Understanding recreational fishers' compliance with no-take zones in the Great Barrier Reef Marine Park

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1. Context

- In 2004 the amount of no-take zones ("Green Zones") in the Great Barrier Reef Marine Park (GBRMP) increased from 5% to 33%.

- Despite public participation, parts of the recreational fishing sector opposed the rezoning.

- Recreational fishing accounts for most of the compliance offenses related to zoning in the GBRMP.

2. Research aim

- We aimed this study for 1) understanding recreational fishers compliance with Green Zones in the GBRMP and 2) assessing a reliable method for measuring compliance.

3. Compliance ➔ Conservation

- Conservation of the GBRMP relies on user compliance.

- Benefits of understanding compliance: determining environmental impact of infractions, gauging awareness and interpretive effort, inferring the enforcement-compliance link and directing enforcement in quantity, space and time.

4. The crux

- Measuring compliance is complex.

- Most methods can be unreliable and/or logistically and economically inefficient (e.g., aerial and vessel-based observation, user reports, indirect observation).

- Poaching is illegal and stigmatizing = high response bias in conventional social surveys.

5. Methods

- Social survey applied at the main boat ramp in Townsville, Queensland, Australia.

- Random Response Technique (RRT) (Warner, 1965): probabilistic method based on a randomizing device (Fig 1).
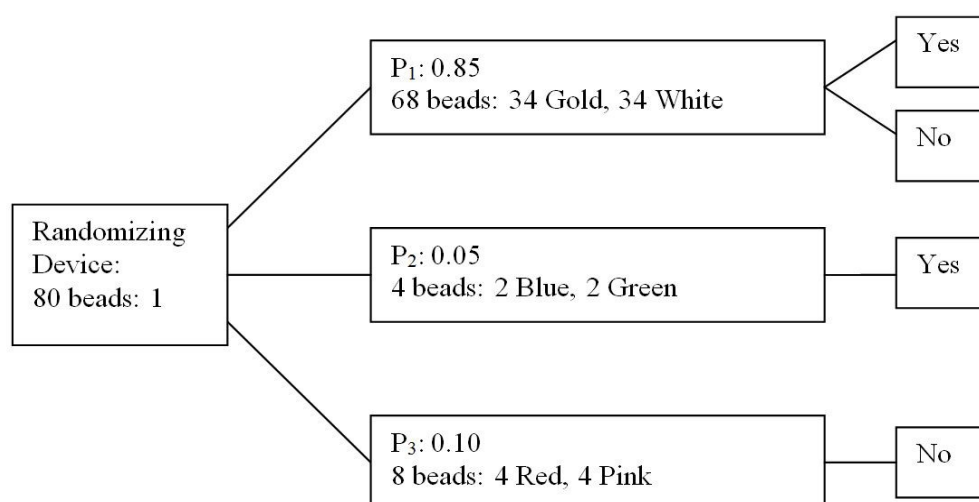
P_1: Probability obtaining the sensitive attribute (i.e., "Did you, knowingly, fish within a Green Zone during the last 12 months?")
P_2: Probability of obtaining the negative non-sensitive statement (i.e., answering "No")
P_3: Probability of obtaining the positive non-sensitive statement (i.e., answering "Yes")

Figure 1. Decision tree for RRT randomizing device.

- Perceived compliance: proxy questions (e.g., "What do you think is the level of compliance with green zones in the Great Barrier Reef Marine Park by recreational fishers?").

6. Results (N=144)

- We found high compliance with both methods.

- A previous study in the same study area, before the rezoning, used direct observation (Davis et al., 2004) and also found high compliance.

- Fines were the main compliance driver, whereas as high fish numbers (in Green Zones) were the main non-compliance driver (Fig. 2).
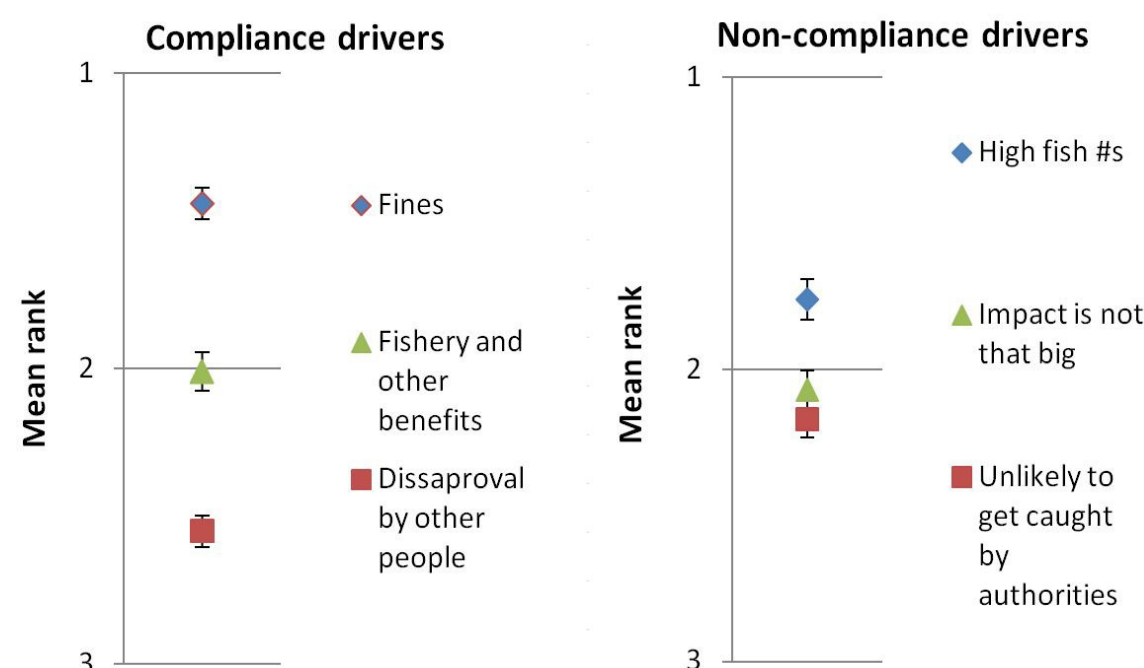
-Fishers' had erroneous beliefs (e.g., confiscation of property, jail) regarding the repercussions from poaching, these can have a coercive effect which further encourage compliance.

