



# On the sustainability of small-scale fisheries in the Philippines

**Richard N. Muallil**

PhD Candidate  
Marine Science Institute  
University of the Philippines  
Diliman, Quezon City, Philippines

Adviser:

**Dr. Porfirio M. Aliño**



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# Outline:

## ❖ Status of small-scale fisheries

## ❖ Achieving sustainable fisheries

### ❖ Fishing effort regulation (fishers' behavior)

- ❖ attachment to the fishery and fishing effort
- ❖ Factors affecting behavior

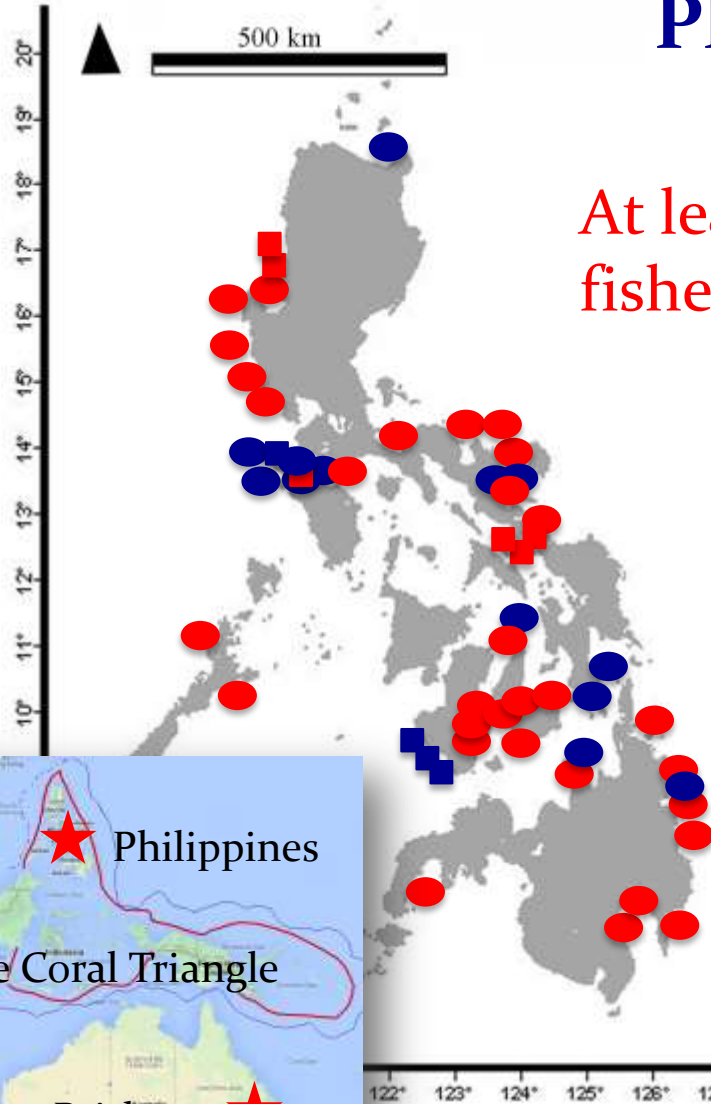
### ❖ Marine protected areas (MPAs) (coral reef fishes)

- ❖ Fish assemblages between fished and protected areas.
- ❖ Dependence of fishers on coral reef fisheries
- ❖ Perception of fishers toward MPAs.

## ❖ Synthesis and recommendations



# Status of small-scale fisheries\* in the Philippines

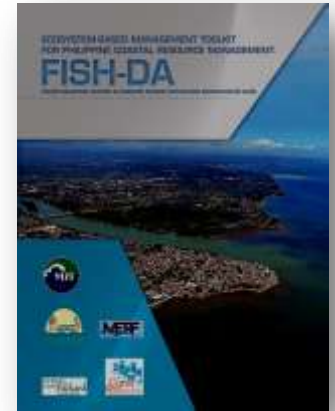


At least 68% of coastal fisheries are unsustainable!!

- Sustainable
- Unsustainable
- Sustainable
- Unsustainable

Muallil et al., 2014

Additional personal data



\* Also called municipal fisheries in the Philippines. Size of boat of <math>< 3</math> gross tons. Exploit coastal fishing grounds.

Large-scale/commercial fishers are prohibited inside municipal waters, i.e. up to 15 km from the shore.

