

# WAMSI Conference 2011

Evaluating Management Strategies for Line fishing in the Ningaloo  
Marine Park

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CSIRO



# Contributors

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# Management Strategy Evaluation

- project : RAD (rapid application development)
- Decision Support tool for Dept. Fisheries
- ELFSim (Effects of Line Fishery Simulator)
  - model to explore and evaluate management strategies for coral reef fisheries
  - main submodels: biology, harvest, management intervention



# ELFSim:

## Component models

### Biological model

- Sub-populations at 1 minute spatial resolution
- Sub-populations have age, sex, size structure
- Sub-populations spawn larvae which are spread on currents

### Exploitation model

- Individual vessels fish from boat ramps
- Vessels select locations to fish based on distance and past catch rates

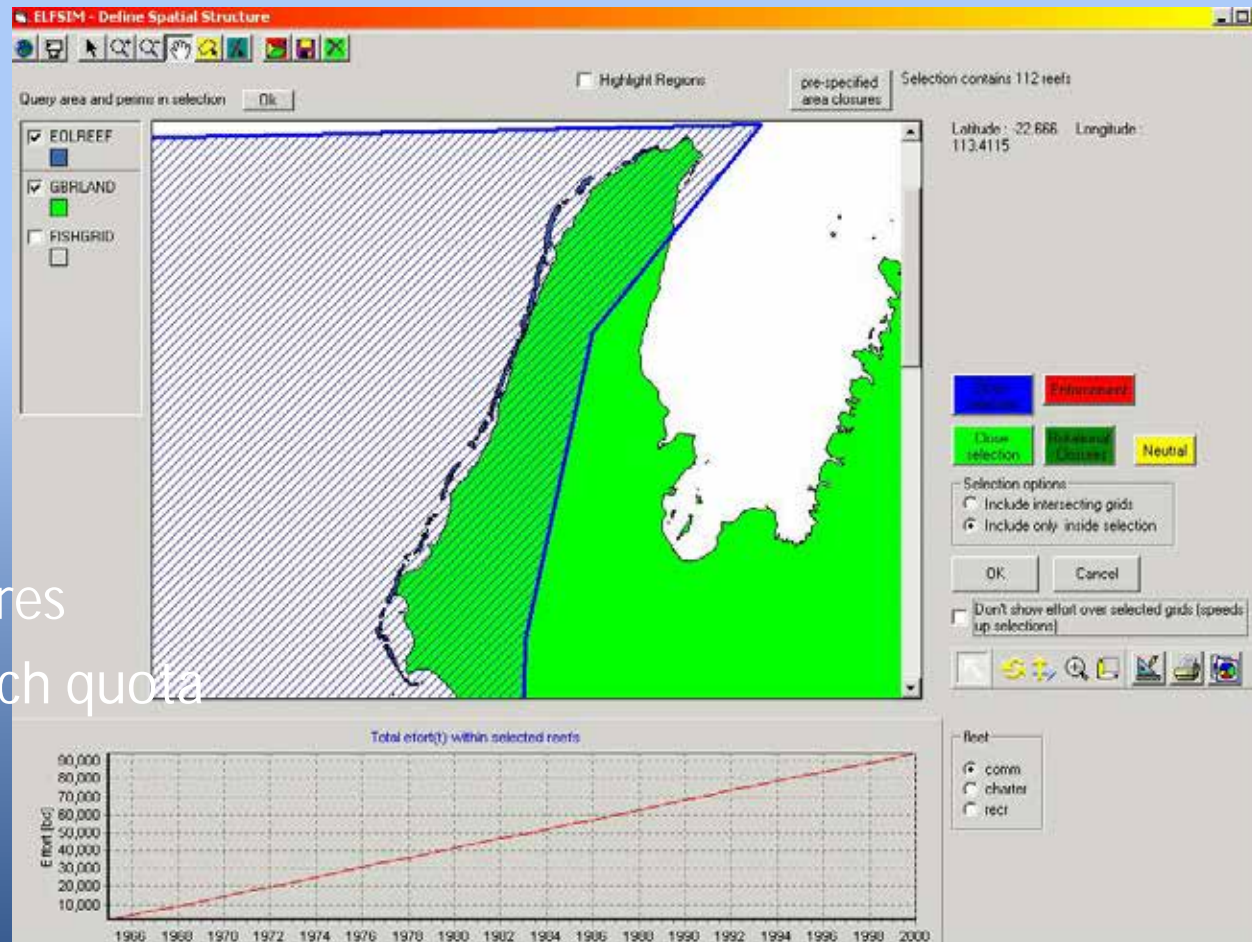
**Spangled emperor**



# Management model

## Management tools:

- Area closures
- Effort levels
- Bag limits
- Min. Legal Size
- Gear Selectivity
- Spawning closures
- Commercial catch quota with I(T)Q



# Mid-term report



## An Evaluation of Management Strategies for Line Fishing in the Ningaloo Marine Park

L. Richard Little  
A. David McDonald  
Fabio Boschetti  
Ross Marriott  
Brent Wise  
Rod Lenanton

Mid-term Report for Ningaloo Reef Project 3.2.3 Biodiversity Assessment, Ecosystem Impacts of Human Usage and Management Strategy Evaluation

March 2009



# Final report



## An Evaluation of Management Strategies for Line Fishing in the Ningaloo Marine Park

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# Contents

## – Mid-term report

- Management objectives and strategies in the Ningaloo Marine Park Management Plan
- Addresses key uncertainties in biological processes
  - Carrying capacity
  - Productivity
  - Larval distribution
- Management strategies examined
  - Current management: sanctuaries, effort, bag limits
  - **Reduced** Bag limits
  - **Doubled** effort
  - **Old** sanctuaries

1. →

2. →

← 3.

