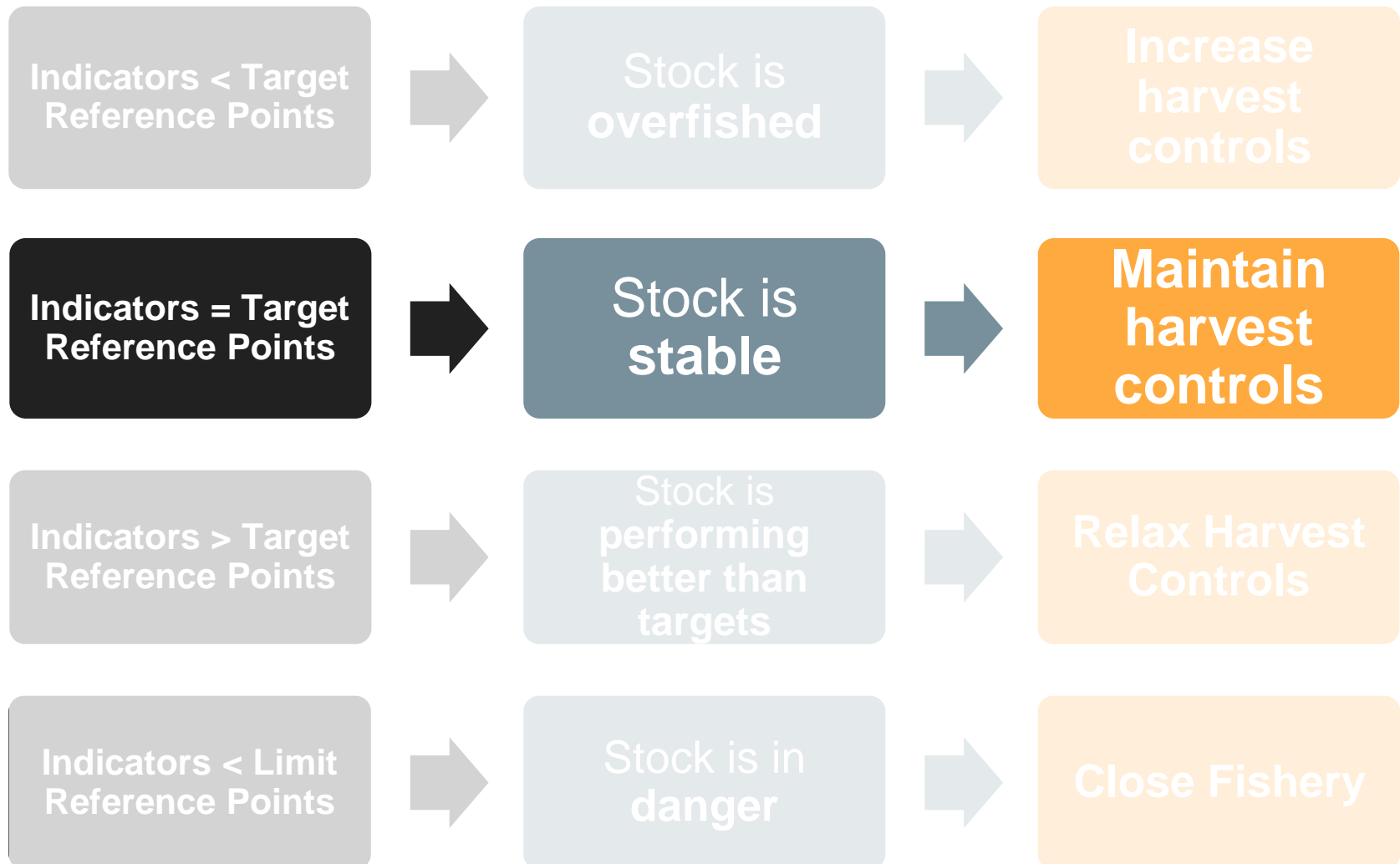
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