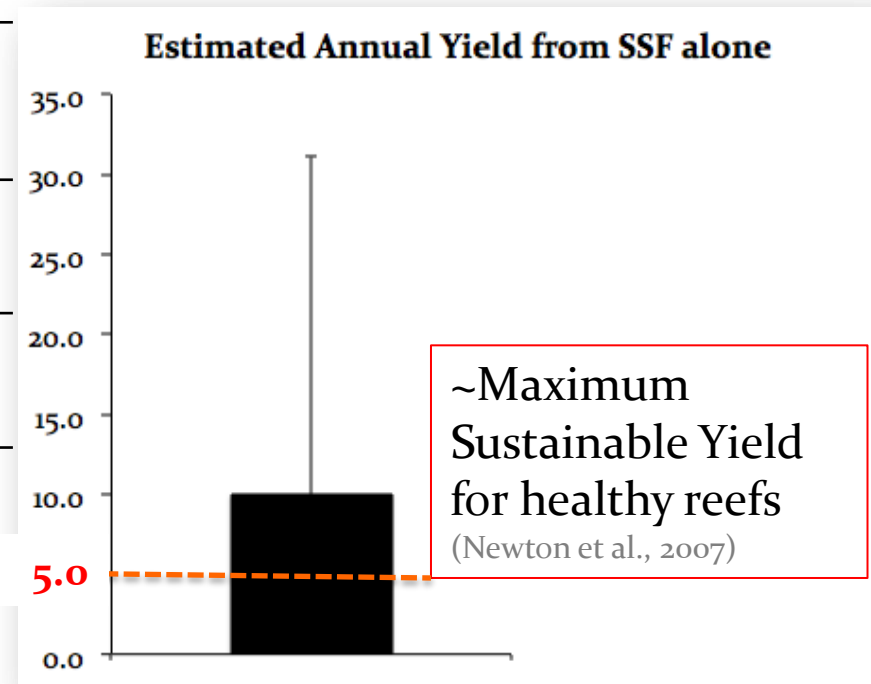
*R.N. Muallil et al. / Marine Policy 44 (2014) 212–221*

# Very high fishing pressure

915 (56% of total) coastal municipalities in the Philippines

	Mean±SD
Size of municipal waters*	442 ±459 km <sup>2</sup>
No. of small-scale fishers per municipality	1,797 ±1,558
Catch rate per fisher	5.3 ±3.7 kg/day
No. of fishing days/year	226 ±37 days

\*Municipal waters – coastal waters from the shore up to 15 km seaward.



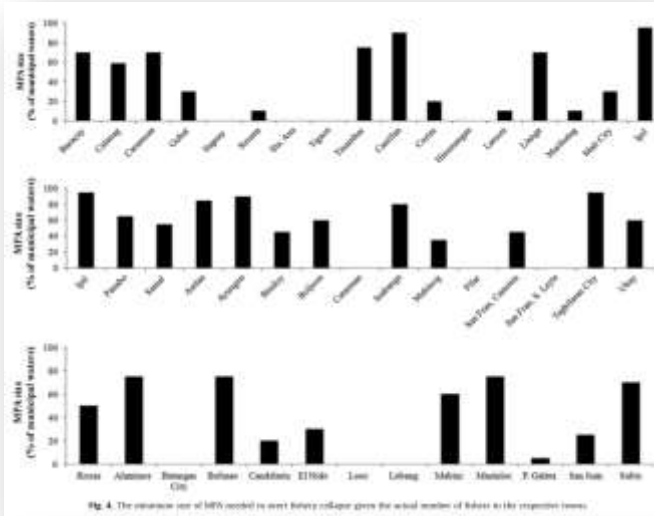
R.N. Muallil et al. / Marine Policy 44 (2014) 212–221



# To achieve sustainable fisheries:



Size of MPAs needed  
(percent of municipal waters)

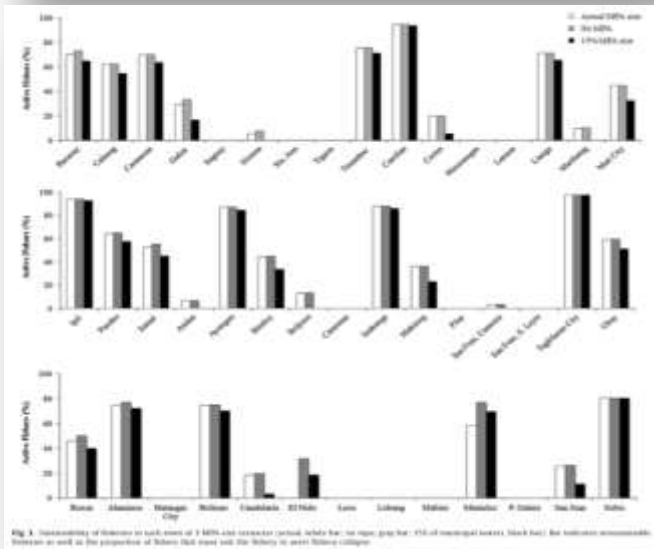


**Establish very large MPAs**

i.e. at least 58% of the municipal waters must be protected!!

(current MPAs in the Philippines cover only about 3% of municipal waters)

Active fishers that must stop  
fishing (%)



