Assessment and Management of Belize Nearshore Fisheries

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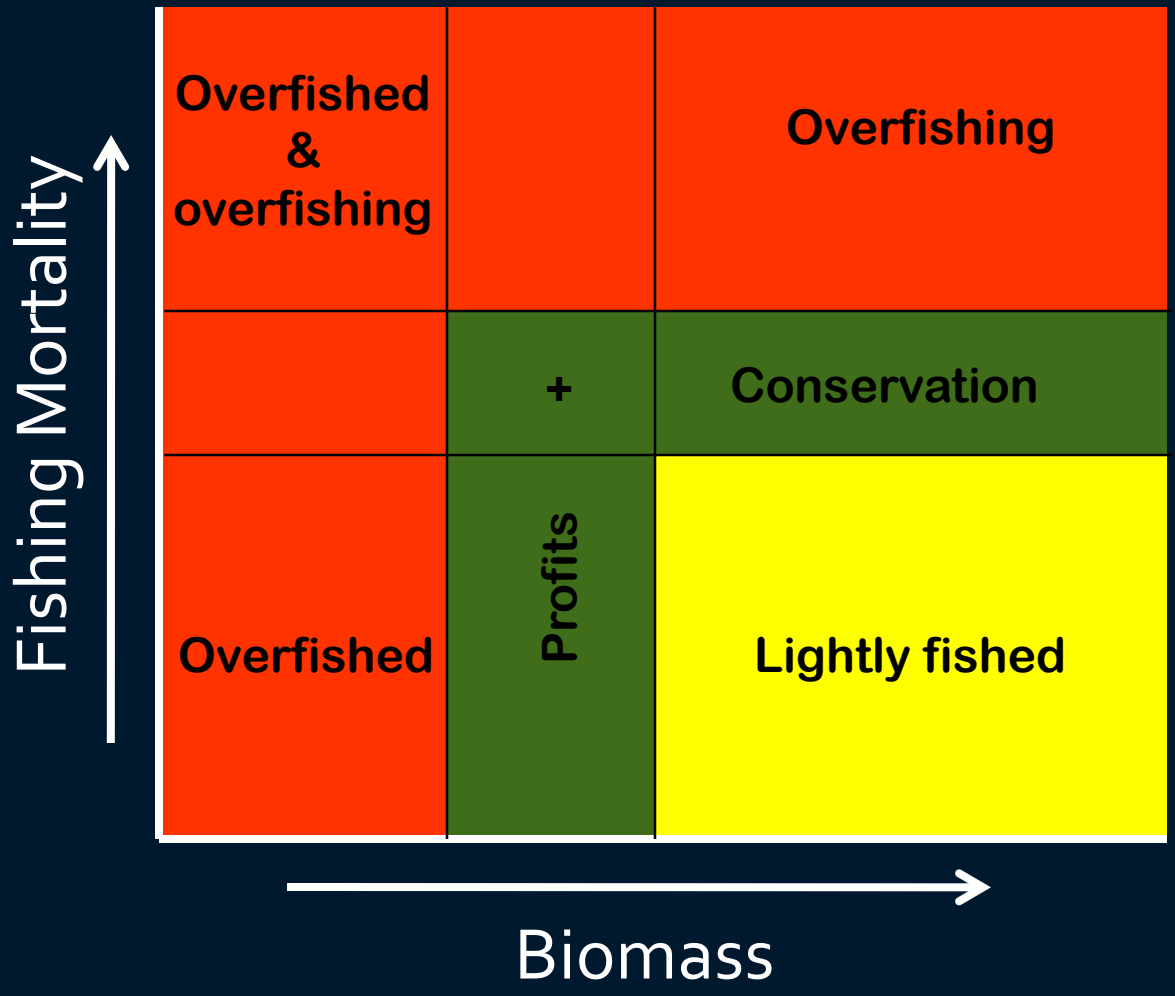
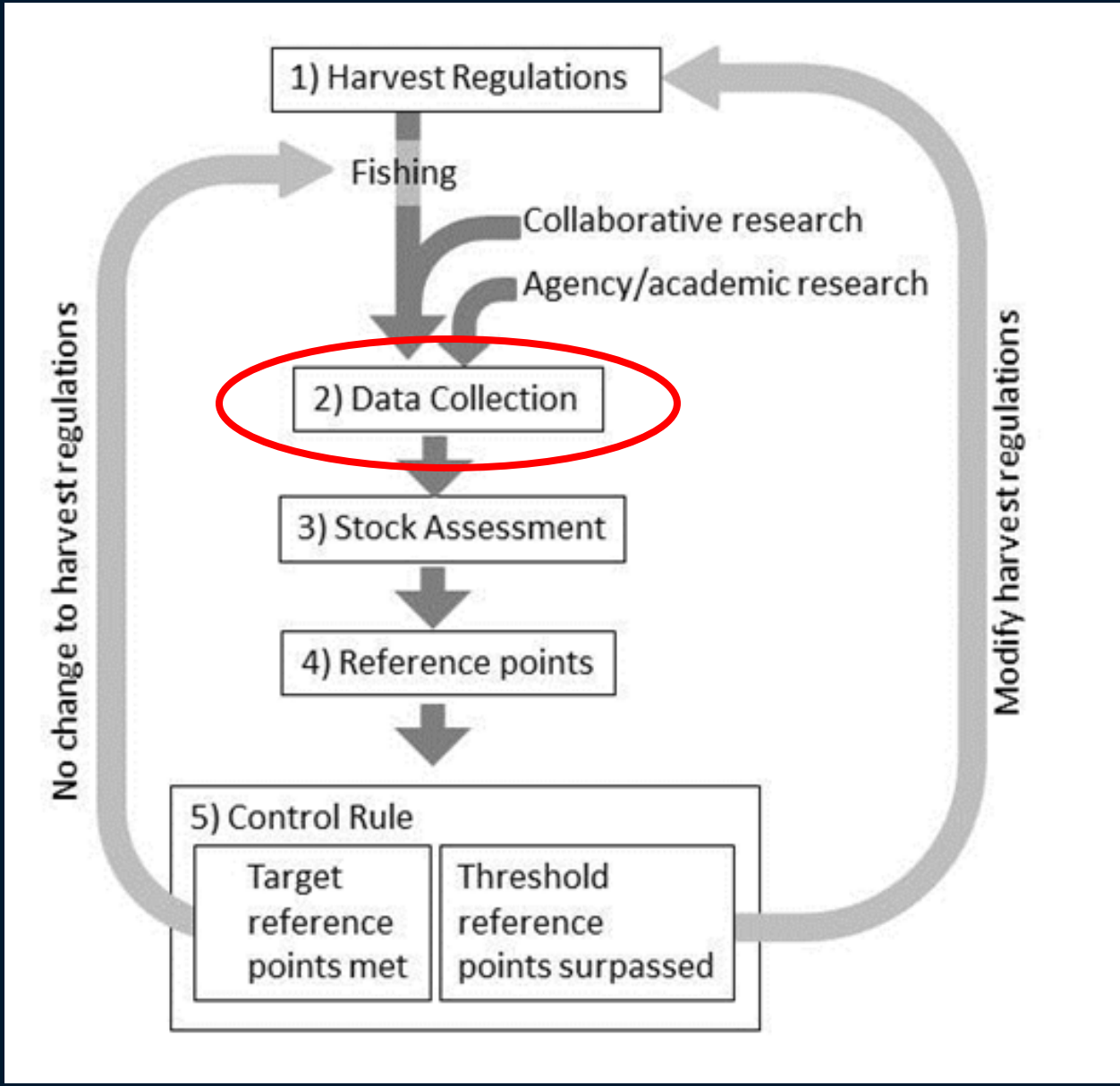
19 November 2013

