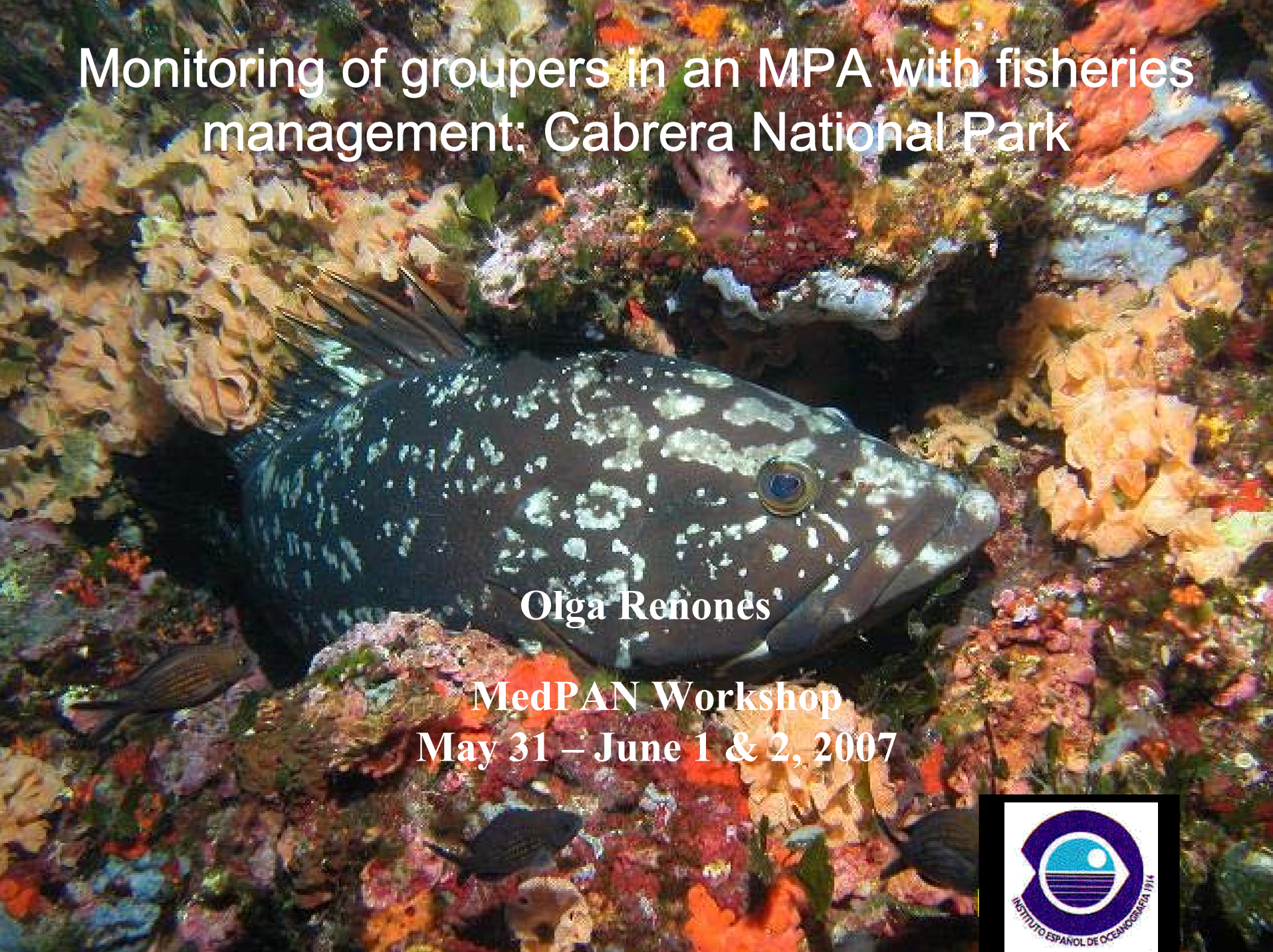
Monitoring of groupers in an MPA with fisheries management: Cabrera National Park