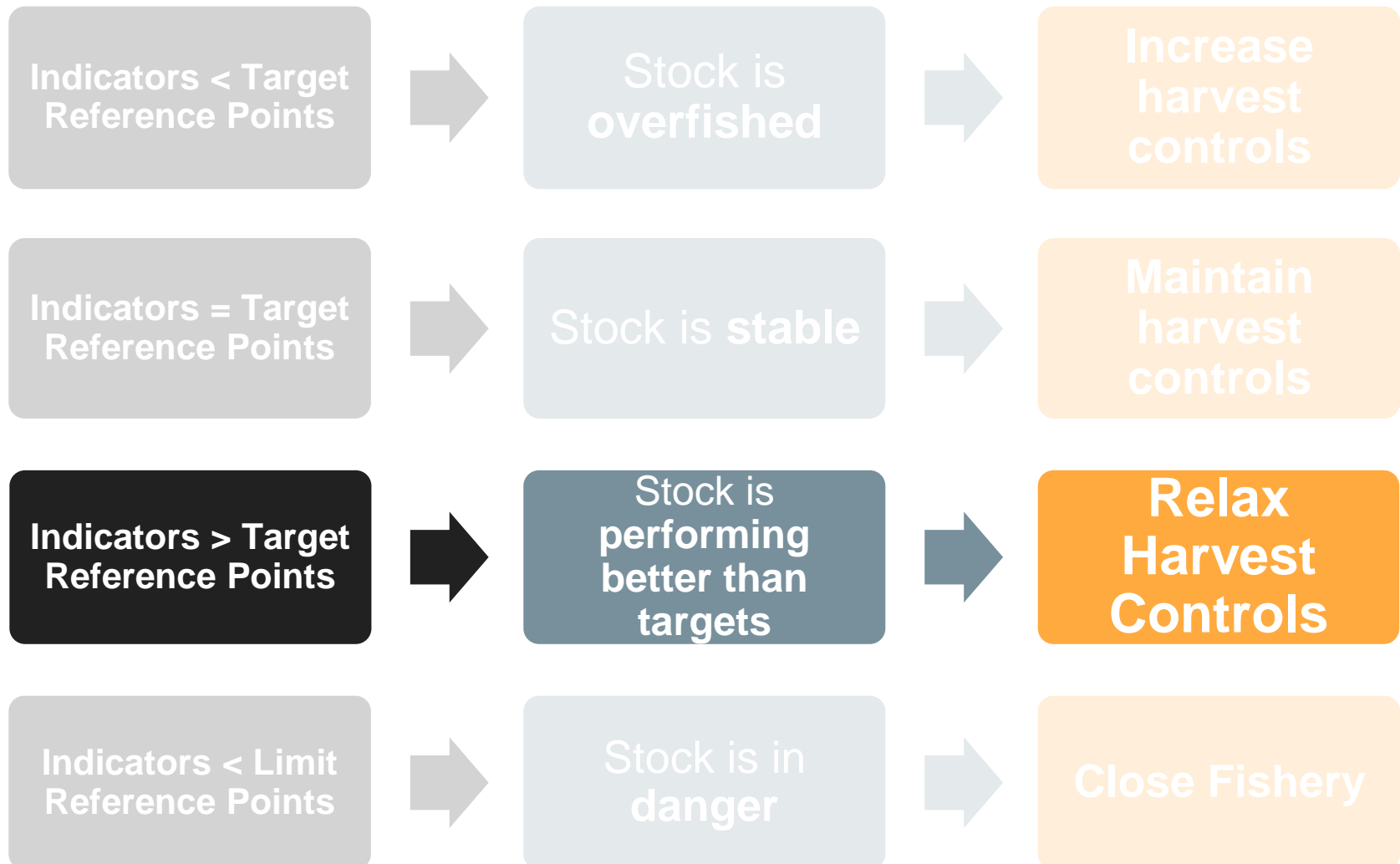
IF we find that our fishery is doing X, then we will do Y



