

Parallel dimensions of fisheries enhancement: evaluating societal support for stocking two recreational fisheries



James Tweedley, Clara Obregón, Sarah Poulton, Denis Abagna, Michael Hughes, Neil Loneragan, Malcolm Tull & Anne Garnett



Introduction

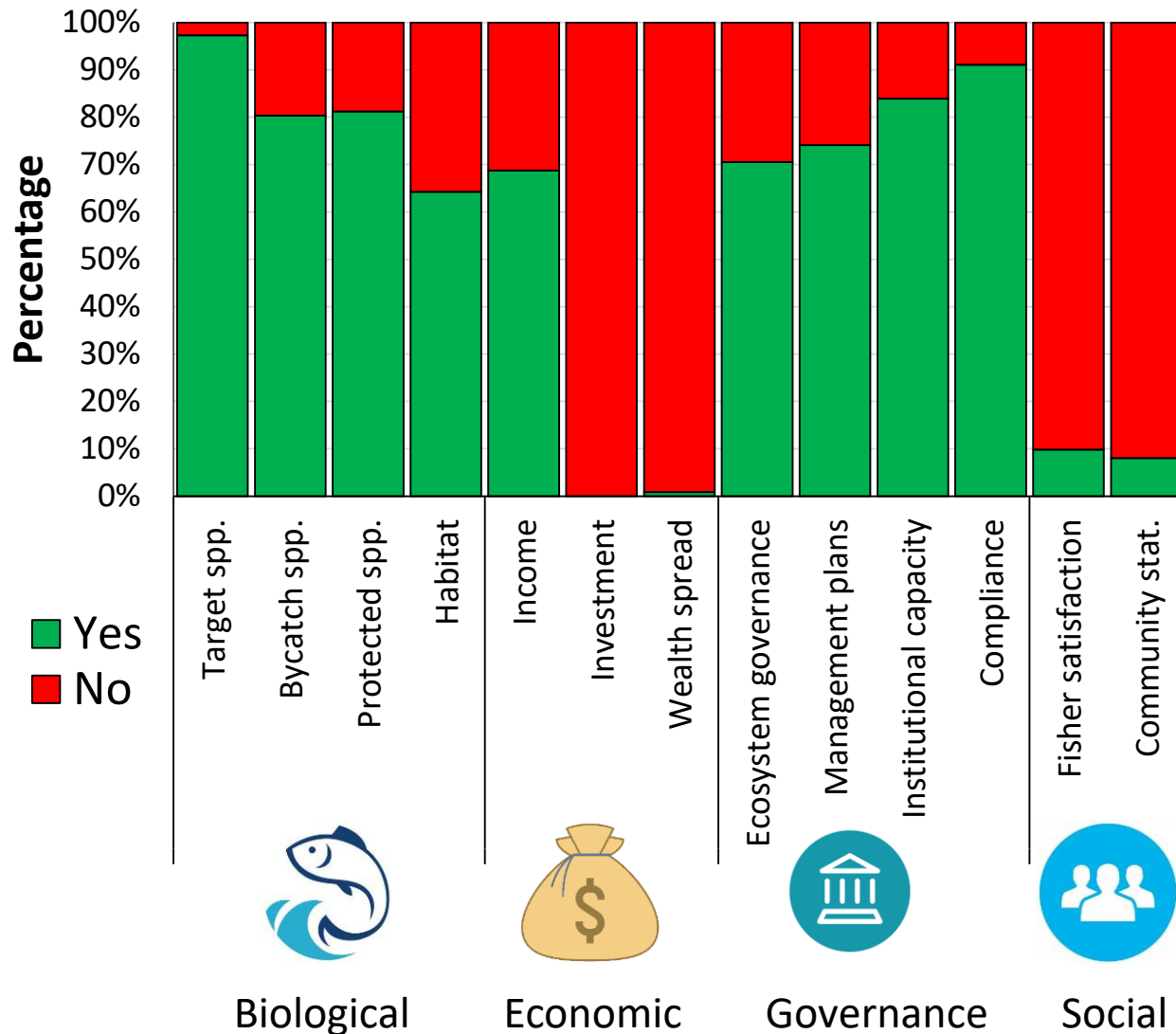
- Recreational fishing engrained in Australian culture
- Particularly high participation in WA (30%)
- Increasing pressures on WA fisheries
- Anthropogenic degradation of estuaries & coastal waters
- Compounded by marine heat-wave
- No. of rec. fishers doubled in last 25 year
- Aquaculture-based enhancement part of the fisheries managers toolbox