Olga Renones

MedPAN Workshop
May 31 – June 1 & 2, 2007

The species: Epinephelus marginatus

Biological traits

Maximum size: 120 cm total length

Longevity: 61 years

Slow growth from maturity

Hermaphrodite proterogynous

Females maturity: 49 cm TL – 6 years

Sex change under social control

Sex change: 80 cm total length

Distribution

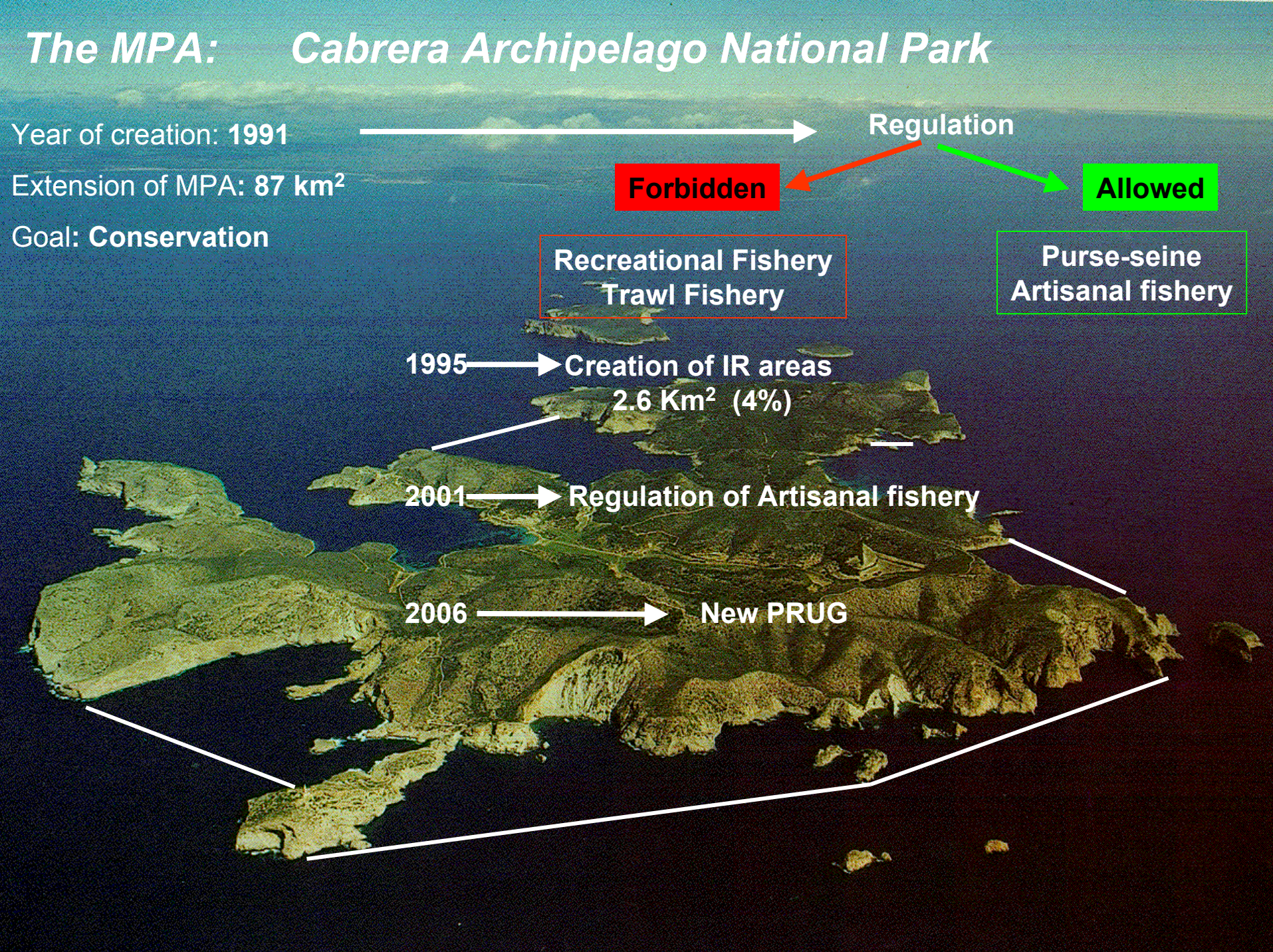
Habitat: Hard substrates

Depth range: 0 – 50 m

Behaviour

High vulnerability to fishing

The MPA: Cabrera Archipelago National Park



The Objective of the study

Evaluation of management measures on *E. marginatus* population

Cabrera

RU areas

vs.

Mallorca

OF areas

→ Effect of Recreational fishing

Abundance
Biomass
Length range
Mean length

RU -Cabrera > OF - Mallorca

The differences will increased with time from protection