**Reduce considerable fishing effort**

i.e. at least 53% of active fishers must stop fishing



# Willingness to exit the fishery:

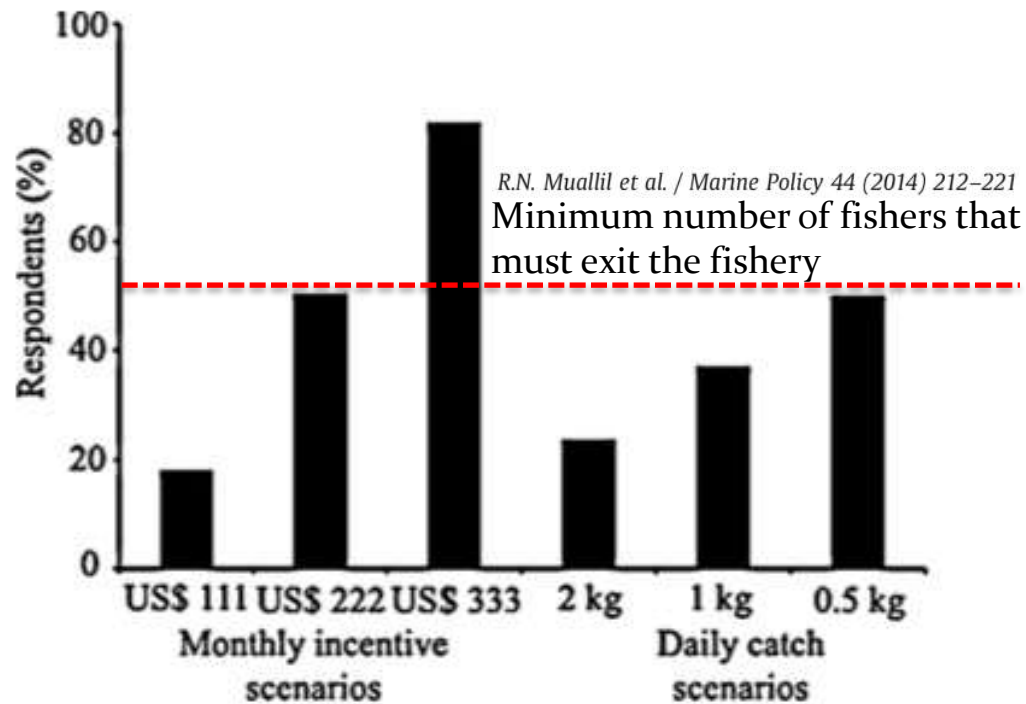


Fig. 2. The proportion of fishers that would exit the fishery as a response to different low catch and monthly monetary incentive scenarios.

Binary logistic regression in R

**Fishers who are more likely to exit the fishery:**

**1. New in the fishery**

i.e.  $\leq 10$  years

**2. Seldom fish**

$\leq 14$  days/month

**3. Young fishers**

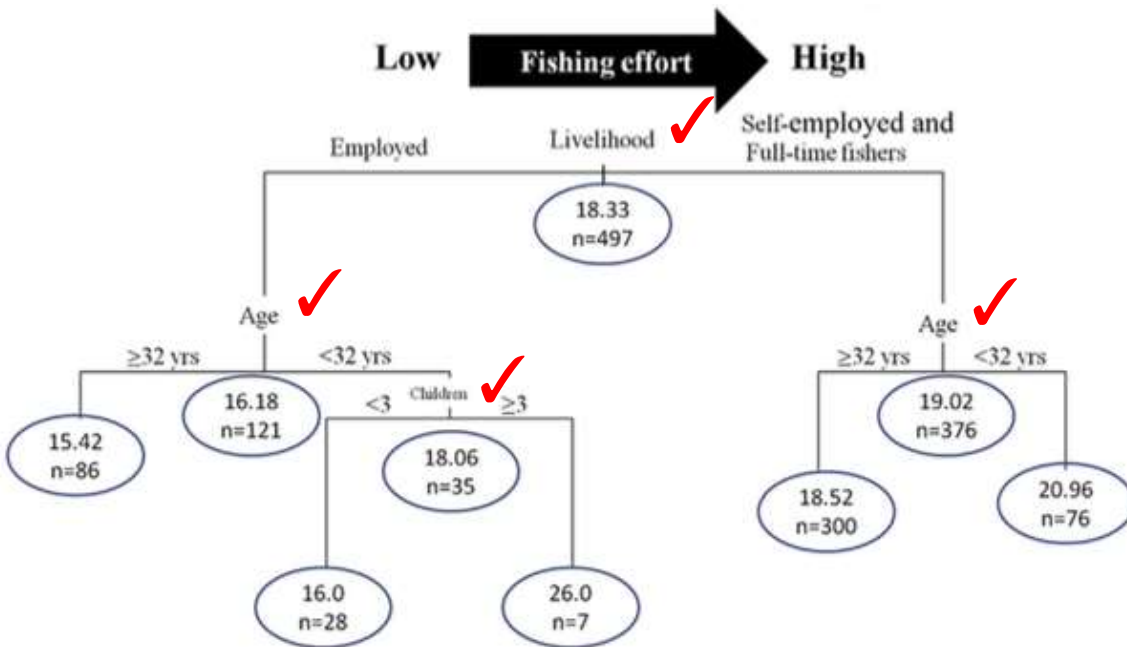
$\leq 35$  yrs old

R.N. Muallil et al. / Fisheries Research 111 (2011) 74–81

# Factors associated with fishing effort:

Fishing effort: measured as the number of fishing days per month.

Regression tree in R



**Fishers with high fishing effort:**

1. Those w/o alternative livelihood
2. Young fishers
3. Those with more children

**Fig. 2.** Regression tree showing the most important factors determining fishing effort. Higher branches offer greater explanatory power. Average fishing effort and number of respondents are listed at each node. The length of the vertical line of each split is proportional to the variation explained by each variable.



