MOW WP1: Potential target reference points that consider profitability of fleets: south Pacific albacore longlining as an example

SciCOFish
SCIENTIFIC SUPPORT FOR THE MANAGEMENT OF COASTAL AND OCEANIC FISHERIES IN THE PACIFIC ISLANDS REGION

Background

- MOW candidate objective – maximizing the economic yields from the fishery (i.e., MEY)

- <u>Example</u> of how to make this operational through candidate TRPs

- Stimulate discussion on matters, including:
  – overall objective

  – appropriate economic quantities/values to be considered

  – potential implications of management options for the southern longline fishery

- emphasising principles and broad strategic approach, not specifics of the costs and assumptions used

The example

SP ALB
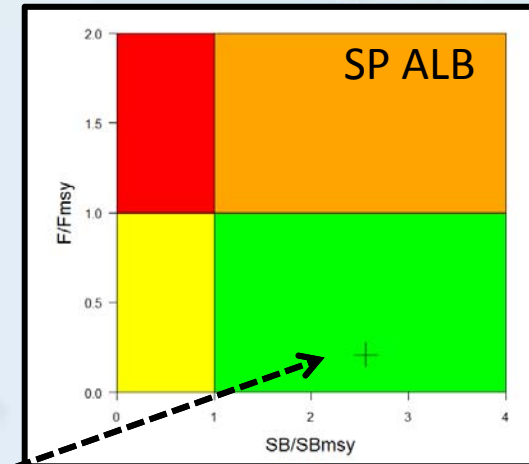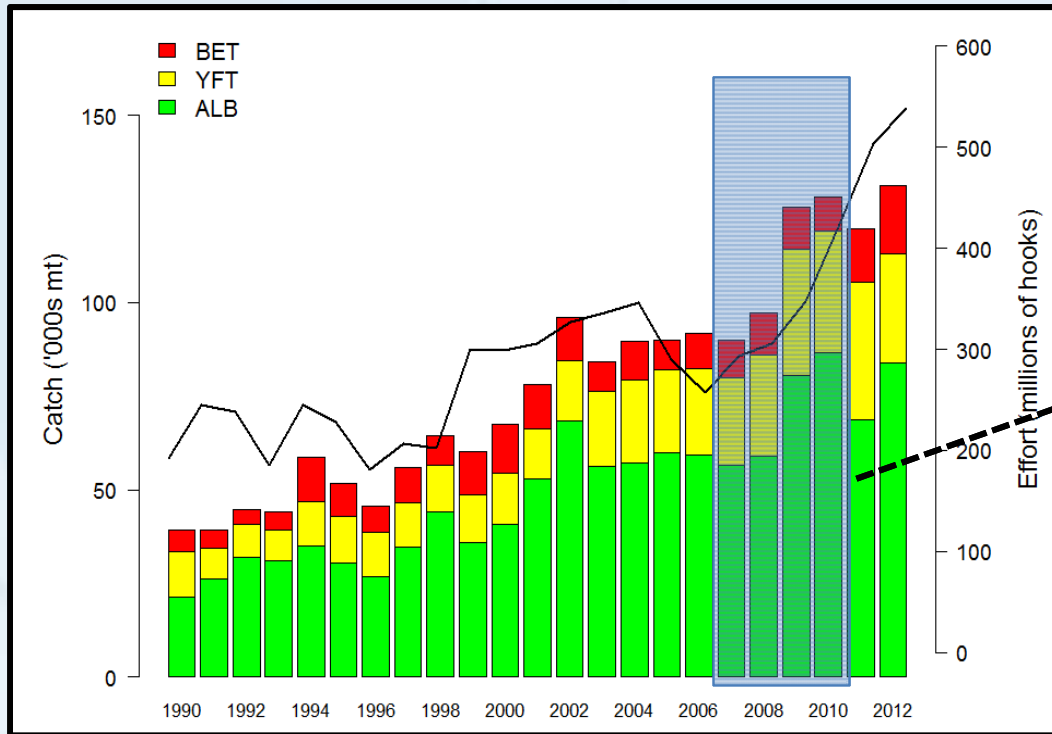
% Change from 2010 Effort	% Change Catch	% Change VB
-70	-57	34
-60	-47	26
-50	-39	20
-40	-32	14
-30	-25	8
-20	-19	4
-10	-14	-1
0	-10	-5
10	-5	-8
20	-1	-12
2012 levels	2	-14
40	5	-18
50	8	-20
60	11	-23
70	13	-25
80	16	-27
90	18	-29
100	20	-31

Note: effort scalar of 1.29 in 2012

Concerns for the SP albacore fishery coming from an economic standpoint (not a conservation one) because it is *increasing* overall effort and *reducing* catch rates that are currently of concern, not overall stock status.