Cabrera

IR areas

vs.

RU areas

→ Effect of Artisanal fishing

Abundance
Biomass
Length range
Mean length

IR -Cabrera > RU - Cabrera

The differences will increased with time from protection

Methods

Visual census

Transects (50m * 5 m)

Habitat: blocks

Depth: (5-10 m and 20-25 m)

Sampling season: Summer

Periodicity: biannual

Density /250 m^2

Size structure of the population by depth strata

Monitoring of commercial fishery

Onboard sampling

Main fisheries

Sampling season: dependent on the fishery

CPUE

Size structure → Size gear selectivity

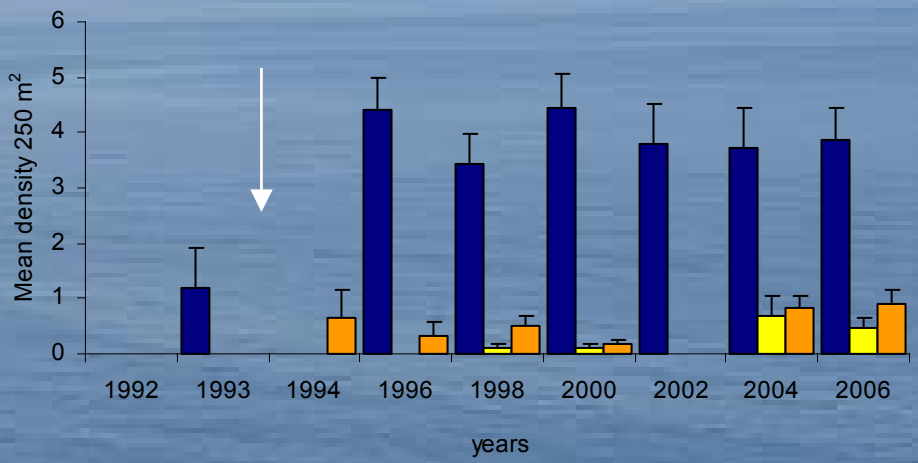
No comparables main fishery out of MPA

Results

1. Effect of Recreational fishing

Abundance

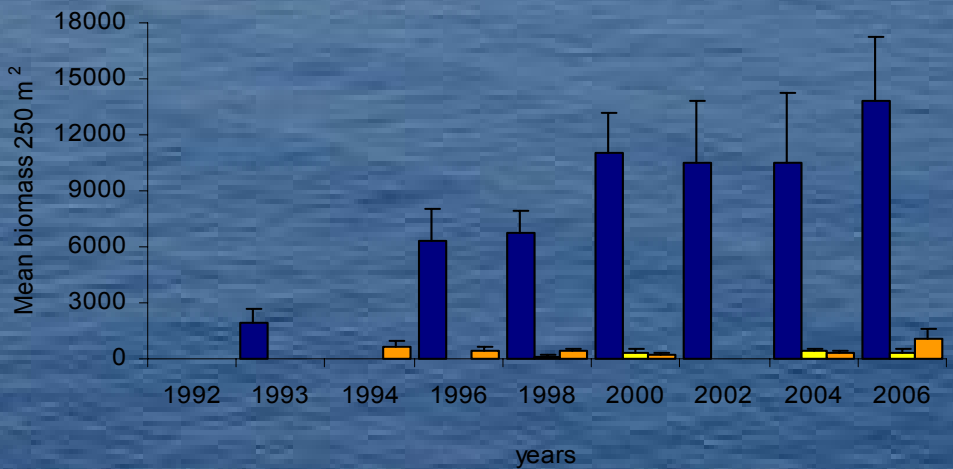
1993: Cabrera 2 > Mallorca
2006: Cabrera 6 > Mallorca