Maximizing Fishing and Conservation



Adaptive Management



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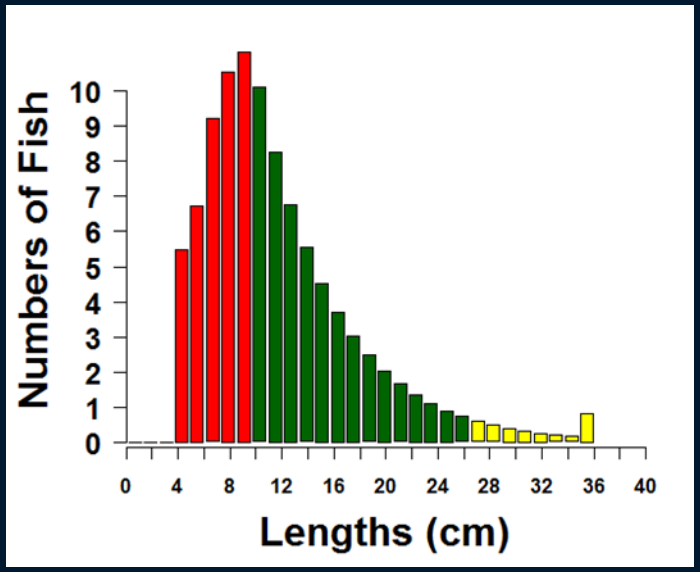
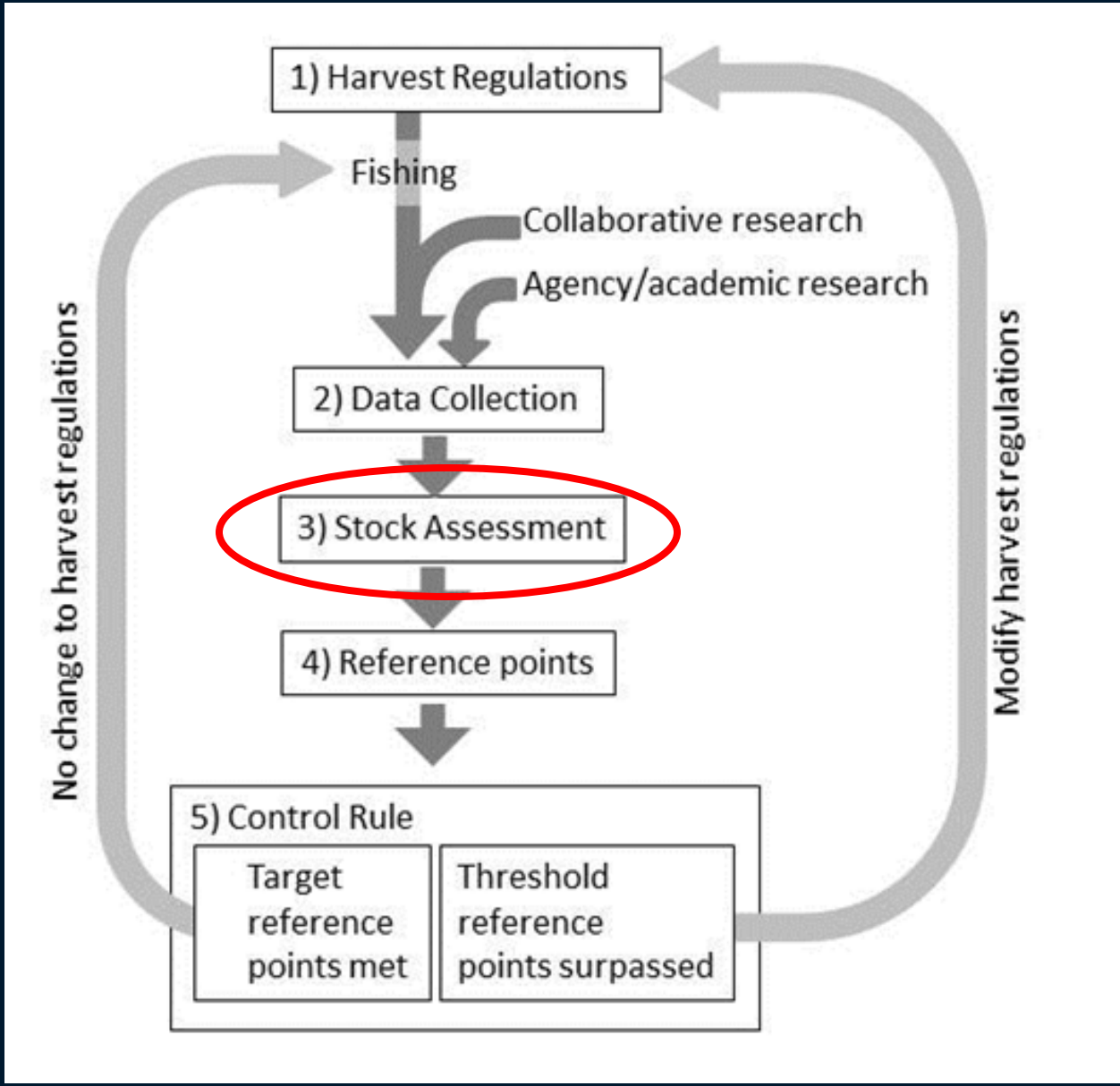
Data Collection



	A	B	C	D
1	Date	Species	Total Length Cm	
2	30-Mar-09	Lane Snap	23	23
3	30-Mar-09	Lane Snap	20	20
4	30-Mar-09	Lane Snap	23	23
5	30-Mar-09	Lane Snap	24	24
6	30-Mar-09	Lane Snap	20	20
7	30-Mar-09	Lane Snap	24	24
8	30-Mar-09	Lane Snap	20	20
9	30-Mar-09	Lane Snap	23	23
10	30-Mar-09	Lane Snap	25	25
11	30-Mar-09	Lane Snap	22	22
12	30-Mar-09	Lane Snap	22	22
13	30-Mar-09	Lane Snap	24	24
14	30-Mar-09	Lane Snap	20	20
15	30-Mar-09	Lane Snap	22	22
16	30-Mar-09	Lane Snap	25	25
17	30-Mar-09	Lane Snap	22	22
18	30-Mar-09	Lane Snap	20	20

