A social-ecological assessment of partially protected marine areas *How effective are they?*

John Turnbull, Graeme Clark and Emma Johnston
University of NSW / Sydney

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Evaluating the social and ecological effectiveness of partially protected marine areas

John W. Turnbull, Emma L. Johnston, Graeme F. Clark

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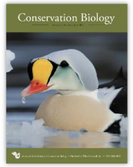
Article impact statement: Partially protected areas create an illusion of protection and consume conservation resources for little or no social–ecological gain.



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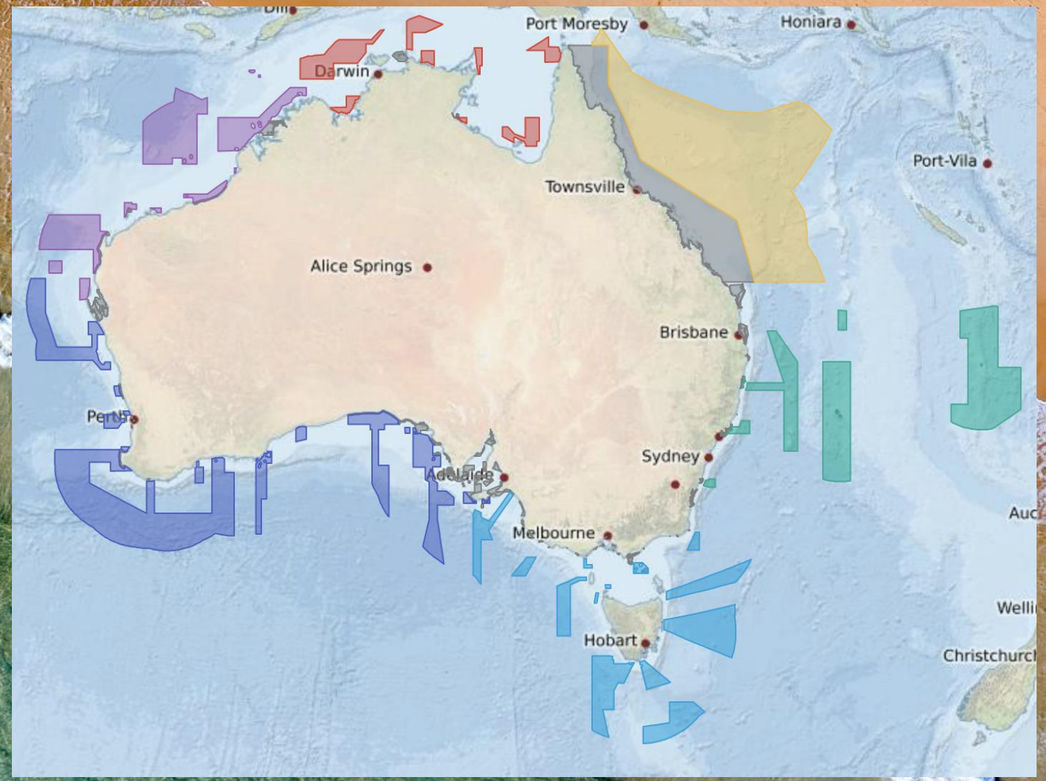
Figures | References | Related | Information

Recommended

On the surface we're doing ok

- Australian MPAs
  - 36% Commonwealth waters
  - 42% State waters
  - ***25%*** of these are fully protected
- Global MPAs
  - 8% of oceans protected
  - ***30%*** of these are fully protected
- 30% x 2030
  - USA, UK, Australia and others
  - But what is "protected"???



Should we count PPAs as “protected”?

Biological responses in marine no-take reserves versus partially protected areas

Sarah E. Lester[1,3,*], Benjamin S. Halpern[2]

Evaluating the relative conservation value of fully and partially protected marine areas

Marija Sciberras[1], Stuart R Jenkins[1], Rebecca Mant[2], Michel J Kaiser[1], Stephen J Hawkins[3] & Andrew S Pullin[2]

No-take marine reserves are the most effective protected areas in the ocean

Enric Sala[1]* and Sylvaine Giakoumi[2]

Key drivers of effectiveness in small marine protected areas

John W. Turnbull[1,3] · Yasmina Shah Esmaeili[2,3] · Graeme F. Clark[1] · Will F. Figueira[2,3] · Emma L. Johnston[1,3] · Renata Ferrari[2,3,4]

Some benefit, but non-significant

Some benefit for targeted species, but inferior to FPAs

No benefit over open areas

Our PPAs allow *substantial* human impact

Species that can be taken from Habitat Protection zones*

*Some of the Habitat Protections zones (HPZ) in Port Stephens - Great Lakes Marine Park have additional rules, including Dutchies Beach HPZ where no hand picking or attempting to take any invertebrate fish by hand picking is permitted . Please check the User Guide (PDF, 2665.04 KB) for further details.