Cabrera RU > Mallorca OF

Biomass

1993: Cabrera 3 > Mallorca
2006: Cabrera 11 > Mallorca

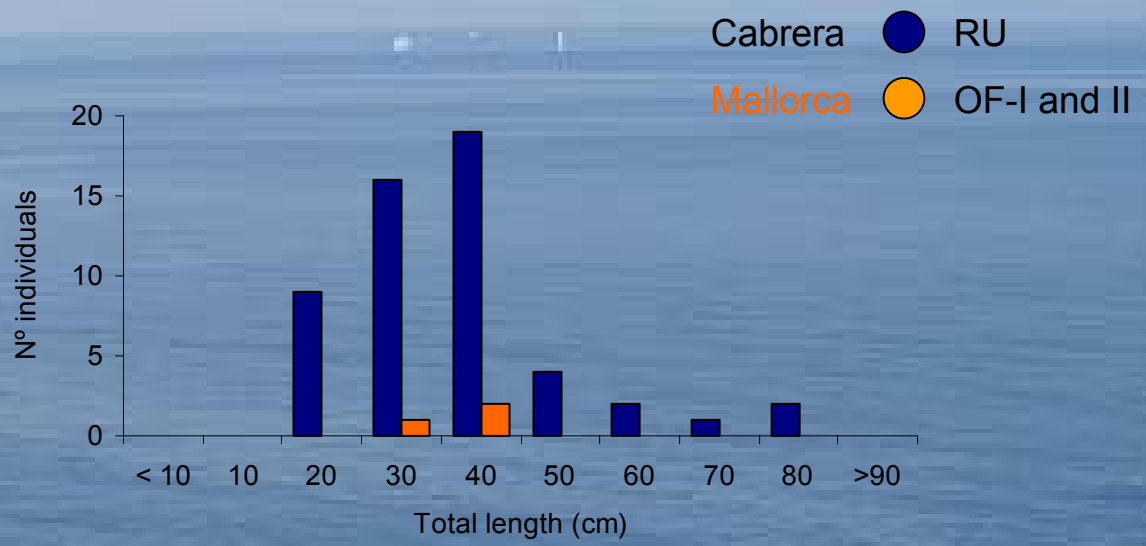


Results

1. Effect of Recreational fishing : Size structure

1996: **5** years after protection

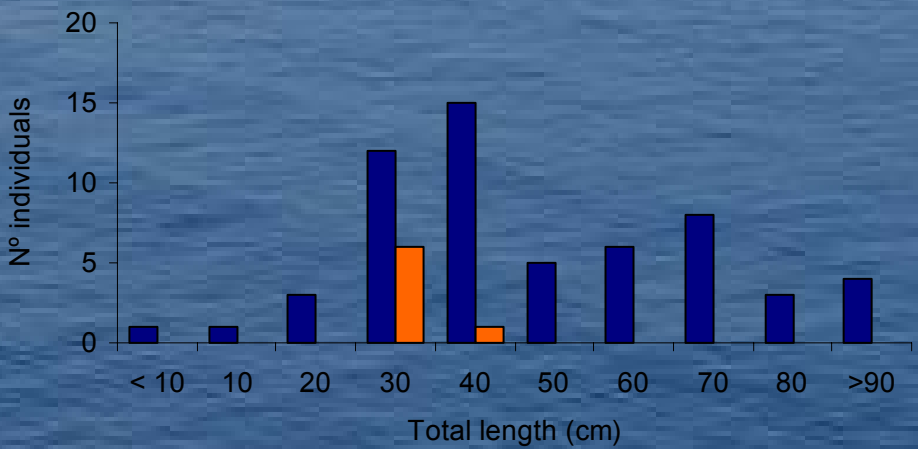
Mean size
Mallorca: 41 cm (± 4)
Cabrera: 40 cm (± 13)