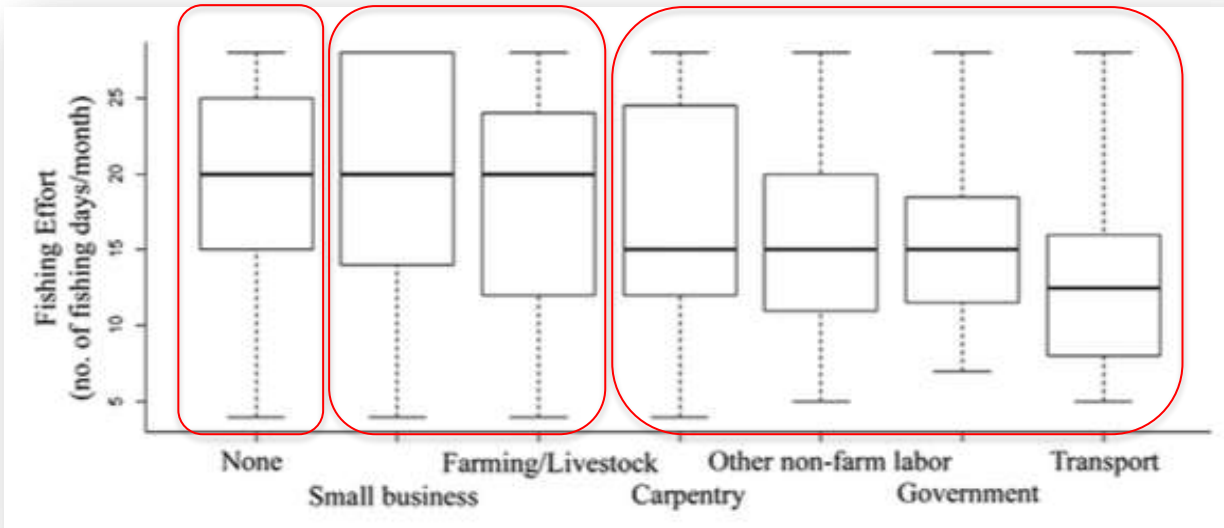
# Relationship between fishing effort and different types of livelihood

No alternative livelihood

“self-employed”

“employed”

Nested ANOVA in R  
(municipality as random effects)



I

II

III



I

II

III

R.N. Muallil et al. / Ocean & Coastal Management 82 (2013) 27–33

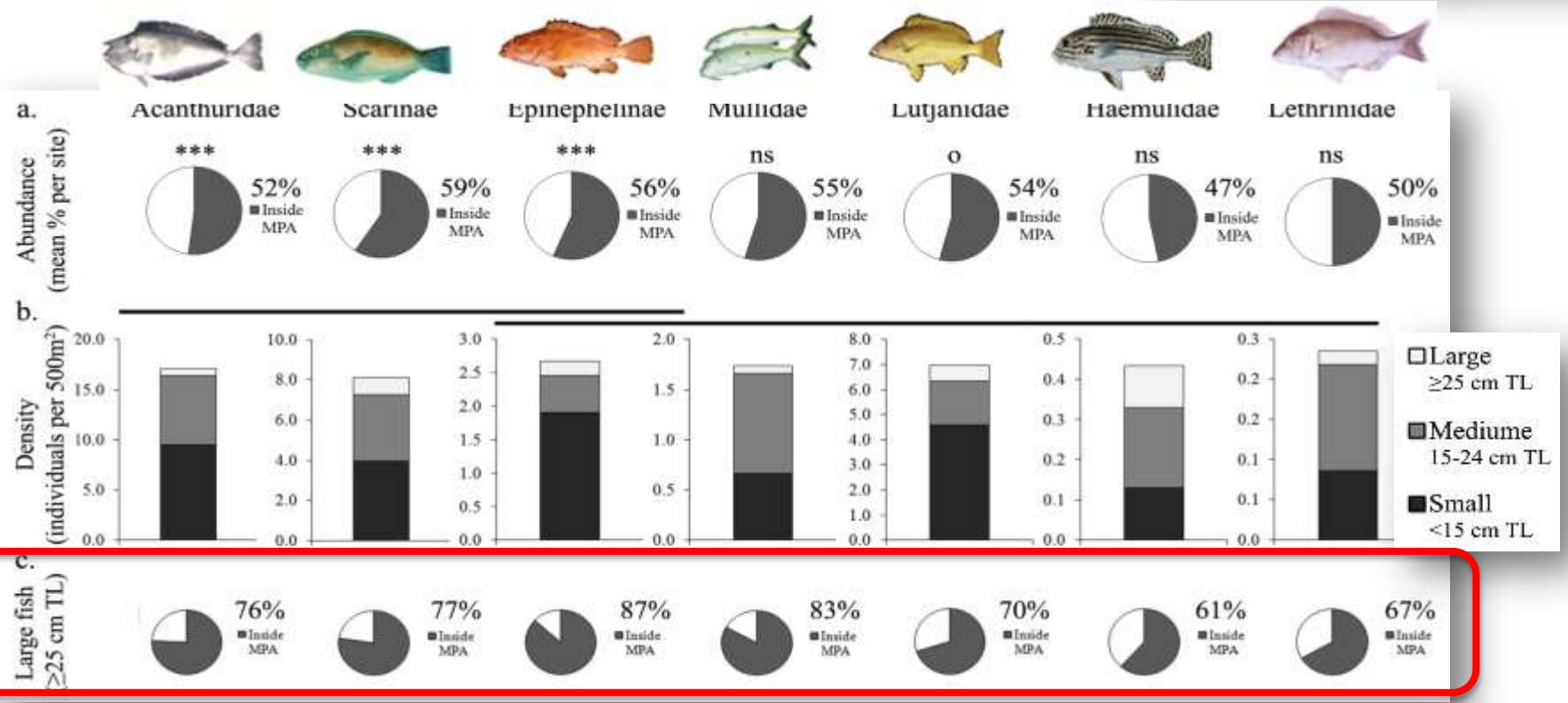
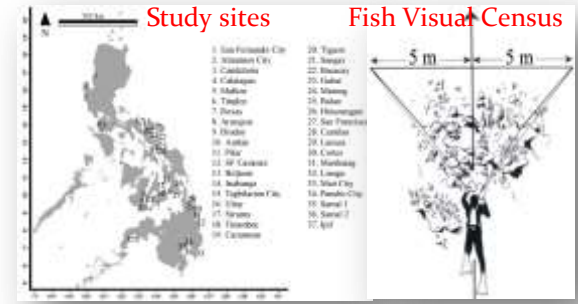