Common name	Class or Family	Species
Finfish (fish with fins and scales)	Class Osteichthyes	All species
Shark, ray	Class Chondrichthyes	All species
Lobster, crayfish	Family Palinuridae	All species
Slipper lobster	Family Scyllaridae	All species
Prawn	Family Penaeidae	All species
Squid	Family Sepiidae	All species
Cuttlefish	Family Spirulidae, Sepiidae and Sepiadariidae	All species
Beach worm	Family Onuphidae	All species
Ghost shrimp, Marine yabby (nipper)	Family Callianassidae	All species
Mud crab	Family Portunidae	*Scyalla serrata*
Blue swimmer crab	Family Portunidae	*Portunus pelagicus*
Rock crab	Family Grapsidae	All species

Activity	Sanctuary Zone	Habitat Protection Zone	General Use Zone
Recreational fishing			
Line fishing	✗	✓*	✓
Spearfishing	✗	✓*	✓
Trapping	✗	✓*	✓
Bait collection	✗	✓*	✓
Nets (scissor, hand hauled, scoop, landing, hoop)	✗	✓*	✓
Collecting			
Recreational shell collecting	✗	✓*[2]	✓*[2]
Collecting for aquariums - commercial and private	✗	P*	P
Recreational seaweed collection	✗	✓*[2]	✓[2]
Non-Extractive Recreational Activities			
Navigation of vessels	✓	✓	✓
SCUBA diving and snorkelling	✓[3]	✓[3]	✓[3]
Motorised water-sports	✗[4]	✓	✓
Hovercraft, airboat and seaplane	P	P	P
Domesticated animals	✓[5]	✓[5]	✓[5]
Competitions			
Line and spearfishing	✗	P*	P
Other (non-extractive)	P	P	P
Other Activities			
Aquaculture	✗	P[1]	✓[1]
Anchoring	✓[6]	✓	✓
Organised sporting or other activity	P	P	P
Research	P	P	P
Commercial Tourist Activities			
Commercial tour operators (non-extractive)	P	P	P
Charter fishing	P	P*[1]	P
Commercial Fishing			
Fish and prawn trawling	✗	✗	✓[7]
Beach hauling/purse seine/lift net	✗	✗[8]	✓
Line fishing	✗	✓*	✓
Fish and lobster trapping	✗	✓*	✓
Hand gathering	✗	✓*	✓
Longline/setline/dropline	✗	✗	✗
Estuary prawn netting	✗	✗[9]	✓
Estuary - mesh and haul netting	✗	✗	✓[10]
Crab and eel trapping	✗	✓*	✓