Bioeconomic model - approach

- MEY – we define 'economic yield' as the net present **value** of the fishery over a 20 year period of fishing

- Given different effort levels, predict annual changes in catch

Fi**Find the level of effort that maximizes long-term resource rents**t)

(inc. 'normal' return on investment)   (inc. price received from all catch)

Resource rent *(profit)* = Revenues - Costs

$$\boldsymbol{\mathsf{L}} \left[\begin{array}{l} \text{the profit earned above and beyond that required} \\ \text{to justify undertaking fishing activity} \end{array} \right.$$

Projections (key features)

- Modelling simplified to provide a worked example rather than attempting to reflect full reality

- Change in longline effort (rel. 2010 levels) applied to 2012 SP ALB assessment model

- Scale longline effort in southern WCPFC-CA only (other fisheries/areas held at 2010 levels)

- Catches of YFT, BET, Billfish, and 'other' valued species included in catch values

- Economics assumed constant across fleets and regions

Economic conditions

Scenarios

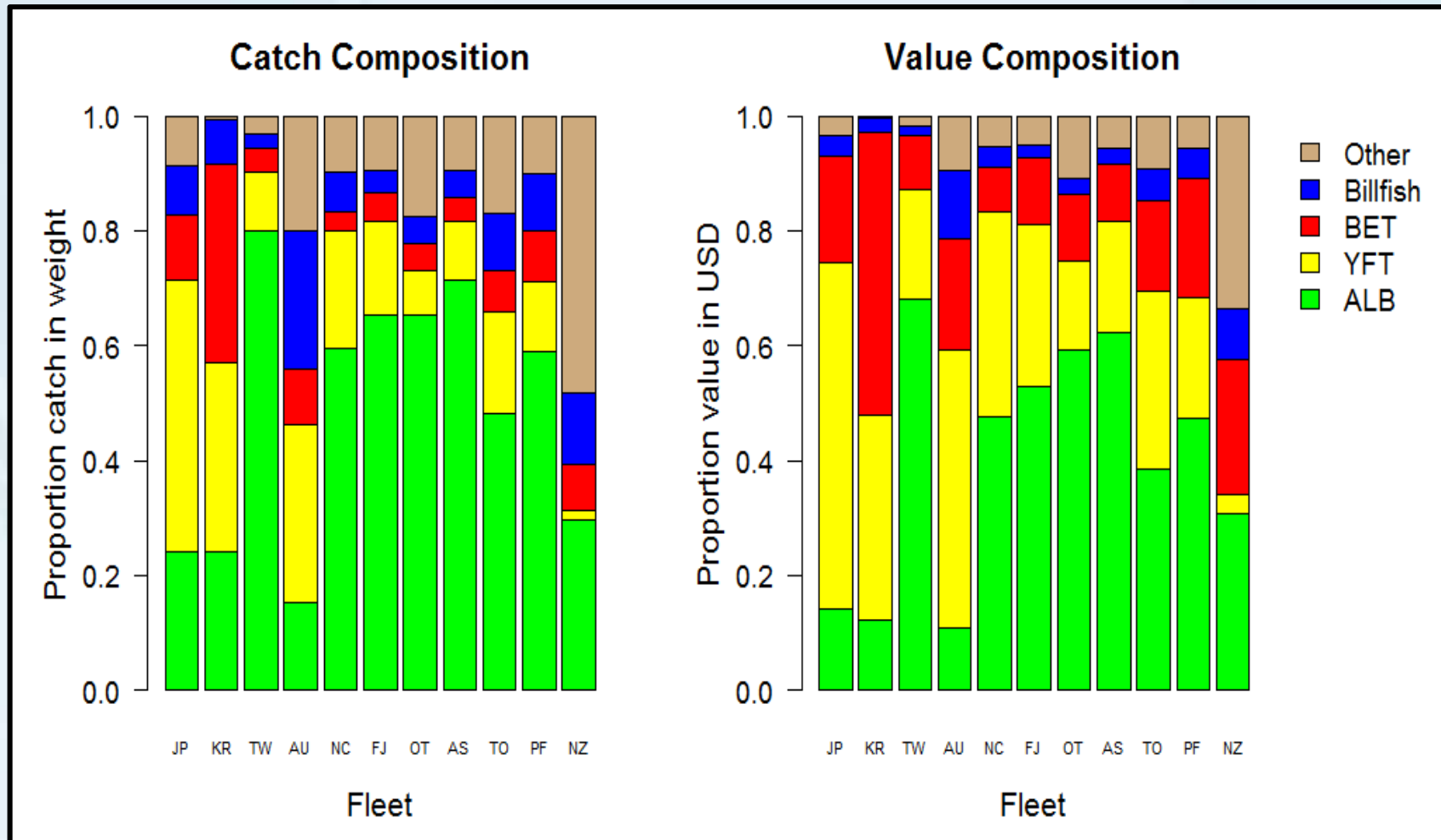| Parameter	Species	High	Med.	Low
Price/mt (USD)	ALB	3,500	3,116	2,731
	YFT	8,200	6,716	5,231
	BET	10,100	8,747	7,394
	Billfish	2,194	2,144	2,094
	Other[a]	2,094	2,094	2,094
Cost/hook (USD)		1.30	1.10	0.90
Discount rate		0.07	0.05	0.03