# MPAs and coral reef fish conservation:

1

More and larger fish inside MPAs, especially for commercially important species

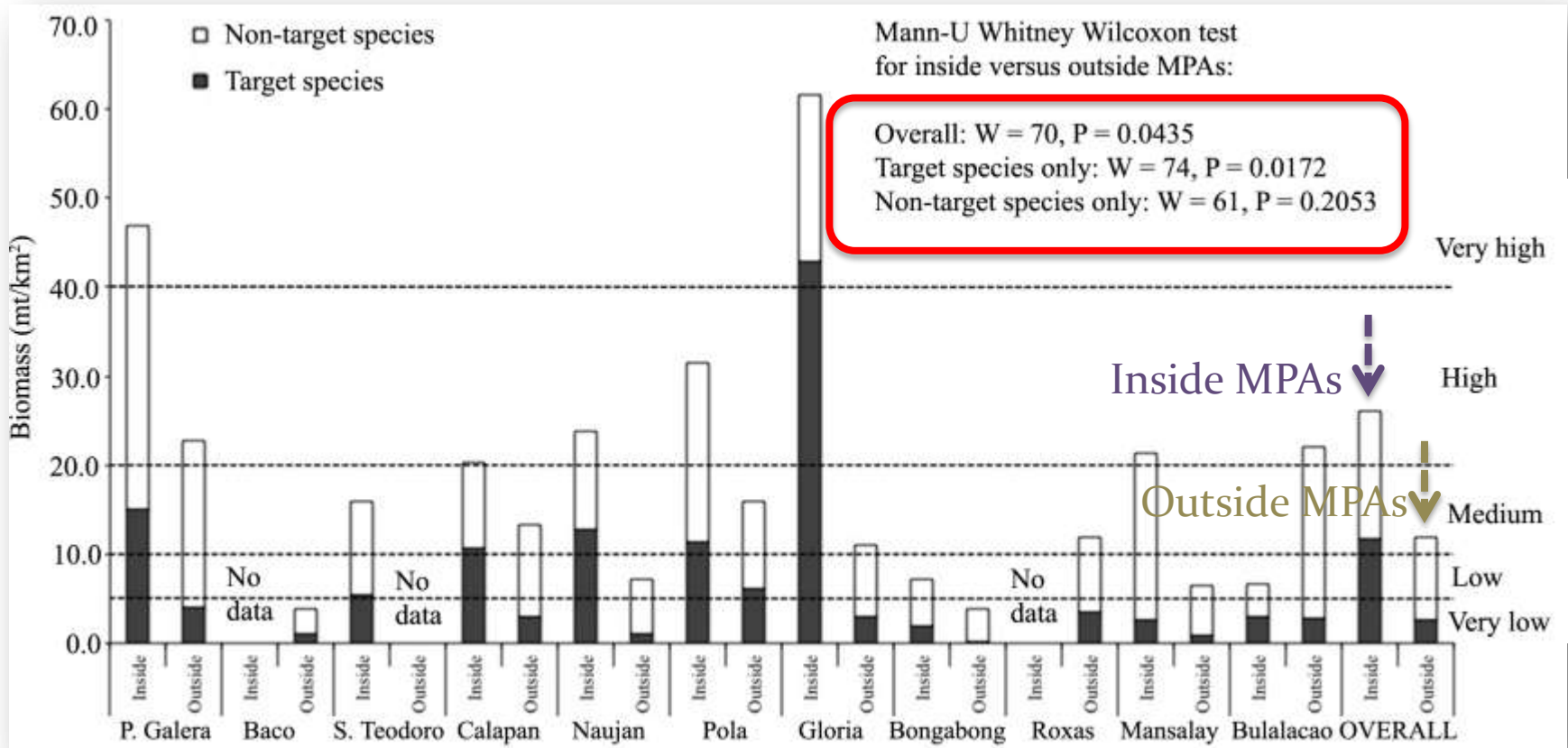


Muallil et al., 2014. Proceedings of the 2<sup>nd</sup> World Small-Scale Fisheries Congress.  
 Muallil et al. *in prep* (submitted to Regional Studies in Marine Science journal)