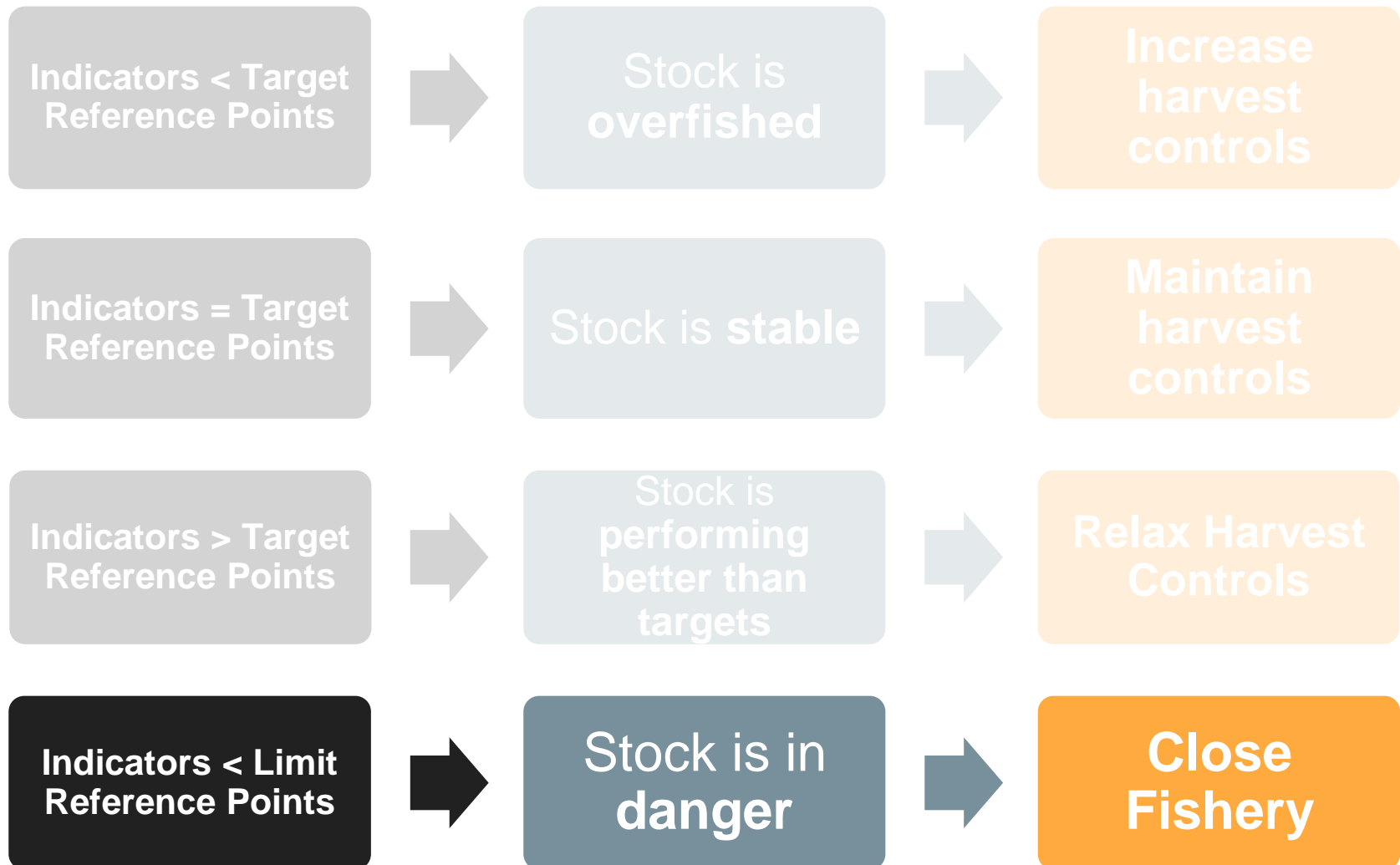
IF we find that our fishery is doing X, then we will do Y