Adaptive Management



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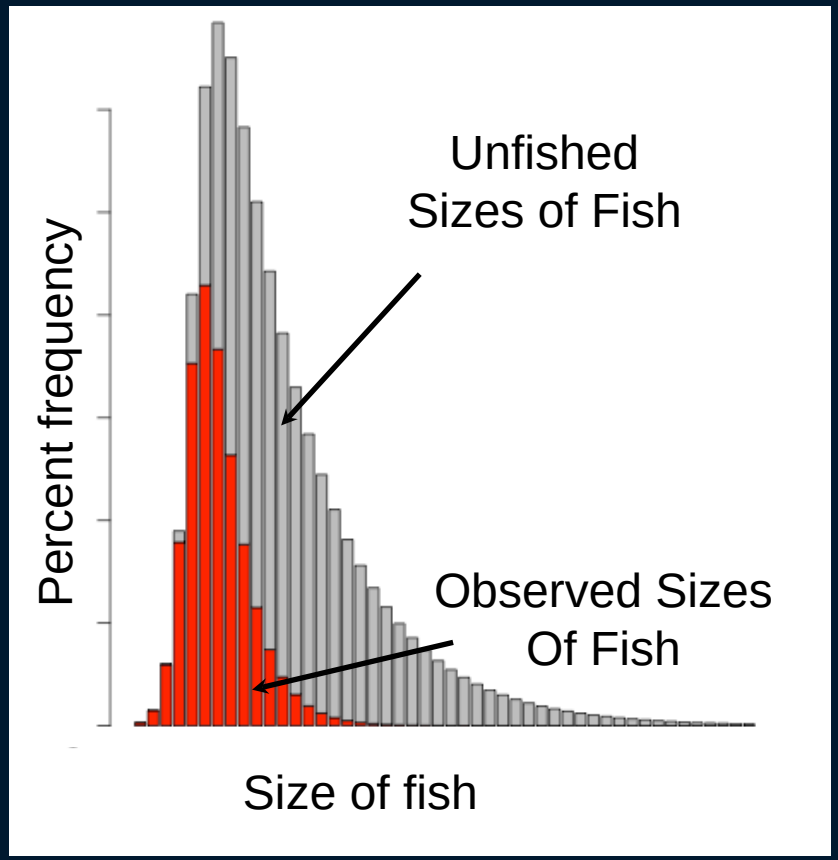
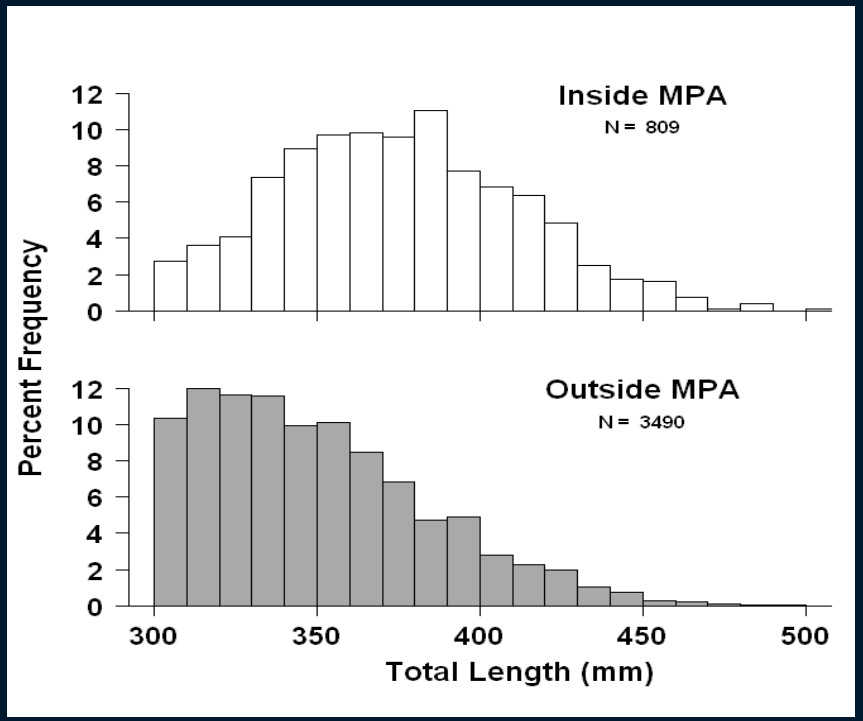
Data Poor Stock Assessments