2006: **15** years after protection

Cabrera RU > Mallorca OF

Mean size
Mallorca: 37 cm (± 3)
Cabrera: 51 cm (± 21)



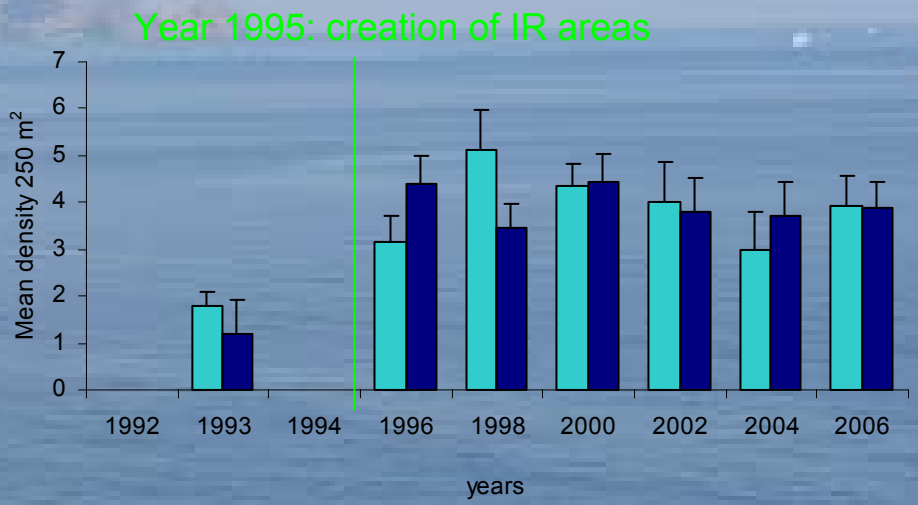
Results

2. Effect of Artisanal fishing

Integral Reserve

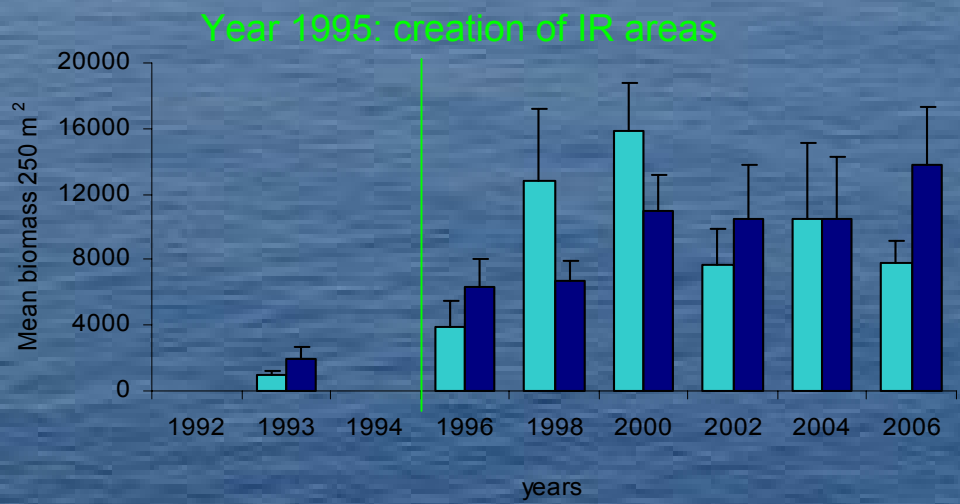
Restricted Use

Abundance



Cabrera IR vs. RU → No clear trend

Biomass



No fishing impact ?