Parallel dimensions

- Traditional focus on biological aspects of fisheries
- Less research and evaluation of economic and social aspects
- Manage the fish and fisher
- Similar situation in ABE
- Despite “*Assess economic and social benefits and costs of enhancement*” in the responsible approach

Australian Fisheries
Healthcheck



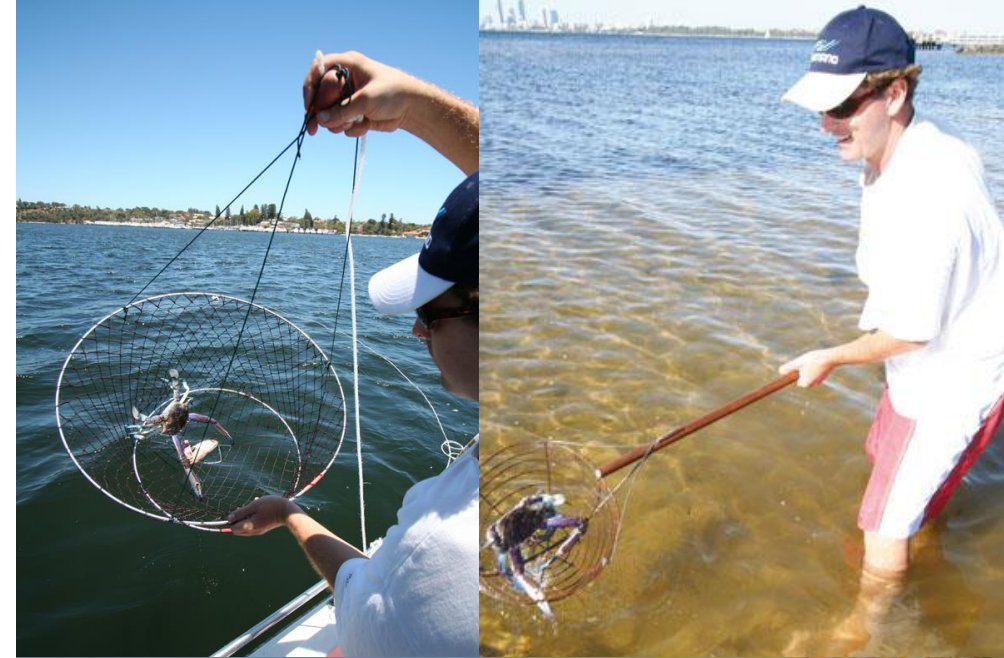
Target species

Blue swimmer crab (*Portunus armatus*)

- Most popular recreational species
- 900,000 crabs caught from boaters in 2013/14
- Substantial shore-based fishery too
- Caught using scoop and drop nets

Black Bream (*Acanthopagrus butcheri*)

- 61k caught in WA (1-11 t retained)
- 74% released (undersize and catch/release)
- Caught by line fishing from boat or shore
- 5th most popular finfish



Study aims

Improve our understanding of the social and economic dimensions of ABE in Western Australia

1. Elicit and measure the strength of recreational fishers' beliefs and associated attitudes regarding enhancement
2. Compared the level of support for enhancement against other fisheries management tools
3. Estimate the willingness to pay for such any enhancement

Sampling methodology

- Two sequential survey methods
 1. An initial face-to-face open question interview
 2. An online closed questionnaire



Online questionnaire

- Built using SurveyGizmo

Your fishing motivation

3. Why do you fish for Blue Swimmer Crabs? (Select any that apply)

- Food
- Pleasure
- Time with family
- Time with friends
- Enjoyment of catch
- Enjoyment of outdoors
- Other - Write In



Recfishwest with Murdoch Uni.
Paid Partnership · 



Estuaries provide safe, sustainable, enjoyable and accessible fishing experiences for many Western Australian families.

Black bream are a popular target species in estuaries and are of great importance to recreational fishers. Our state-wide fishing survey undertaken in 2015/16 survey showed they're the 5th highest caught finfish in WA!

We're partnering with Murdoch University to find out more about your bream fishing experiences, your expectations, estimated spend and what keeps you coming back for more, in order to guide the future management of black bream fisheries in WA.

Please spend a few minutes telling us about your bream fishing experiences here: <https://tinyurl.com/y53eqou3>.