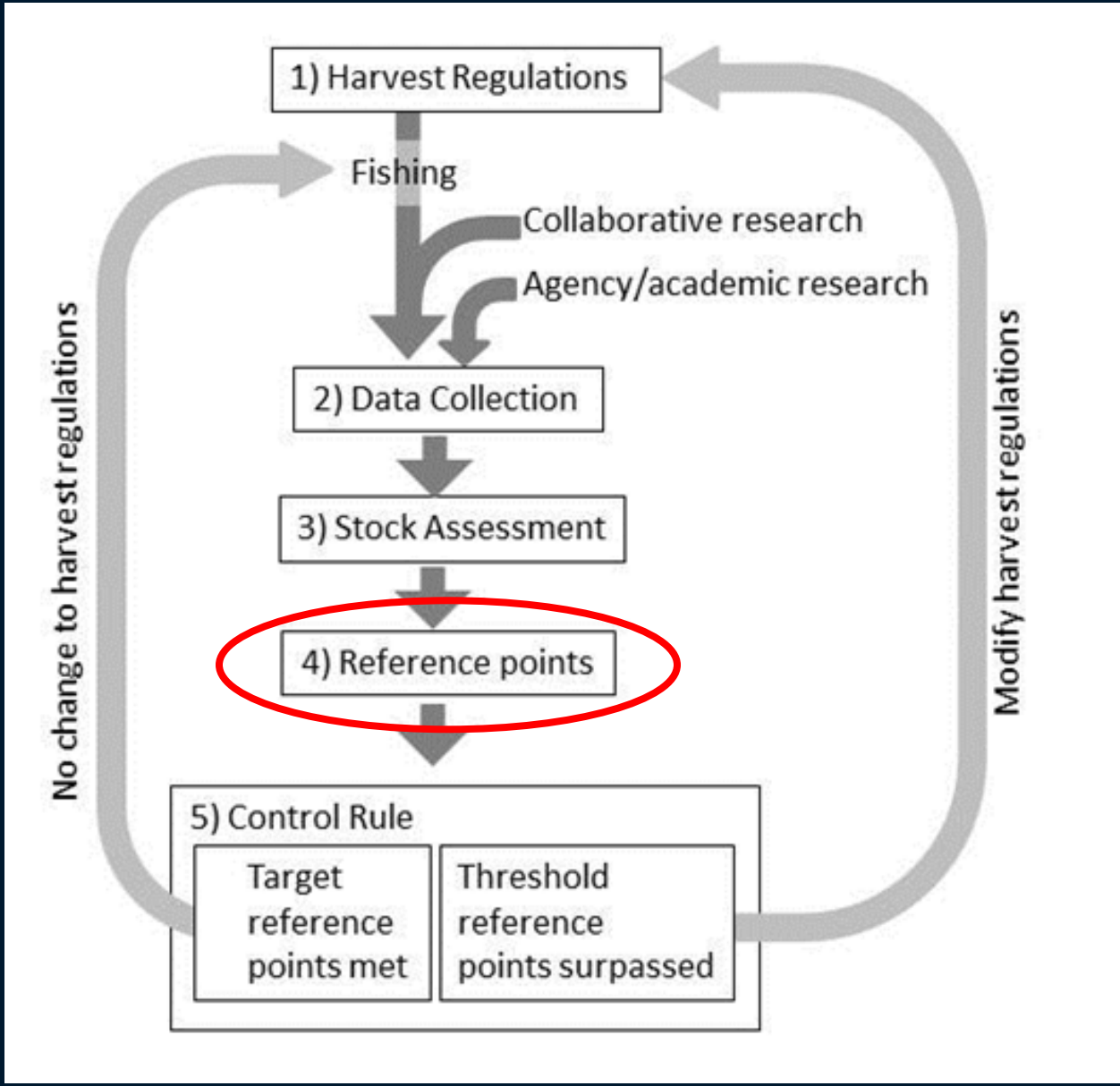
Catch Curve Analysis



MPA Ratios



Adaptive Management