[a] Includes sharks and other finfish

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'typical' longline vessel

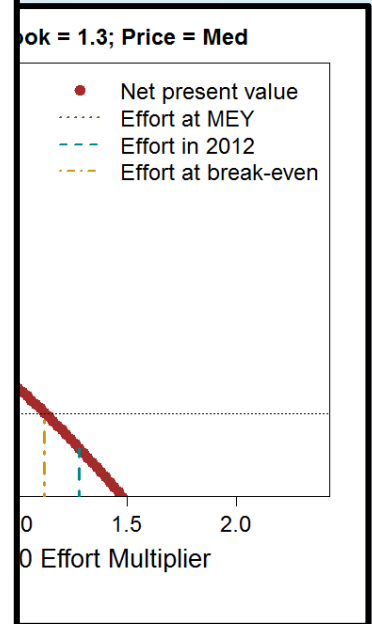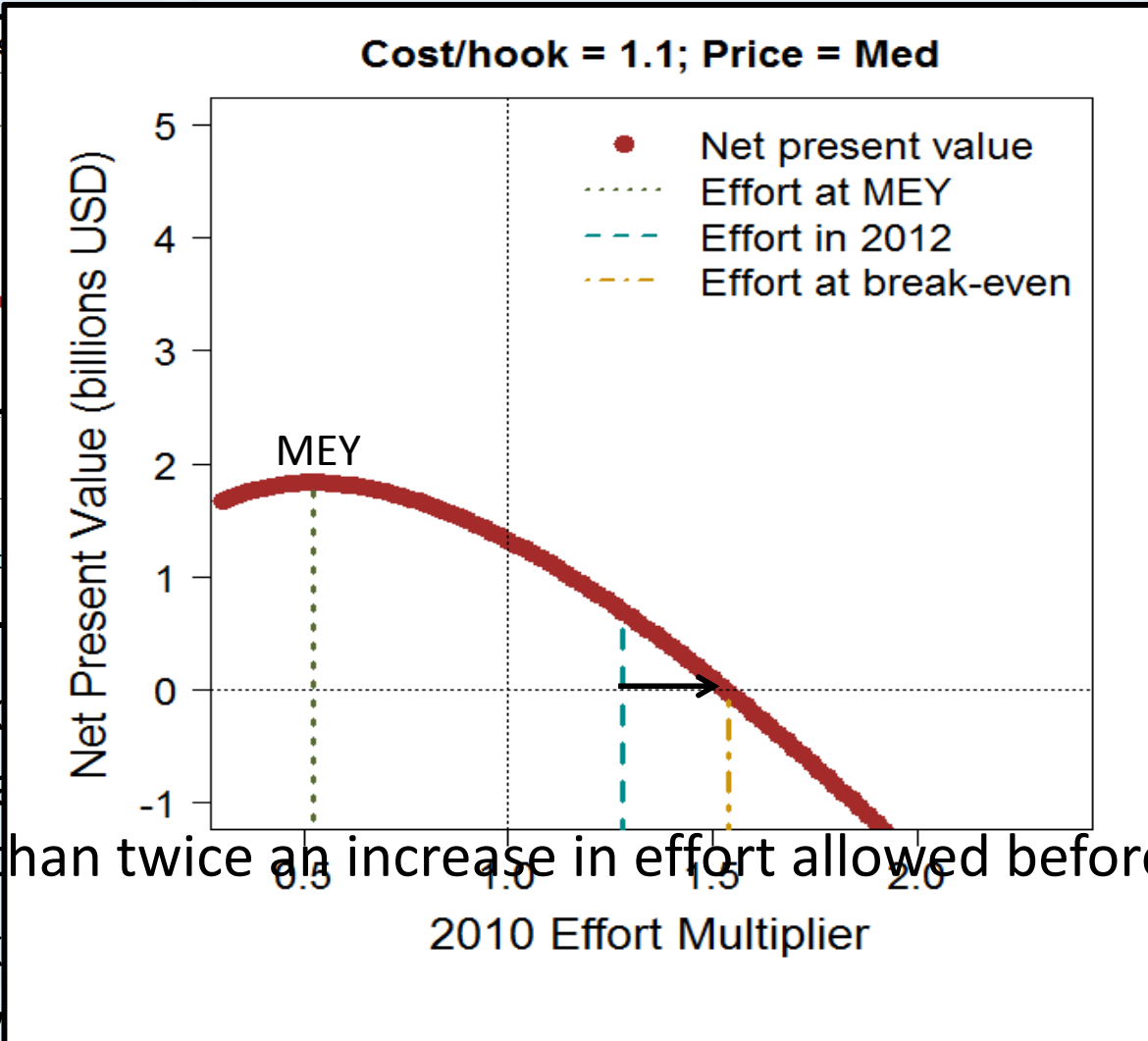vessel with lower costs (e.g. technically efficient)