Entrants can win one of several \$100 vouchers for a tackle store of your choice.

[Murdoch Uni WA Bream Classics](#) [WA Bream Anglers Fishing Western Australia Perth & WA Fishing Reports](#) [Fishing in Western Australia](#) [Western Angler magazine](#) [Albany Fishing](#)

14. Using restocking as a management option for Blue Swimmer Crabs in the Estuary will increase the number of crabs

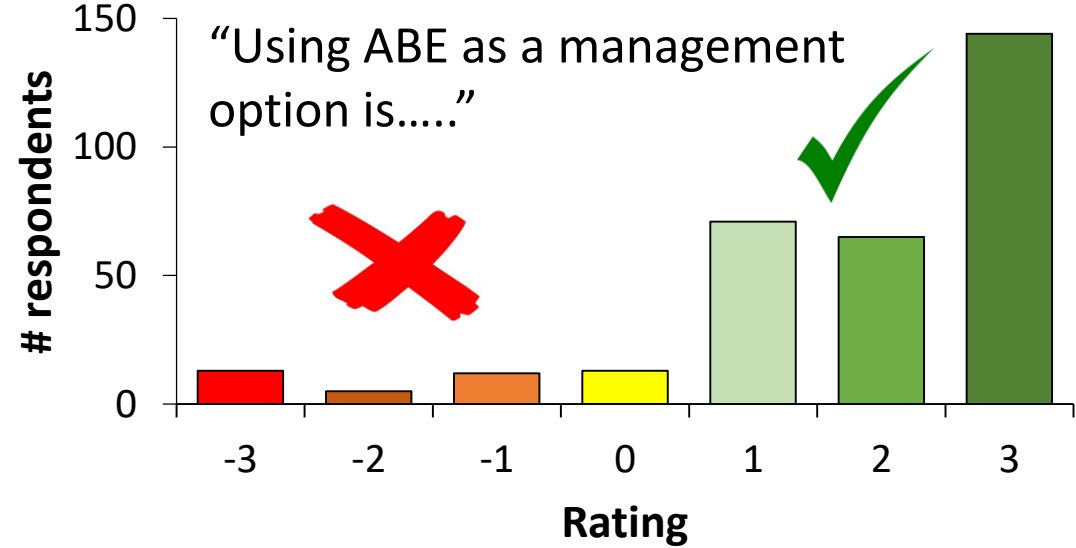


15. Increasing the number of Blue Swimmer Crabs in the Estuary is



Fishers' beliefs & associated attitudes

- ABE rated positively as a management option
- Fishers asked to state + and - effects of ABE
- How likely the effect was (strength)
- What effect it would have (evaluation)
- Scores multiplied together



Good

- Increased number of crabs (12)
- More crabs to catch (12)

Bad

- Increase in fishing pressure (-4)
- Impact on the environment (-2)

Table 3.3. The belief strength (grey) and belief evaluation (white) rating scales and the subsequent cross-product values (i.e. the belief-based attitude; colour).

Belief strength		very unlikely	unlikely	somewhat unlikely	neutral	somewhat likely	likely	very likely
Belief evaluation		0	1	2	3	4	5	6
very bad	-3	0	-3	-6	-9	-12	-15	-18
bad	-2	0	-2	-4	-6	-8	-10	-12
somewhat bad	-1	0	-1	-2	-3	-4	-5	-6
neutral	0	0	0	0	0	0	0	0
somewhat good	1	0	1	2	3	4	5	6
good	2	0	2	4	6	8	10	12
very good	3	0	3	6	9	12	15	18

Rec fishers believe ABE has strong positive outcomes, but also recognise that there are some negative outcomes, albeit these are perceived as less likely to happen

Contrasting social values

Blue Swimmer Crabs

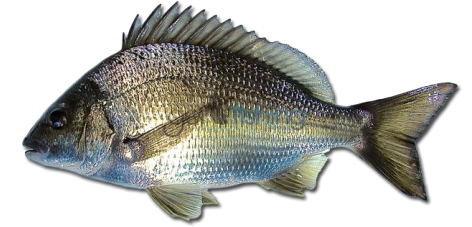


Motivation	%
Food	92
Enjoyment of catch	67
Enjoyment of outdoors	65
Pleasure	65
Time with family	51
Time with friends	48