2

# More fish inside MPAs BUT only very few reefs are “healthy”.



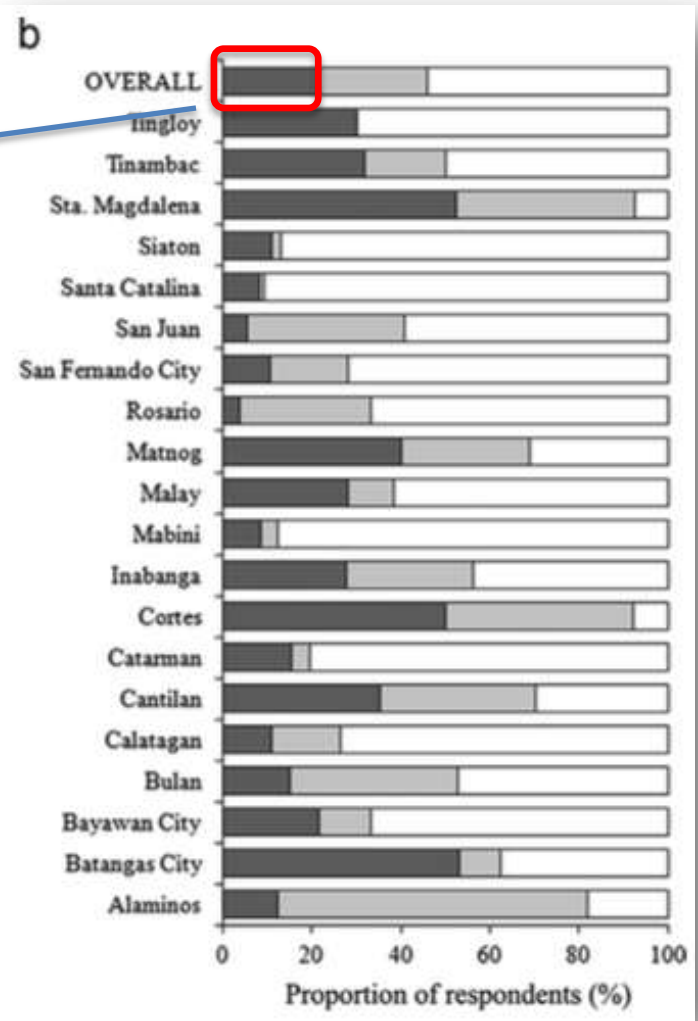
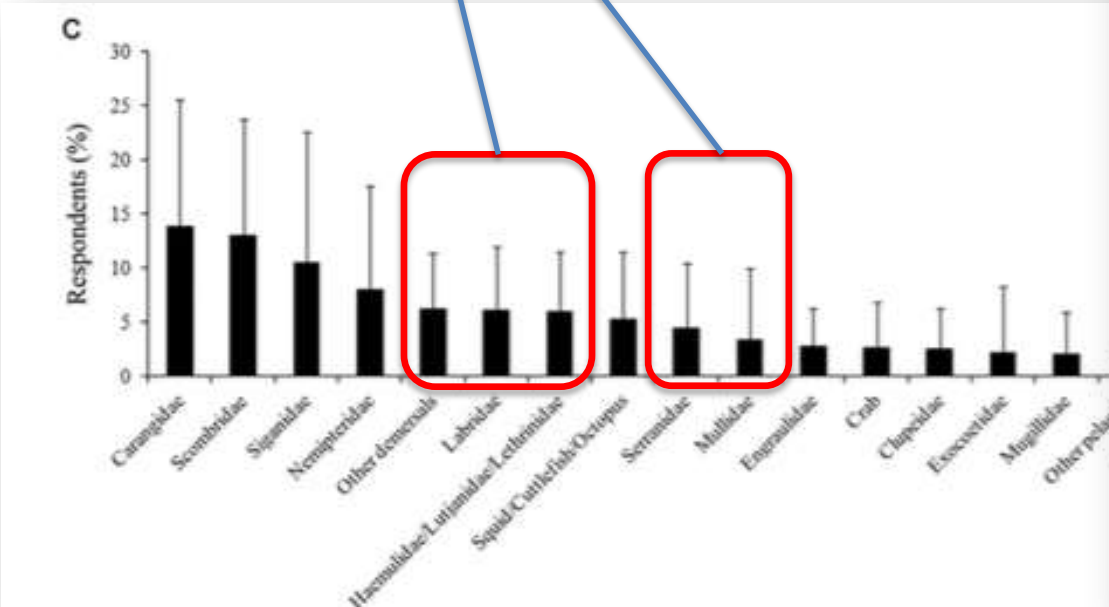
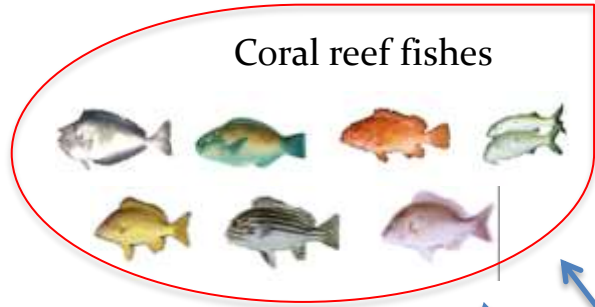
Nañola et al. 2004 categories

Muallil et al. *in prep* (submitted to Marine Policy journal)