$3^3 = 27$ combos
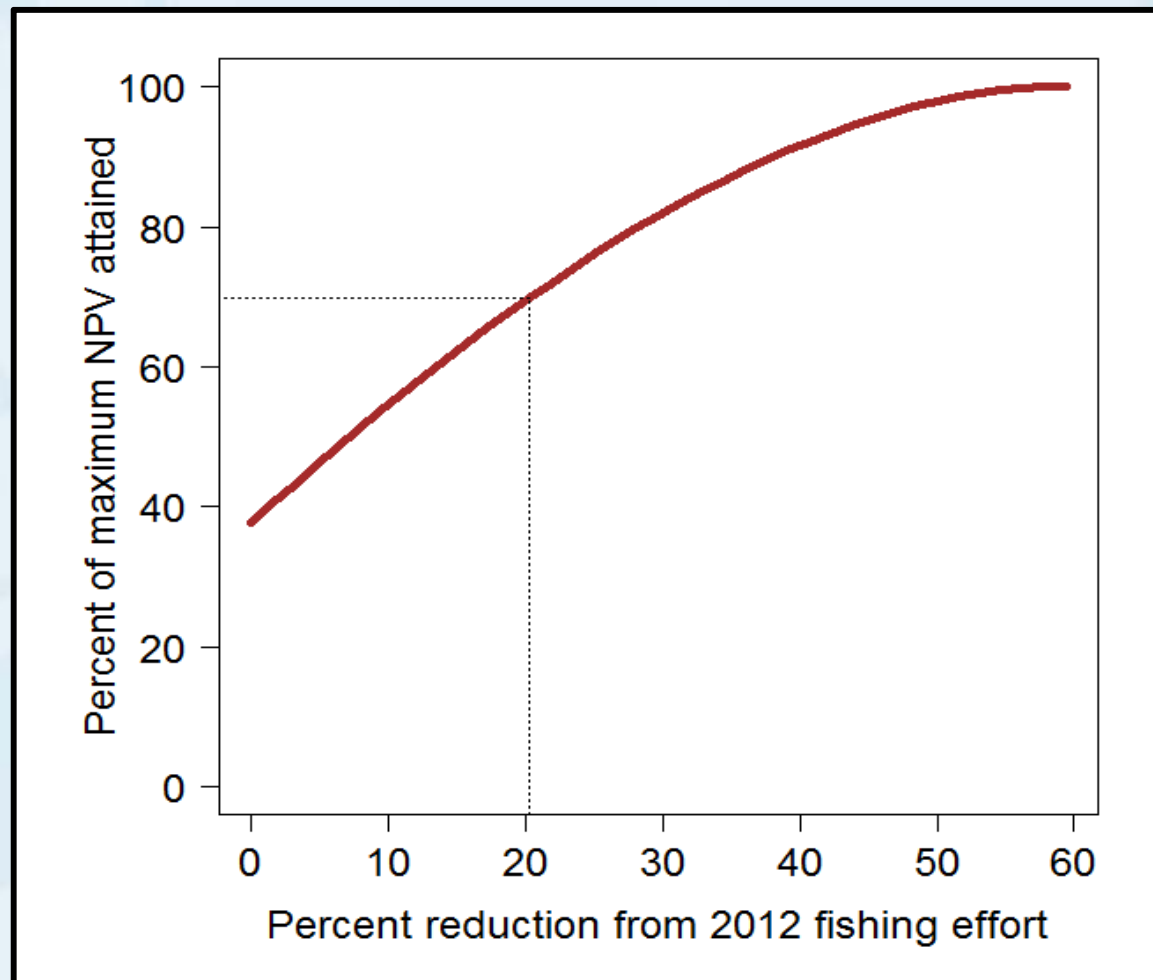
Catch/value composition (2030)