Motivation	Rating -3 to +3
Catching enough crabs to eat	1.89
Catching big crabs	1.89
Being with friends/family is enough	1.52
Being outdoors is enough	1.44
Catching as many crabs	0.43
Catching some crabs	-0.57



Black Bream



Motivation	%
Sport / Challenge	81
Enjoyment of outdoors	67
Pleasure	64
Relaxation	63
Catching a big fish (> 30cm)	58
Time with friends/family	39
Food	15
Easy access	12

Motivation	Rating -3 to +3
Catching a big bream	2.33
Having a relaxing day	1.70
Catching a legal sized bream	1.64
Being outdoors is enough	1.44
Catching a bream no matter the size	1.08
Being with friends/family is enough	1.07
Good weather conditions	0.63
Catching my bag limit of bream	-0.94



Social media: Crabs



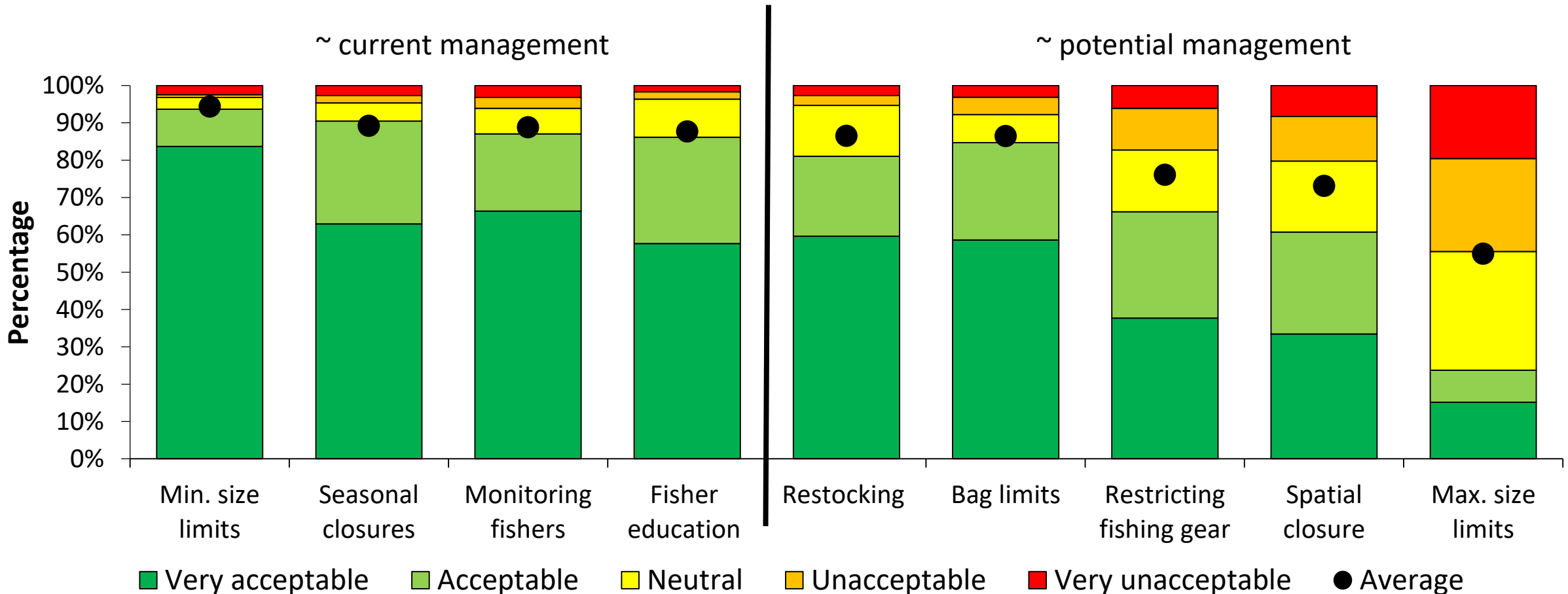
Blue Manna Crabbing WA

Social media: Black Bream



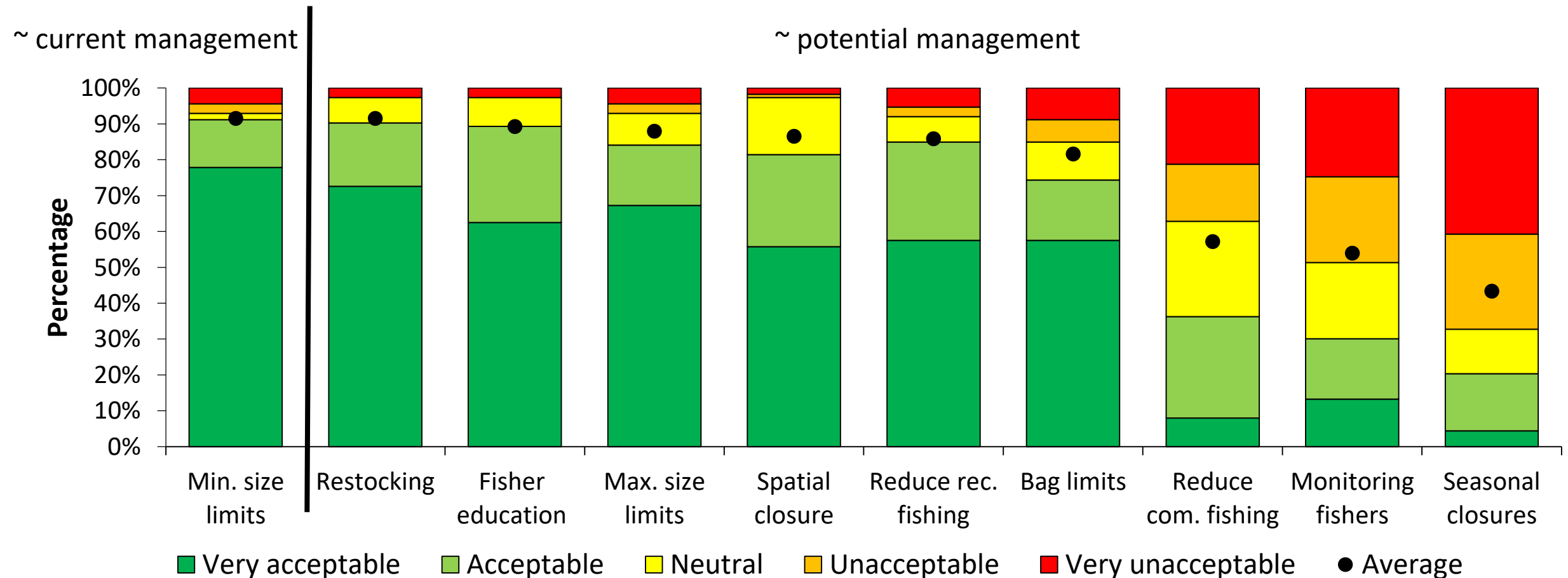
Management options: Crabs

- The fishery is well managed: **Yes 27 No 39**
- Stocks need better management: **Yes 69 No 22**



Management options: Bream

- The fishery is well managed: **Yes 14** **No 46**
- Stocks need better management: **Yes 74** **No 3**



Cost of a fishing trip

- ↑ avg. \$ for Bream fishing
- Higher cost of fishing gear
- Need for bait and soft-plastic lures
- Fish for longer times so ↑ food
- Moreover....greater opportunity cost due to ↑ travel and fishing time for Bream

Item	Crab	Black Bream