IF we find that our fishery is doing X, then we will do Y



IF we find that our fishery is doing X, then we will do Y



¿What is the goal?

Performance Indicator:
“Percentage of team Wins”

Reference Point 0.500

Above “.500” = Winning Team

Below “.500” = Losing Team



¿What is the performance indicator and reference Point?

Performance Indicator:
“Percentage of Team Wins”

Reference Point 0.500

Above “.500” = Winning Team

Below “.500” = Losing Team



¿What are some potential control rules?

IF we find that our fishery is doing X,
then we will do Y

Performance Indicator:
“Percentage of team Wins”

Reference Point 0.500

Above “.500” = Winning Team

Below “.500” = Losing Team



¿What measures would you put in place?

Performance Indicator:
“Percentage of team Wins”

Reference Point 0.500

Above “.500” = Winning Team

Below “.500” = Losing Team



Goals from the collaborative multispecies finfish Belize FMP work (March 2020)

Stakeholder outlined a triple-bottom-line set of social, economic, and biological objectives for management of the country's finfish fisheries:

- 1) Sustainability and resilience of food security;
- 2) sustainable economic growth and improved livelihoods; and
- 3) abundant finfish populations to support healthy ecosystems.

Happy fishers, happy people, happy fish!

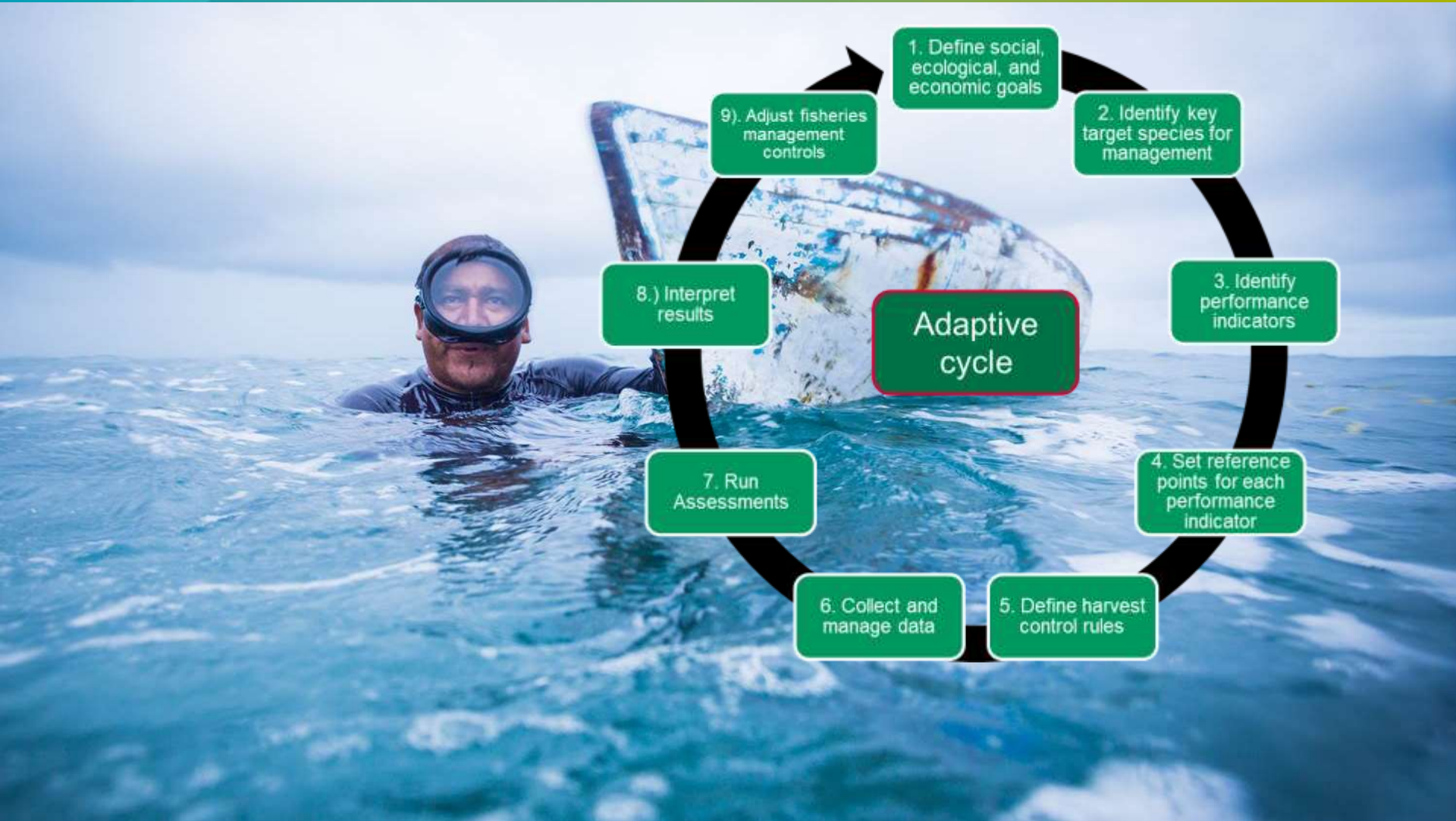
Group ID	Common name	Species name	Group Identity	Priority	Harvest Measures
1	Mahi mahi	<i>Coryphaena hippurus</i>	pelagic/migratory /gear	Moderate	sport license, bag limit
	Wahoo	<i>Acanthocybium solandri</i>		Moderate	
	Marlin - white/ stripe	<i>Kajikia albida/ Kajikia audax</i>		Moderate	
	Swordfish	<i>Xiphias gladius</i>		Moderate	
2	White grunt	<i>Haemulon plumieri</i>	beach traps	Moderate	develop/synergy around the rules of engaging with fishers. Future of tourism efforts - has its own license. size limits, closed seasons,
	Gray snapper	<i>Lutjanus griseus</i>		Moderate	
	Bluestrip grunt	<i>Haemulon sciurus</i>		Moderate	
	Great barracuda	<i>Sphyraena barracuda</i>		Moderate	
	Mojarra (yellowfin)	<i>Gerres cinereus</i>		Moderate	
	Mojarra (pompano)	<i>Diapterus auratus</i>	Moderate		
3	Dog snapper	<i>Lutjanus jocu</i>	opportunistic sling	Moderate	season, size limit
	Schoolmaster	<i>Lutjanus apodus</i>		Moderate	
	Mangrove/Mahogany snapper	<i>Lutjanus mahogoni</i>		Moderate	
	Sailor choice	<i>Haemulon parra</i>		Moderate	
	Margate	<i>Haemulon album</i>		Moderate	
4	Silk Snapper	<i>Lutjanus vivanus</i>	deep-slope fishery	Moderate	license, gear type, gear spec, nationality for license. Allocate spatial ownership to MA fishers.
	Deep water blackfin snapper	<i>Lutjanus buccanella</i>		Moderate	
	Champagne	<i>Lutjanus purpureus</i>		Moderate	
	Queen Silk Snapper	<i>Etelis oculatus</i>		Moderate	
	Yellow-eye Snapper	<i>Ocyurus chrysurus</i>		Moderate	
	Vermillion Snapper	<i>Rhomboplites aurorubens</i>		Moderate	
5	Cubera snapper	<i>Lutjanus cyanopterus</i>	forereef/open/ handline	Low	season, size limit
	Great Amberjack	<i>Seriola dumerili</i>		Low	
6	Mullet	<i>Muguil spp.</i>	bait for other fisheries	High	TAC. limit access spatially or temporally
	Sardine	<i>Sardinella spp.</i>		High	
	Sprat	<i>Sprattus spp.</i>		High	