Differences in habitat?

Results

2. Effect of Artisanal fishing restrictions : Size structure

Integral Reserve

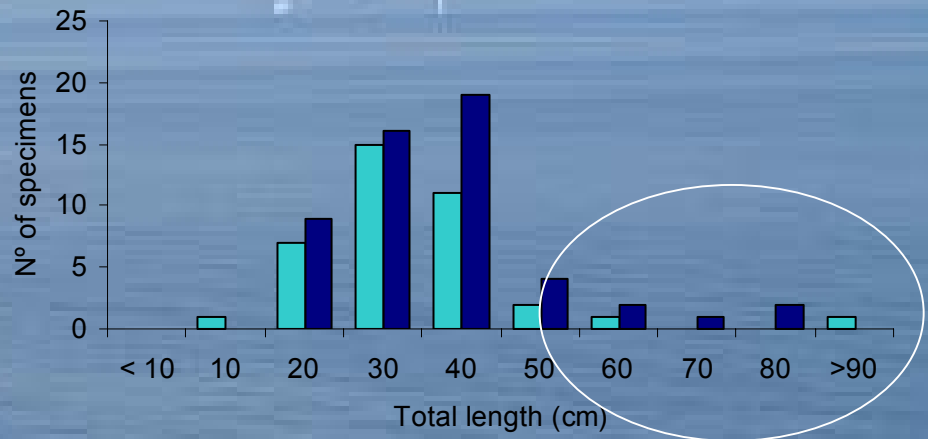
Restricted Use

1996: **1** years after creation of IR areas

Mean size

IR: 37 cm (± 13)

RU: 40 cm (± 13)



Cabrera RU > IR

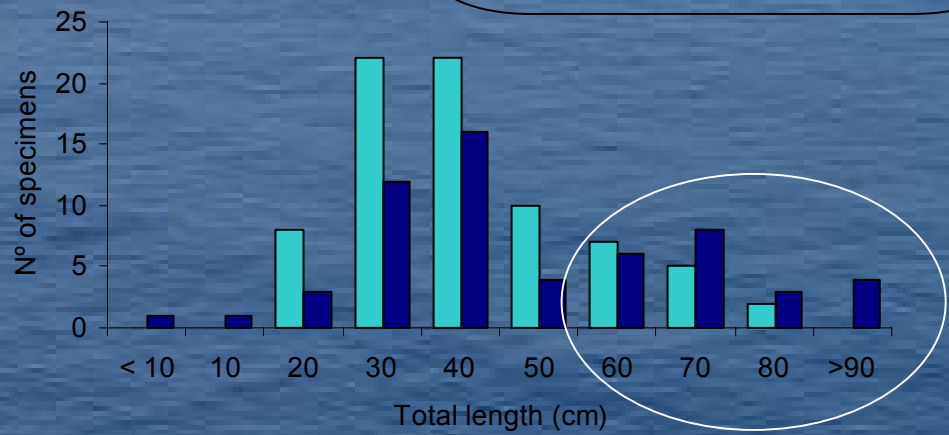
Are the actual spatial management measures protecting effectively the adult population?

2006: **11** years after protection

Mean size

IR: 44 cm (± 14)

RU: 51 cm (± 21)



Fishery: Which fishery capture dusky grouper? and when?