3

# Only small proportion of fishers are primarily targeting coral reef fishes



R.N. Muallil et al. / Marine Policy 44 (2014) 212–221

R.N. Muallil et al. / Marine Policy 47 (2014) 110–117

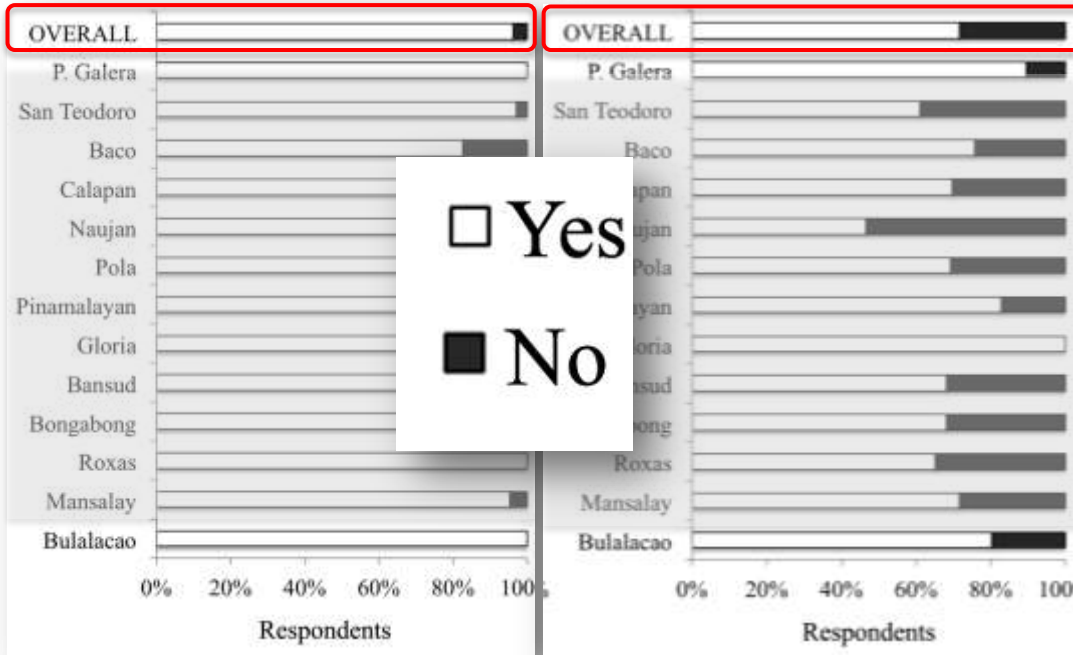


# 4

## High local support for MPA establishment!

a. Do fishers support MPA establishment?

b. Do fishers think MPAs can improve the fisheries?



Please also visit poster exhibit:

**Challenges and opportunities for coral reef conservation in the Philippines: Understanding fishers' perception on Marine Protected Areas establishment**

Bernadyn L. de Ramos<sup>1</sup>, Richard M. Muelbert<sup>2,3</sup>, Samuel S. Mansueto<sup>4</sup>, Porfelo M. Alvaro<sup>5</sup>, Michael D. Abregano<sup>6</sup>, Ramel B. Cabral<sup>7</sup>, Lito Mancao<sup>8</sup>

<sup>1</sup>The Marine Science Institute, University of the Philippines, Olongapo, Quinson City 205, Philippines  
<sup>2</sup>Marine Environment Resource Foundation, Inc., Marine Science Institute, University of the Philippines Olongapo, Quinson City 205 Philippines  
<sup>3</sup>Mediana State University-Tau-tau College of Technology and Oceanography, Borjao, Tau-tau 7102 Philippines  
<sup>4</sup>Wren School of Environmental Science and Management, University of California, Santa Barbara, CA 93106, USA  
<sup>5</sup>SIAM Philippines, Cebu City

Email: rdramos@mar.sci.up.edu.ph; rmmuelbert@gmail.com

**Introduction**  
 The Philippines has long been regarded as one of the most diverse countries in the world, both for terrestrial and marine flora and fauna. The country belongs to the Coral Triangle Region, which harbors vast number of species or compared to other regions of the world. However, the Philippines is also one of the 10 global biodiversity hotspots mostly affected by threats such as overfishing, destructive and illegal fishing, sedimentation, pollution and coastal development (Balle et al. 2018).

One of the strategies that have been employed to address these threats is the establishment of marine protected areas as a solution to conserve fisheries and biodiversity conservation. Private companies in the Philippines (country of Bang) aims to build momentum for conservation by motivating employees and communities of local communities through targeted awareness-raising initiatives which would lead to community support that is crucial for the successful implementation of MPAs in the country (Pillay et al. 2002; Chapman & Diaz, 2016). The results of this study provides socio-ecological and governance insights that may lead to the identification of opportunities and challenges for coral reef conservation in the country.

**Methodology**  
 • Data were gathered using semi-structured interviews in 10 sites under the Bang Private Company program (N=1,200 fishers)  
 • Respondents were asked about their perceptions on the (1) effect of MPA on their livelihood, (2) compliance of fishers, and (3) support to MPA  
 • Statistical analysis were performed using SPSS 26  
 • Assessment scale ranged from: 1= not satisfied to Very Low to Very High using the guide below.