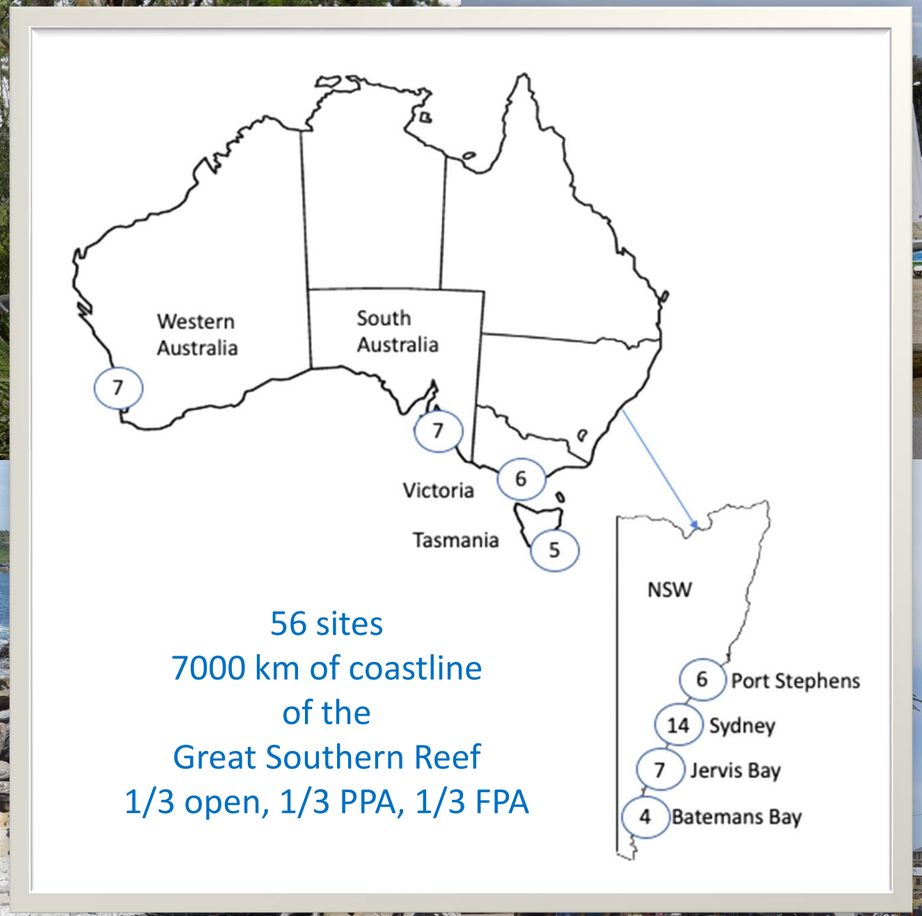
Port Stephens Great Lakes Marine Park

Is ¾ of our MPA network working?

- "Working"
  (in Australian terms)…
  - 1ry: Ecological goals eg
    - Biodiversity
    - Ecological processes
  - 2ry: Social goals eg
    - Sustainable use
    - Appreciating nature
    - Learning experiences

- Why does this matter?
  - Opportunity cost
  - Social / economic costs
  - Ecological costs

Study sites - GSR



56 sites
7000 km of coastline
of the
Great Southern Reef
1/3 open, 1/3 PPA, 1/3 FPA

Study methods

Social:

190 site surveys

439 interviews

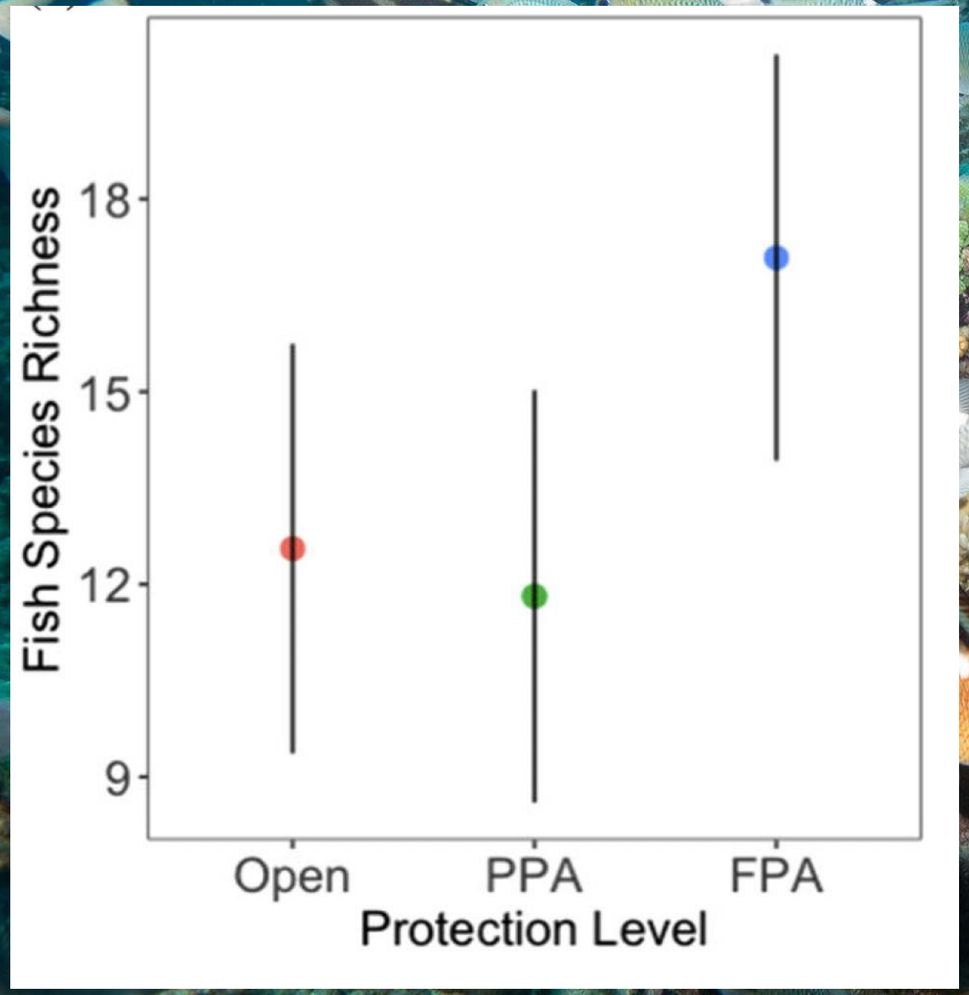
Ecological: 625 RLS

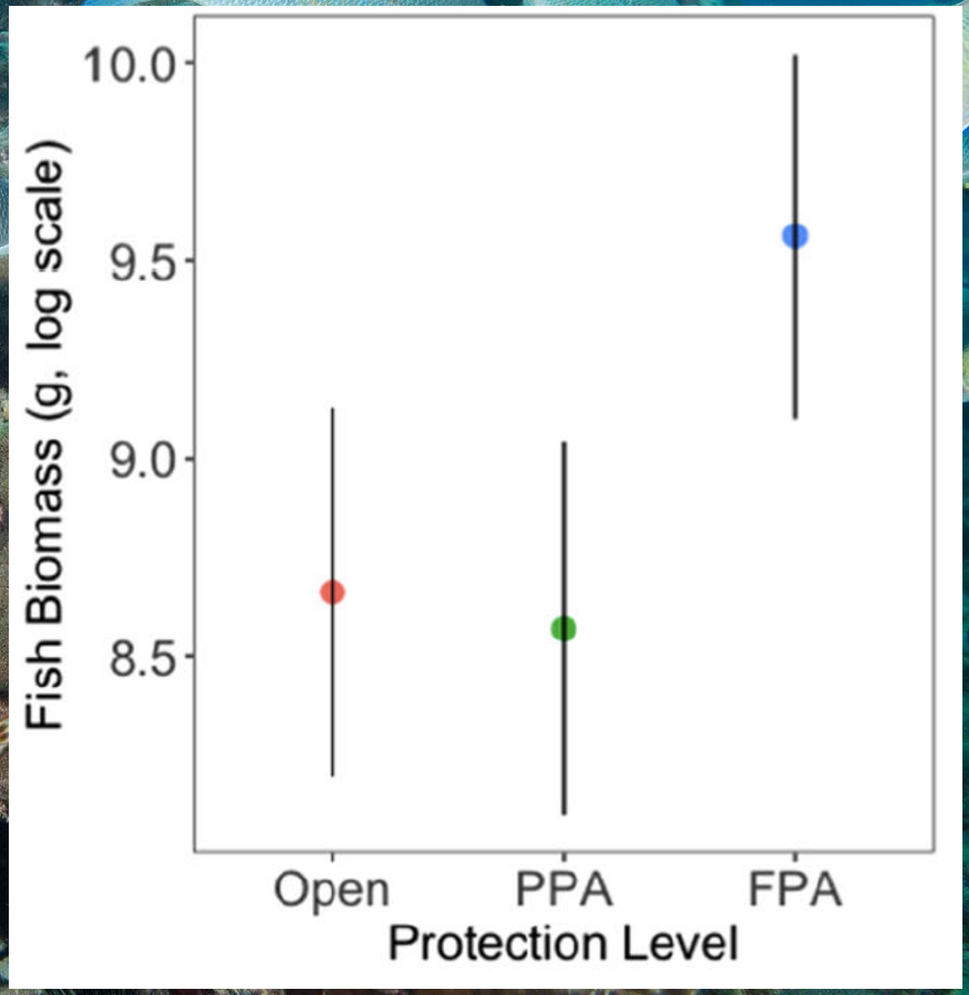
Results

Partially-protected areas were no better than open areas for any of our assessment criteria