J	F	M	A	My	J	Jl	Ag	S	O	N	D

Sparids long line **20 – 90 m**

Trammel net **25 – 60 m**

Trolling line

Grouper long line **20 - 75 m**

32%

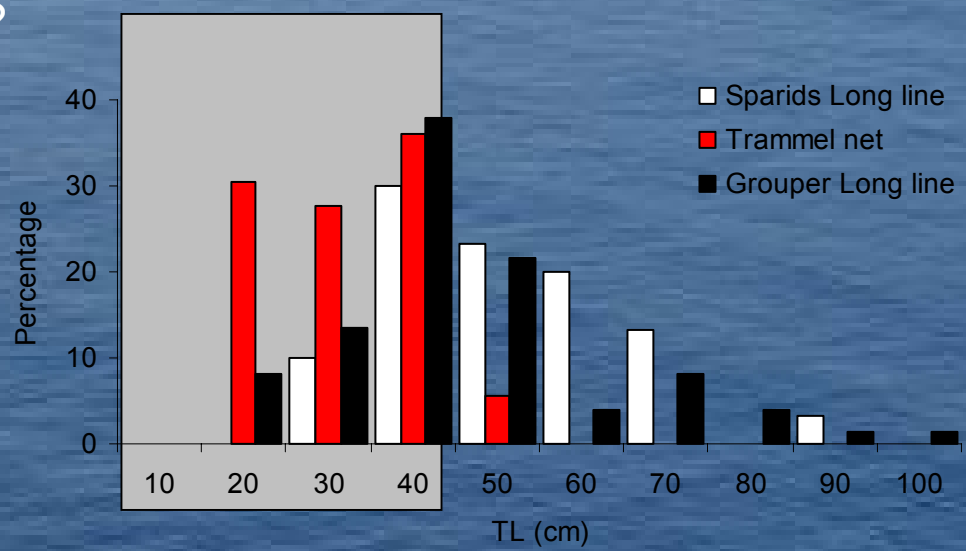
86%

¿?

38%

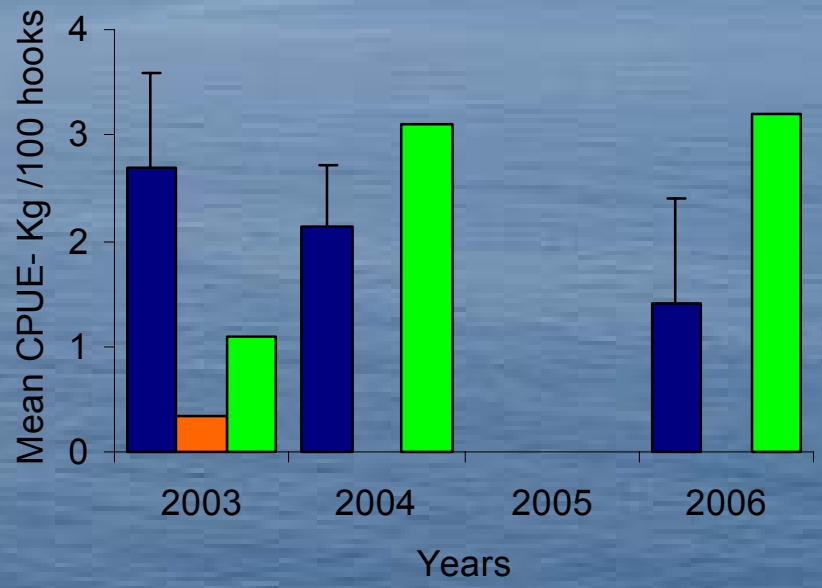
Which size range?