Boat fuel	\$22	\$14
Bait and tackle	\$11	\$40
Ice	\$9	\$2
<i>Subtotal</i>	<i>\$42</i>	<i>\$56</i>
Food	\$18	\$44
Gear	\$25	\$214
Total	\$85 AUD	\$314 AUD



Willingness to pay for ABE

- ABE supported by 81% crab and 91% Bream fishers
- 65% of fishers (both fisheries) willing to pay for ABE
- \$ ranged from \$0.30 to \$105 AUD (\$40 fishing licence)
- Average \$15 (crabs) and \$20 (Bream)
- Mismatch!
- Building a business case for stocking....
- ABE would increase frequency of fishing and expenditure
- Crab ABE estimated 57% (Peel) & 135 (Swan) % increase in \$\$\$
- Bream: 165% (Swan) and 426% (Walpole)



Conclusions

- Rec fishers believe ABE has strong positive outcomes.
- There are some negative outcomes, although minor and unlikely to occur
- Motivations for fishing can differ markedly between species
- Fishers not happy with current fisheries management
- Stocking less popular than established management, but more than new management regulations
- Expense profiles different for the two fisheries
- Mismatch in support for ABE and willingness to pay
- Additional licence fee not sufficient

Take home message

Time to move **beyond biology** and into the parallel dimensions and take a more **holistic approach**





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WAFIC



Recreational Fishing
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