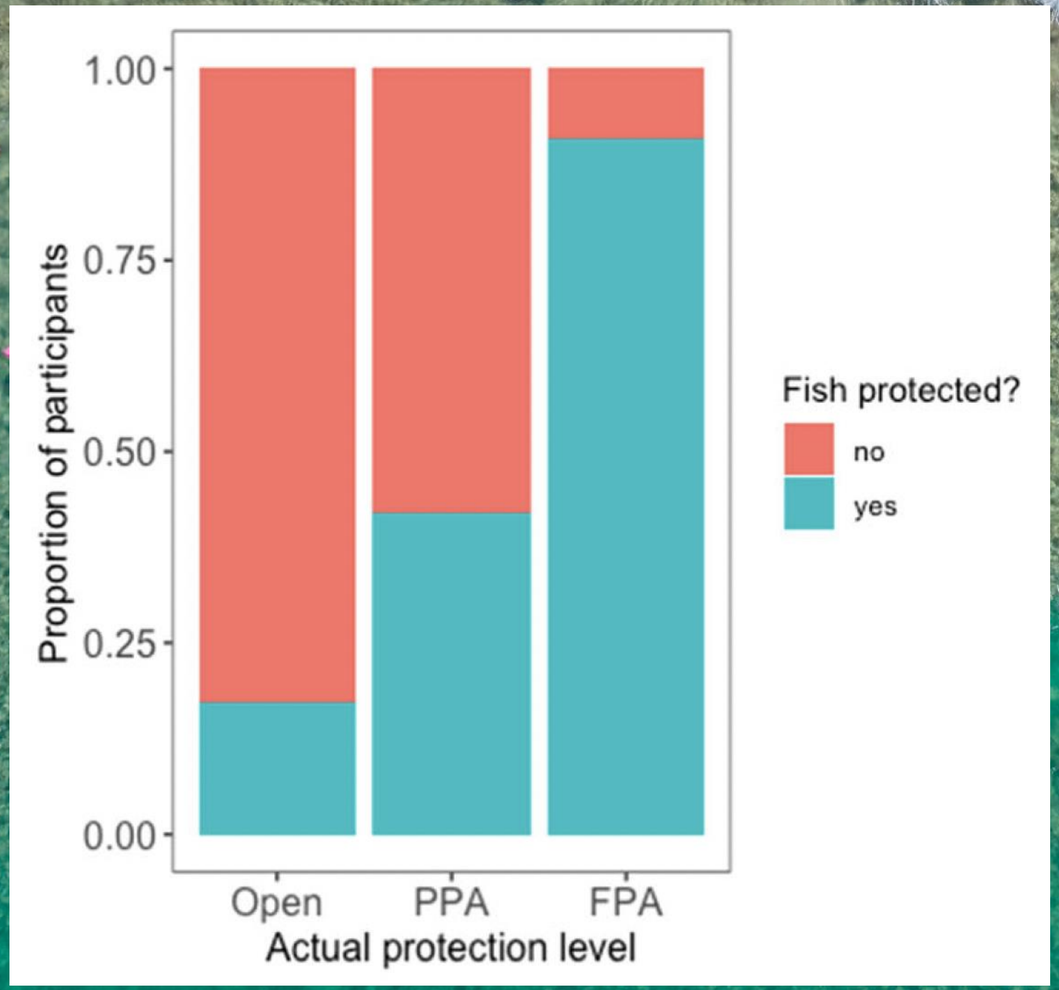
		PPA	FPA
Ecological			
	Fish diversity (species richness)		⇧
	Fish biomass		⇧
	Large (20+ cm) fish biomass		⇧
	Mobile macro-invertebrate diversity (sp. richness)		
	Mobile macro-invertebrate abundance	⇩	⇩
	Mobile macro-invert abundance (excl. urchins)		
	Sessile invertebrate diversity (CATAMI)	⇩	
	Sessile invertebrate cover	⇩	
	Algal diversity (CATAMI)		
	Algal cover		
Social			
	Human usage community		⇔
	Attraction to ecological values		⇧
	Attraction to protection values		⇧
	Understanding of MPA and level of protection	⇩	⇧
	Perception that marine life is better at site		⇧
	Perception that marine life is improving over time		⇧