MLS = 45 cm TL



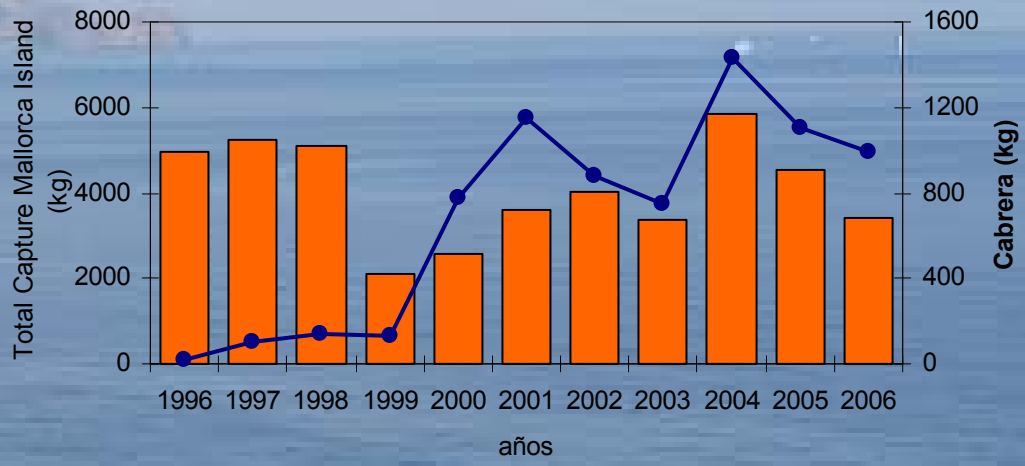
Fishery: Grouper long line

CPUE Biomass



- Cabrera National Park
- Mallorca : Cala Ratjada (Mallol & Goñi 2004)
- North of Menorca **Marine Reserve** (Coll et al., 2007)

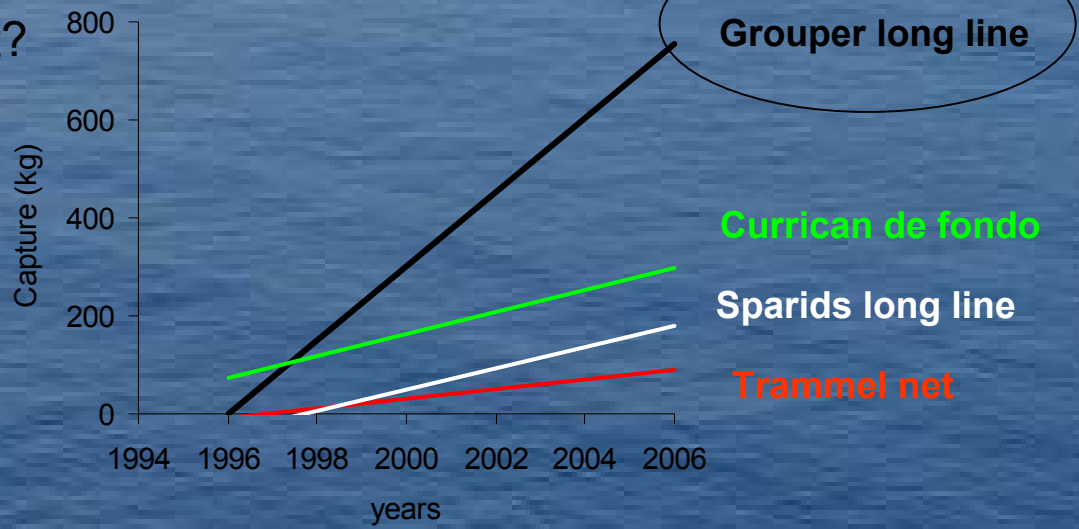
Fishery: Are artisanal fishery benefied by the fishing regulation in Cabrera?



1996. Cabrera 1% of Mallorca total catch

2006. Cabrera 29% of Mallorca total catch

Which fishery has been more benefit?



Recommended Management measures for groupers species

Fishery regulations → Prohibition of spear-fishing

Fishery regulations → Regulation Artisanal fishing effort

Spatial regulations Design → Protection of adults habitats – "hot spots"

Spatial regulations Design → Protection of juveniles habitats

Methods for monitoring "Reserve effect" for groupers species

Visual census

Main advantage

Low impact / low sampling effort

Habitat variables could be controlled

Allow comparison to other MPAs

Main disadvantage

Depth restriction

Different behaviour in MPAs vs OF

Commercial fishery

Main advantage

High knowledge

Wider depth range

Wider spatial information

Main disadvantage

Is CPUE a good index of population abundance?

Depend on: Fishery strategy and habitat patchiness

Size gear selectivity

Monitoring of groupers in Cabrera Archipelago National Park

E.E.R.C Project (1993)
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ERCA Project (1996 – 2006)
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