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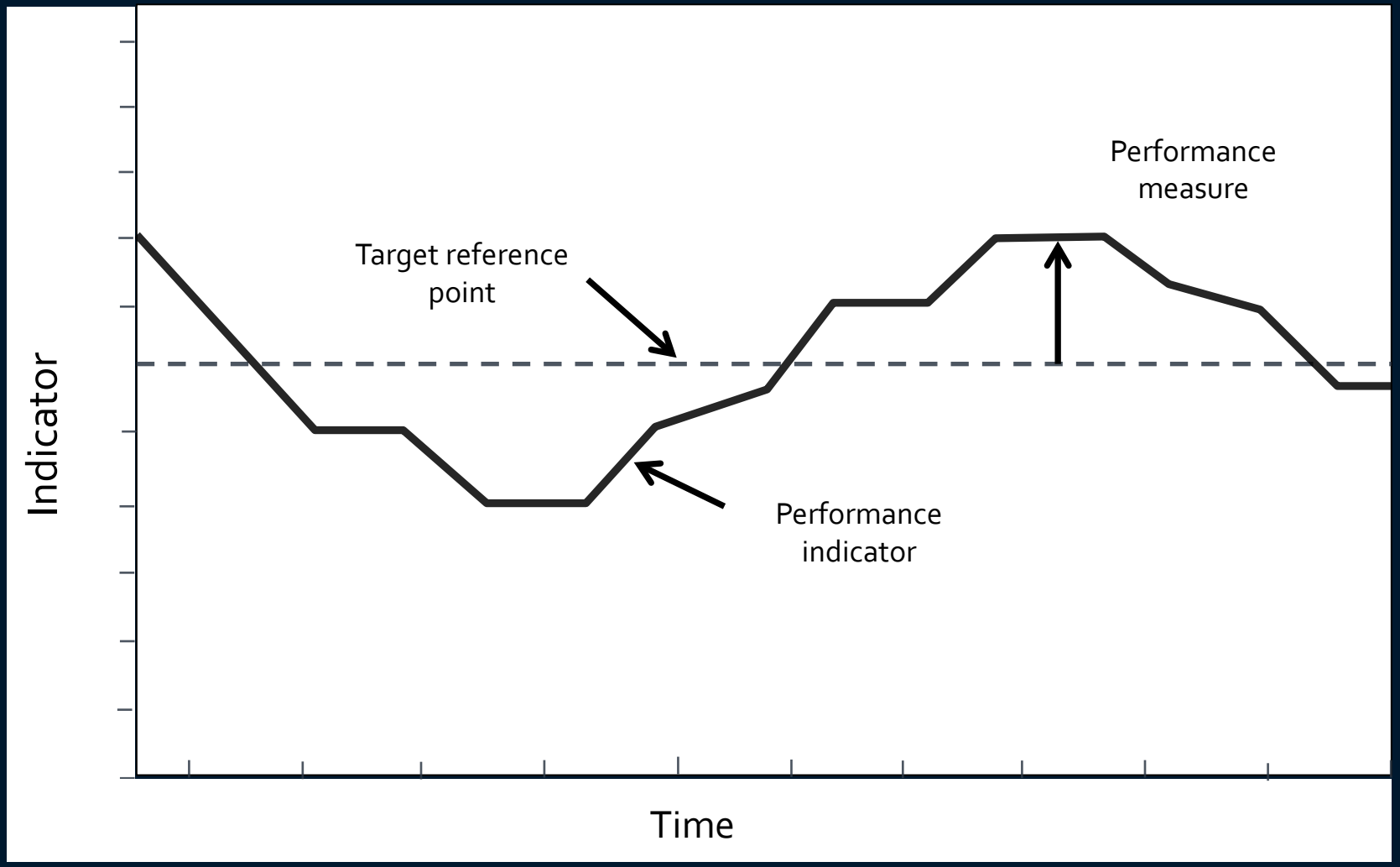