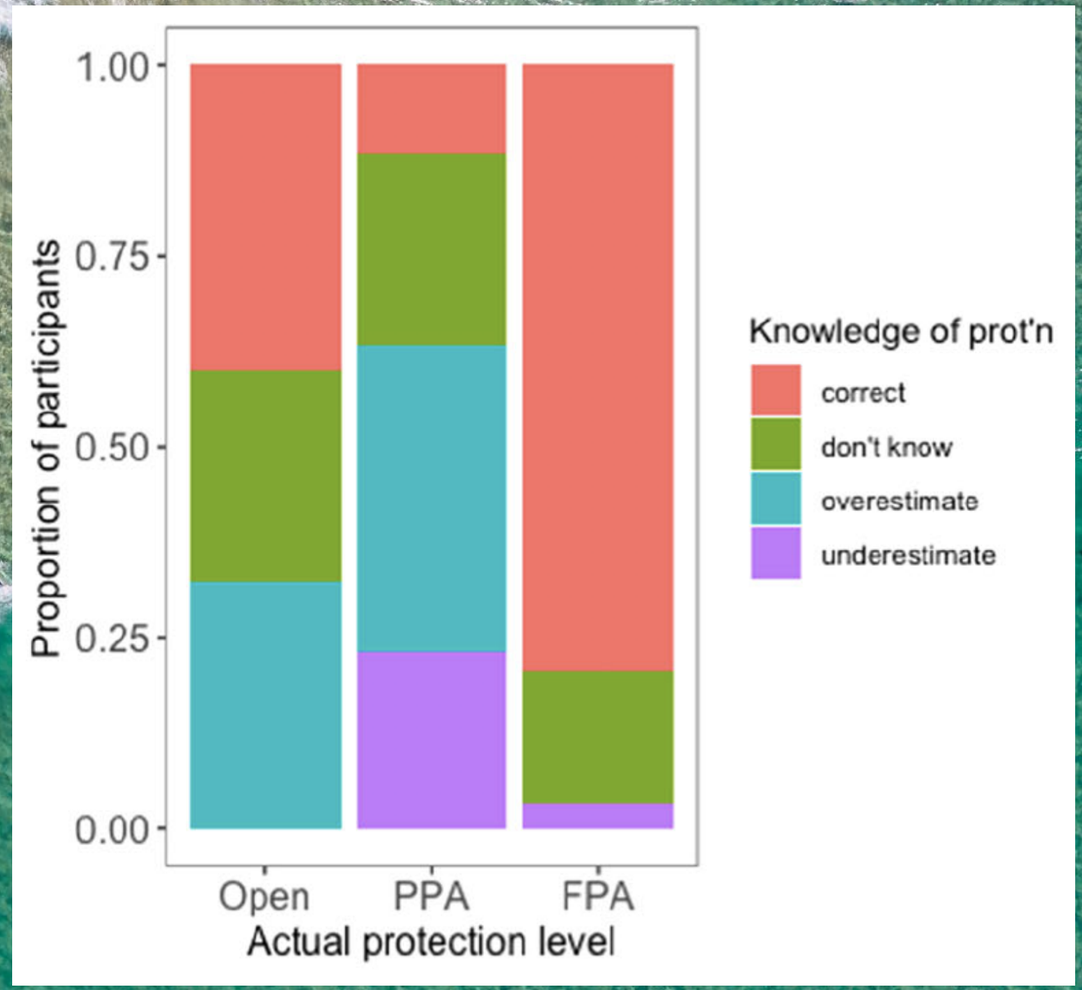
Ecological results





Social results





More social results

	Partially protected areas	Fully protected areas
Popularity (measured as attendance)	No significant difference vs open areas	2x SCUBA divers, 3.5x snorkelers, almost no fishers
Attraction to ecological values	No significant difference vs open areas	Significantly higher than open areas and PPAs (p=0.01)
Perception of marine life compared to nearby areas	No significant difference vs open areas	Significantly better and improving (in-water users) (p=0.017)

Coastal users expressed high support for FPAs (92%) including among people who fished (91%).

Almost ¾ of people who fished also undertook other activities (myth of the “fisher”)

Perception of marine life quality correlated significantly with fish species richness and habitat diversity (CATAMI)

Over ¼ of coastal users (27%) reported observing non-compliance at site. We observed just 3 enforcement activities in over 300 hours on sites

Discussion

PPAs do have a role

- Buffer zones
- Specific ecological goals eg protecting seagrass

However in terms of their broader objectives, we found:

- PPAs divert resources and mislead the public
- PPAs are “red herrings” in marine conservation
- Social effectiveness depends on ecological effectiveness
- We need to monitor and upgrade PPAs if they aren’t delivering

Thanks!!!

I couldn't have done this without the incredible support of participants, the many people in our lab, Reef Life Survey volunteers, my co-authors and supervisors Graeme Clark and Emma Johnston, UNSW and the Australian Government RTP