**Results and Discussions**  
 • Overall perception of respondents are highly to very high (Table 1). Among the reasons for high community support (mean of 3.8-4.8) include: increase in catch from MPA (33.63%) and the reduction of illegal fishing activities (3.38%).  
 • Compliance to the ordinance (i.e. no fishing inside MPA) were also high in all sites (mean: 4.0-4.75)  
 • Site specific responses such as fish density, average catch per fisher, presence of alternative livelihood and coral reef damaged fisher do not have a significant effect on community support (Regression tree analysis, R<sup>2</sup>).

**Conclusions**  
 Challenge for conservation effort emerge from the threats not only internal but also those based outside the protected areas. Understanding fishers' perception on MPA is not a one towards integrative factor that may affect a community's capacity to enhance its own capabilities. It also provides an idea of what resource users expect from the interventions. It may not be enough to focus on site management interventions but on combination of management strategies appropriate for each area. The challenge for us is to find more opportunities to facilitate conditions for our conservation efforts.

Muallil et al. *in prep* (submitted to Marine Policy journal)

## ❖ **Synthesis:**

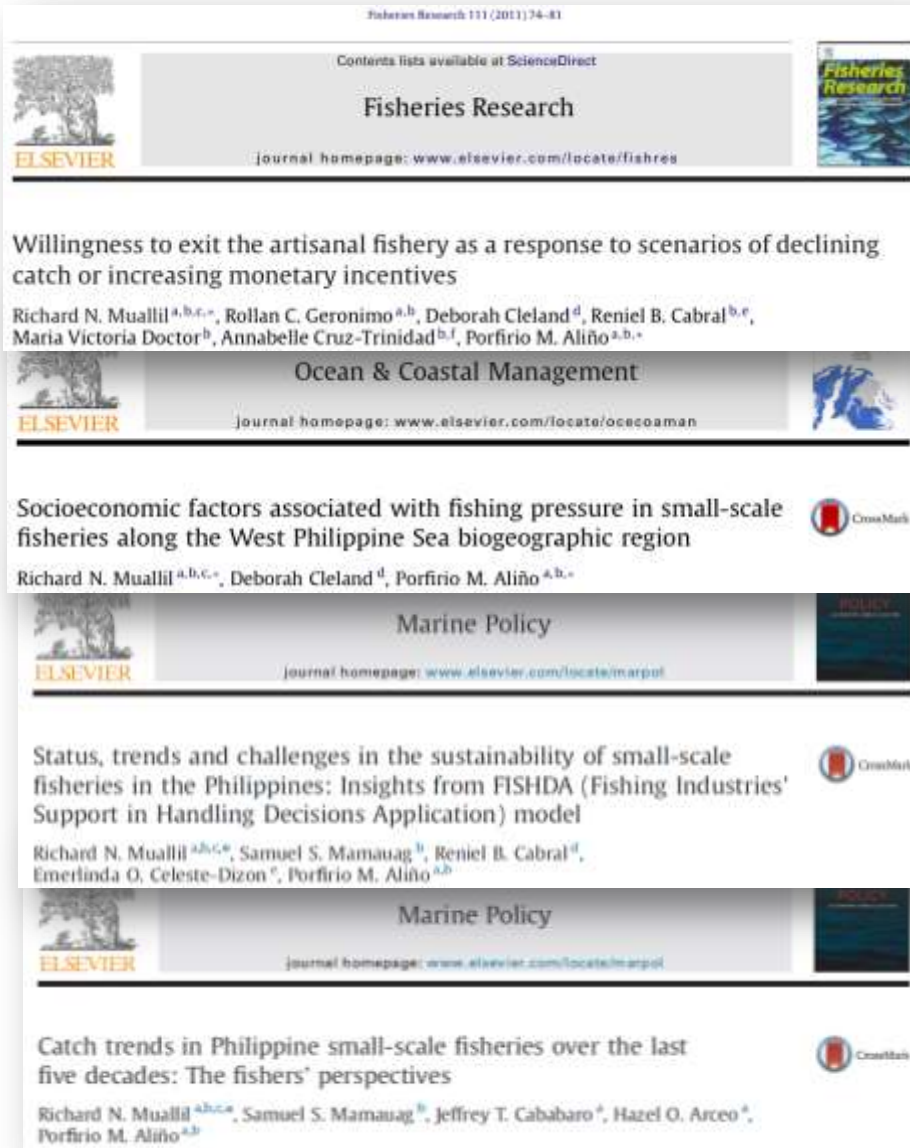
- ❖ SSF is highly unsustainable and has been drastically declining.
- ❖ The required MPA size and fishing effort reduction for sustainable SSF are very high.
- ❖ Fishers have variable behaviors in terms of their attachment to the fishery and fishing effort they exert.
- ❖ Better condition of reef fishes inside MPAs.

## ❖ **Recommendations:** Policy makers must also carefully address the ff:

- ❖ Illegal and destructive fishing practices and other anthropogenic threats
- ❖ IEC and awareness raising activities to encourage local participation in coastal resource management activities.
- ❖ Poverty and lack of alternative options (livelihood programs, capacity building, conditional cash transfers).
- ❖ Right sizing of fishing effort (i.e. divert catch from vulnerable coral reef fishes to the more abundant pelagic species).
- ❖ Poor governance



# References



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Muallil et al., *in prep.* **Density, size frequency and distribution of commercially important coral reef fishes in the Philippines: fished versus protected areas.** Submitted to Regional Studies in Marine Science journal.

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## COMECO laboratory



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