- We found differences between "yes" and "no" respondents with the RRT: "No" respondents were more likely to feel comfortable using the RRT (p=0.01), understand why the RRT ensured confidentiality (p= 0.01) and perceive higher compliance levels (p=0.058).

7. Management implications

- We found high compliance and room for improvement.

-Do we want people to comply because they are afraid of fines? Or do we want people to comply because they are aware of the benefits of no-take zones?

-Compliance based on rational drivers (e.g., fines) is generally expensive since it relies on enforcement.

- Normative drivers (e.g., peer pressure, legitimacy) should be further exploited.

- RRT is an effective method for studying fishers' compliance.

- Perceived compliance and the false consensus effect deserve closer attention for further use in compliance studies.

"Through interpretation, understanding; through understanding, appreciation; through appreciation, protection." Anonymous U.S. National Park Service ranger

Sofía Rodríguez

Figure 2. Mean rank: compliance and non-compliance drivers. Bars indicate SEM.
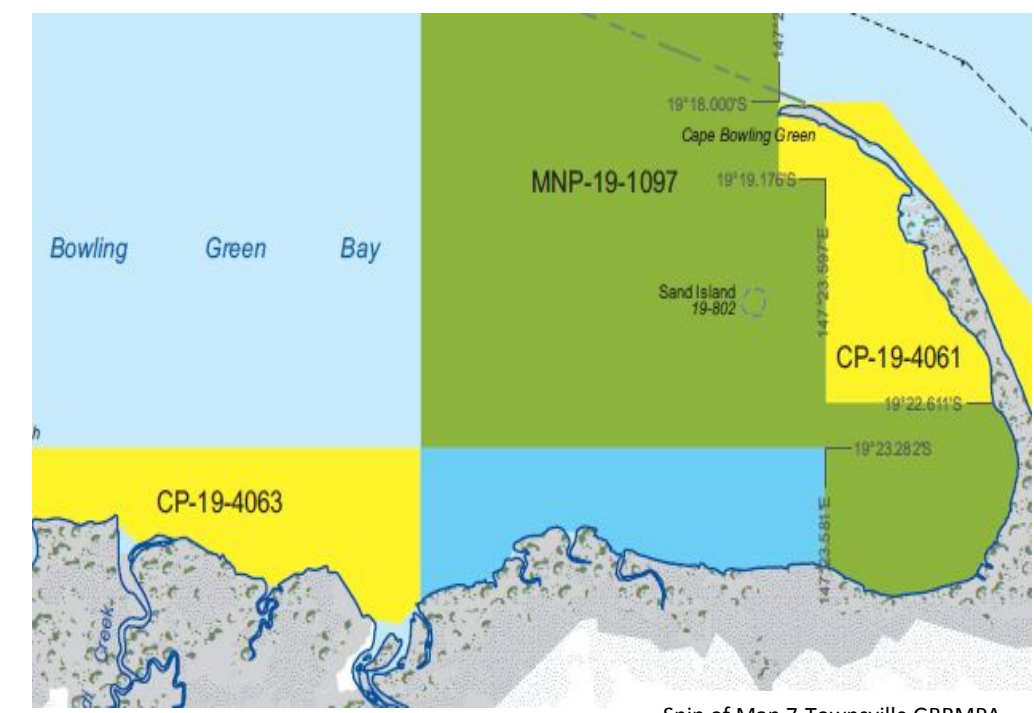
Snip of Map 7-Townsville GBRMPA

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Warner, S. L. (1965). Randomized Response: A Survey Technique for Eliminating Evasive Answer Bias. *Journal of the American Statistical Association, 60*(309), 63-69.