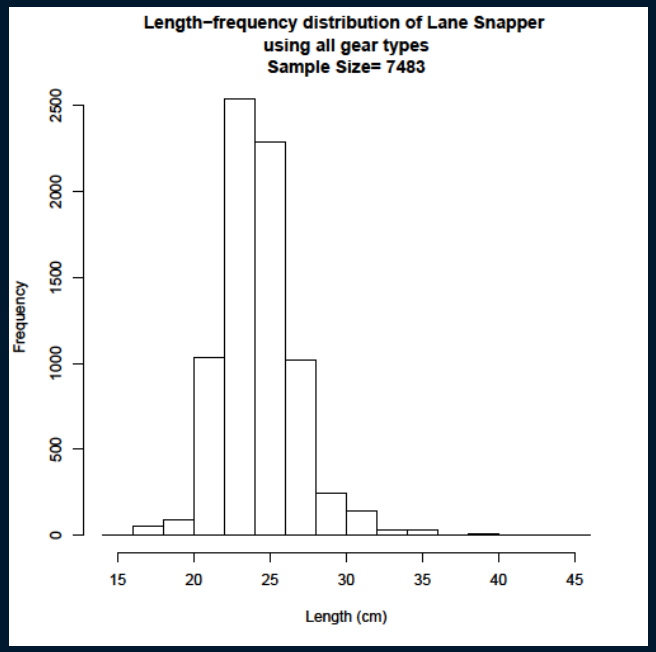
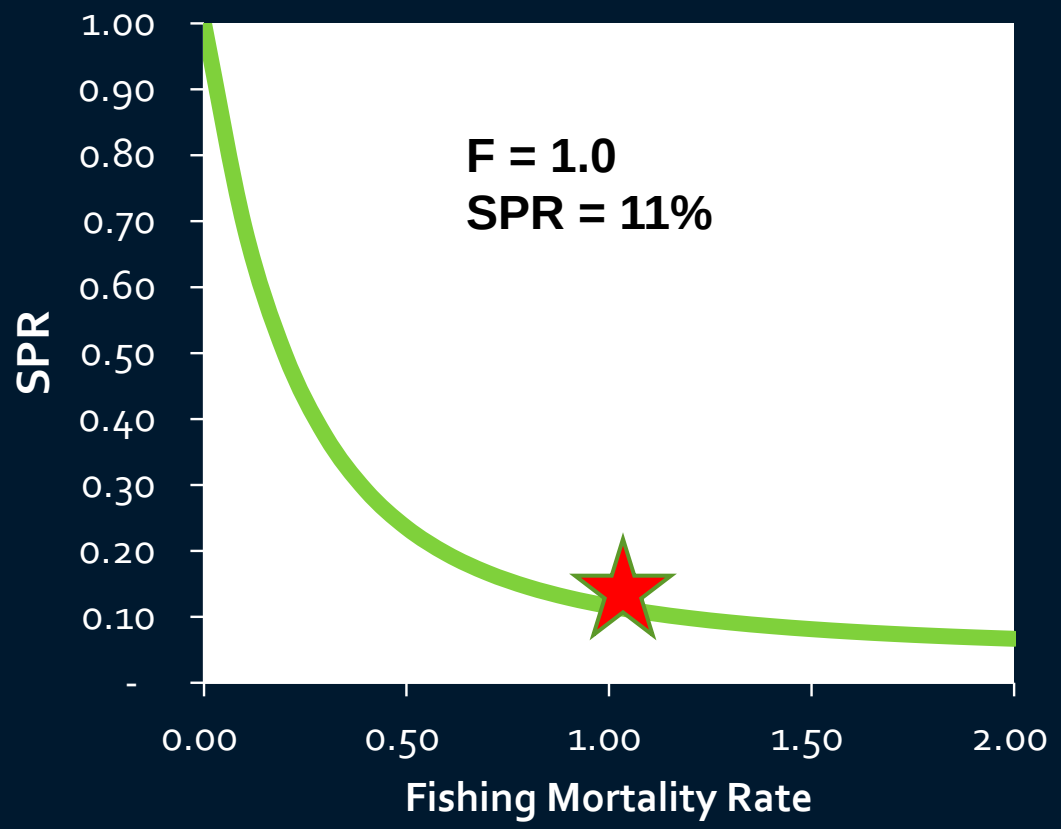
Reference points