'medium' price structure

MEY/Break-even points
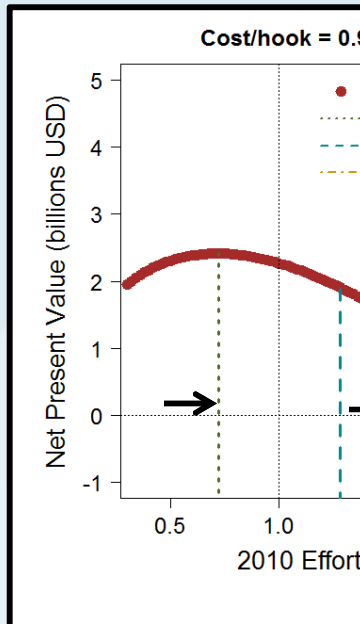
- Cost/hook
  - effort a ... sts
  - more than twice an increase in effort allowed before break-even
- Cost/hook
  - fishery

Increase in value greatest with initial effort reductions

Performance indicators (effort at MEY)

Relative Price Structure	Cost/hook (USD)	PERFORMANCE INDICATOR AT MEY					
		Scalar at Max. NPV (rel. 2010 Effort)	Forgone Value (million USD)	Catch ALB-SP (MEY) (mt)	Catch MEY/MSY %	Biomass SBMEY/SBMSY ratio	Change ALB CPUE (MEY) ratio
MEDIUM	1.3	0.38	1,965	45,998	47	3.08	1.28
	1.1	0.52	1,168	56,551	58	2.86	1.18
	0.9	0.72	526	68,704	70	2.61	1.07

Note: effort scalars of 1.13 and 1.29 correspond to observed 2011 and 2012 effort levels releative to 2010

Performance indicators (effort at break-even)

Relative Price Structure	Cost/hook (USD)	PERFORMANCE INDICATOR AT Break-Even				
		Scalar at Break-Even (rel. 2010 Effort)	Catch ALB-SP (mt)	Vul. Biomass ALB-SP (2030/2010)	Catch YFT-SP (mt)	Catch BET-SP (mt)
MEDIUM	1.3	1.12	83,071	0.91	22,177	10,257
	1.1	1.54	95,612	0.79	24,861	10,988
	0.9	2.14	107,849	0.66	27,659	11,906

Note: effort scalars of 1.13 and 1.29 correspond to observed 2011 and 2012 effort levels releative to 2010

Main conclusions

- Analysis based on current catch and effort settings for SPA suggest there is considerable loss of potential economic value
  - To achieve MEY estimated that reductions of 14-70% of 2010 effort levels required, depending on economic conditions

- Substantial gains in value (and improved catch rates) can be made even with only moderate reductions in fishing effort

- Vessels with lower costs will have sufficient returns to stay in fishery long after other 'average' vessels with higher costs will exit the fishery due to inadequate returns

- Resource rent at MEY or %MEY is one potential economic indicator that can help define TRPs (others incl. employment or other onshore economic benefits); all require access to industry/market data

Discussion points

- What economic indicators are most suitable for the calculation of the Maximum Economic Yield?

- Do we want to maximise economic yield – or just get 'pretty good' economic yield?

- How do you consider the differing economic performance of fleets, in particular consideration of SIDs fleet performance when considering MEY-based target reference points?

- The importance of secondary species when determining economic returns and impacts/linkages with other fisheries.

- Should bioeconomic analysis like this form part of the work of the Commission? If yes, how might it be done?