Group ID	Common name	Species name	Group Identity	Priority	Harvest Measures
7	Snook	<i>Centropomus undecimalis</i>	habitat/traps/lines/ nets	Moderate	new fishery act - allows management of freshwater areas - need to refocus/include. Habitat by size considerations.
	Bay snook	<i>Petenia splendida</i>		Moderate	
	Crana	<i>Cichlosomas urophthalmus</i>		Moderate	
	Tuba	<i>Cichlasoma synspilum</i>		Moderate	
8	Spanish mackerel	<i>Scomberomorus maculatus</i>	pelagic/migratory/g ear -- handline	High	size, area-based via conservation areas.
	Crevalle	<i>Caranx hippos</i>		High	
	King (fish/)mackerel	<i>Scomberomorus cavalla</i>		High	
	Cerro mackerel	<i>Scomberomorus regalis</i>		High	
9	Black grp	<i>Mycteroperca bonaci</i>	large groupers	High	size, bag, season, no-take, temporary ban
	Goliath	<i>Epinephelus itajara</i>		High	
	Tiger	<i>Mycteroperca tigris</i>		High	
	Yellowfin grouper	<i>Mycteroperca venenosa</i>		High	
10	Mutton	<i>Lutjanus analis</i>	fished together, mutton needs to be managed	High	season, bag limit, size limit
	Red hind	<i>Epinephelus guttatus</i>		High	
11	Hogfish	<i>Lachnolaimus maximus</i>	needs to be rebuilt	High	season, bag limit, size limit, temporary ban
12	Nassau grouper	<i>Epinephelus striatus</i>	special considerations	High	temporary ban, season, size
13	Yellowtail snapper	<i>Ocyurus chrysurus</i>	resilient and rebuild	Moderate	size limit
	Lane snapper	<i>Lutjanus synagris</i>		Moderate	

Collaborative multispecies finfish Belize draft FMP work (March 2020)

- For **13 independent fish baskets**, the harvest control measure options on the table for these various species include:
 - Input control
 - Temporary ban, closed seasons, license limits, gear restrictions, and expansion of no-take zones.
 - Output controls
 - Catch limits, bag limits, size limits (minimum and/or slot)

Science to action



Questions?