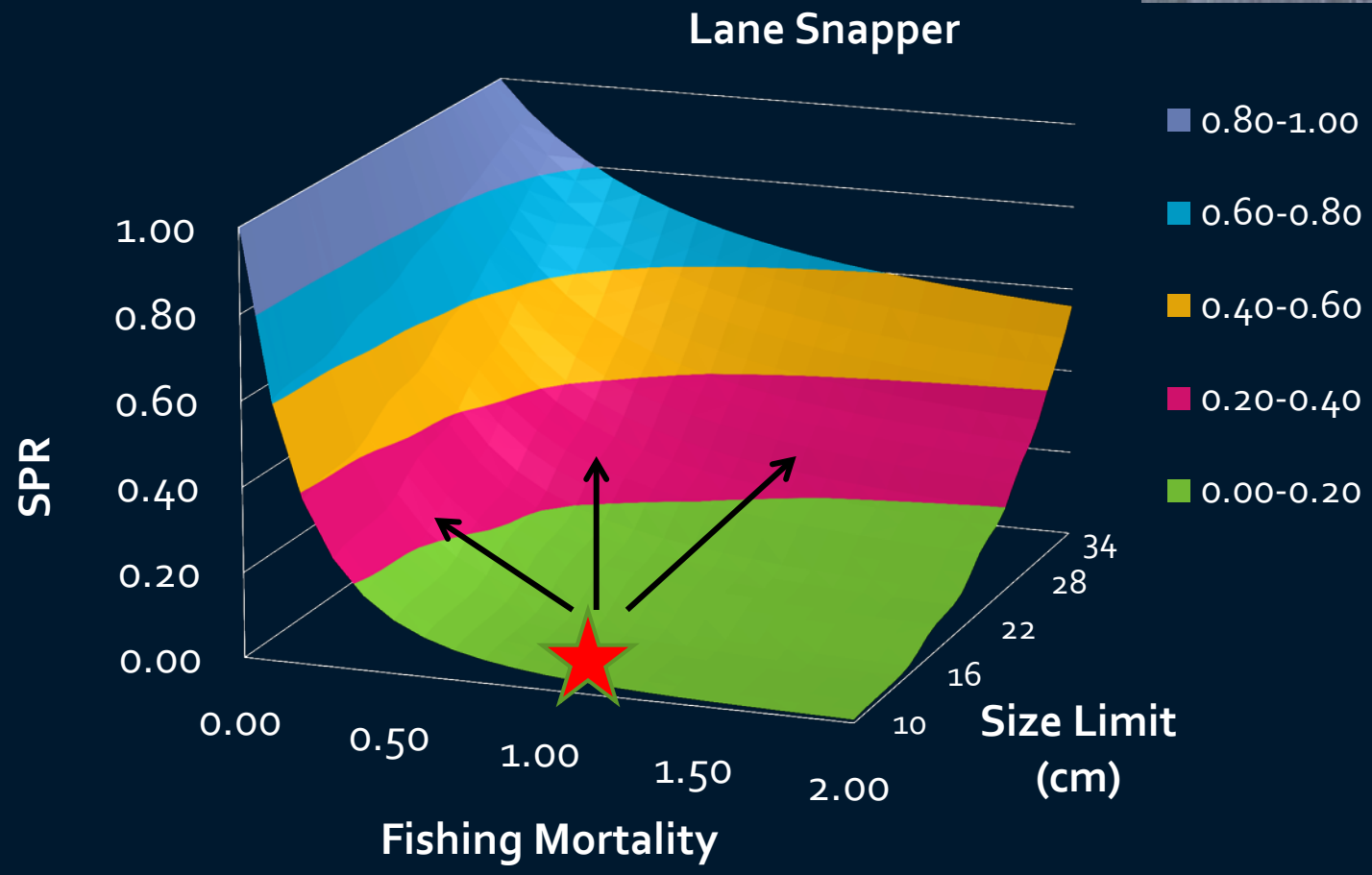



Length−frequency distribution of Lane Snapper
using all gear types
Sample Size= 7483
Frequency
0
500
1000
1500
2000
2500
15
20
25
30
35
40
45
Length (cm)


1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
-
SPR
F = 1.0
SPR = 11%
0.00
0.50
1.00
1.50
2.00
Fishing Mortality Rate

“If you don’t know where you’re going, you’ll end up someplace else”

Increase size limits or reduce fishing mortality



An Adaptive Management Framework for Decision-Making

Scenario	Performance Indicators: relative to target			Interpretation / possible causes	Suggested management response sequence
	SPR	***Local Knowledge***	*MPA Ratio*		
1	↑	↑	↑	o Stock productivity and fishery performance stable and/or increasing	<u>*No response required, but optionally:*</u> a) Make no change b) Ease harvest rate regulation
2	↓	↑	↑	o Fishery lightly harvested (i.e., fishing effort and harvest rates are low)	<u>*No response required, but optionally:*</u> a) Make no change b) Ease harvest rate regulation
3	↑	↓	↑	o Increased pressure or new gear o Low sample sizes of old fish o Large recruitment pulse o hyperstability	<u>*No response required, but optionally:*</u> 1) Confirm/monitor SPR values with multiple models/approaches a) No change (if SPR trends are stable/near limit) b) Harvest rate reduction or gear restriction c) No change (if sample sizes are small)
4	↓	↓	↑	o Potential early warning of growth and recruitment overfishing o Large recruitment pulse o hyperstability	<u>*No response required, but optionally:*</u> 1) Confirm/monitor SPR values with multiple models/approaches a) No change (if SPR trends stable) b) Harvest rate reduction (if SPR trends declining) a) Increase min size limit

Scenario	Performance Indicators: relative to target			Interpretation / possible causes	Suggested management response sequence
	SPR	***Local Knowledge***	*MPA Ratio*		
5	↑	↑	↓	o F and mean length still too high even though they have been decreasing o F or SPR estimate(s) in error?	<u>*Response required;*</u> Harvest rate reduction 1) consider additional regulatory options a) Increase min size limit
6	↓	↑	↓	o Overfishing, or o Error in calculations	<u>*Response required;*</u> Harvest rate reduction 1) consider additional regulatory options a) Increase min size limit
7	↑	↓	↓	o Overfishing, or o Error in calculations o Hyperstability in size	<u>*Response required;*</u> Harvest rate reduction 1) consider additional regulatory options a) Increase Min size limit
8	↓	↓	↓	o Overfishing	<u>*Response required;*</u> 1) Harvest rate reduction 2) consider additional regulatory options a) Increase Min size limit

Food For Thought

- What are the key elements of stock assessments?
- What types of information can be used in data poor stock assessments?
- What types of situations can data poor assessments facilitate?
- What data biases create challenges for data poor stock assessments?
- Why are density estimates from underwater surveys difficult to use in decision-making?