## – Final Report

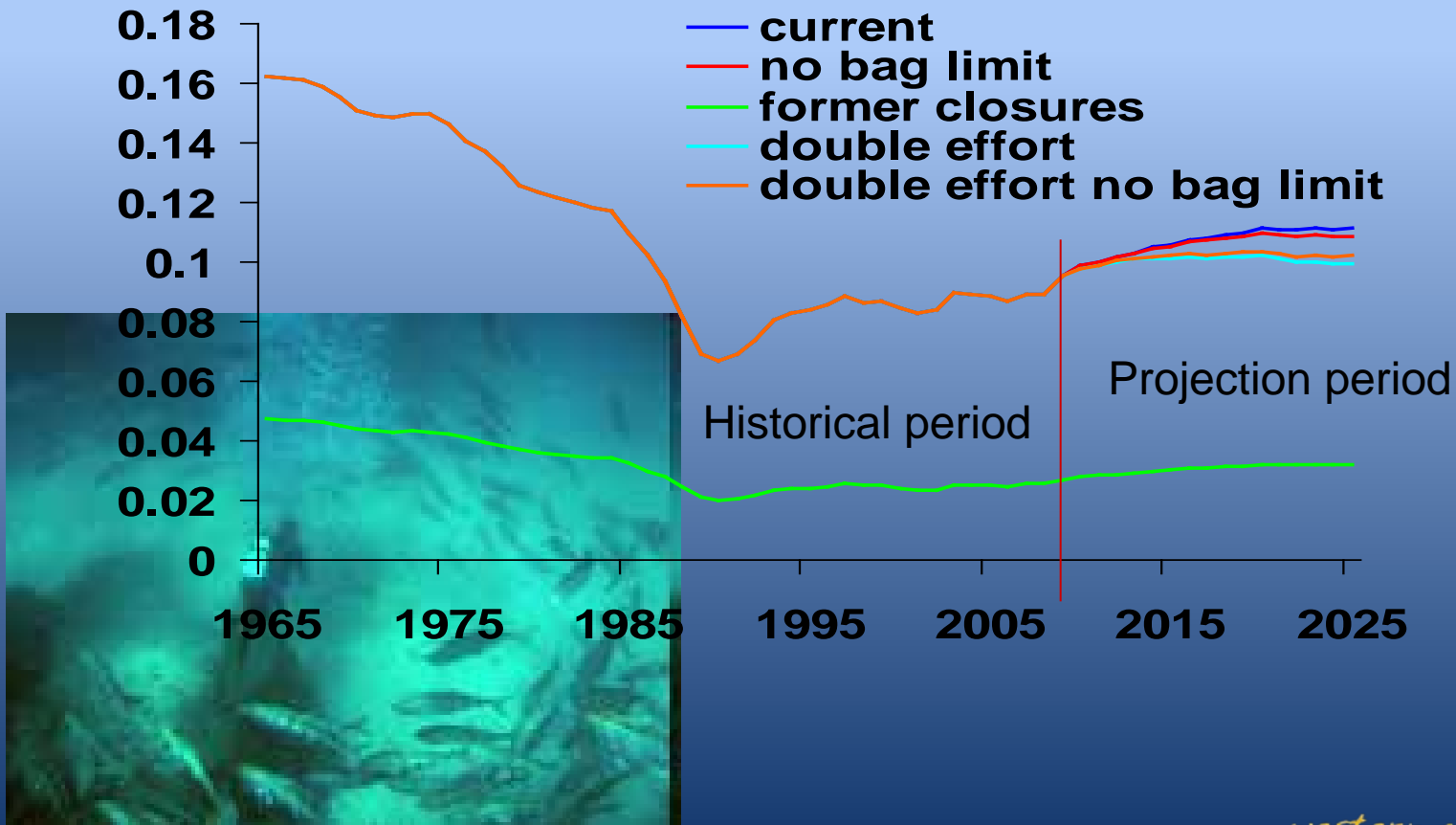
- Alternative management strategies (**current conditions**)
  - Current management: sanctuaries, effort, bag limits
  - No inshore fishing
  - Incr. compliance measures
  - Increased Sanctuaries
- Limiting catch
- 3 strategies (**Alternative future scenarios**)
  - Env. pressure
  - Env. catastrophe
  - Tech creep
  - Decreased costs
  - Coral Bay upgrade
  - Env. press. + Tech creep





# Results (mid-term)

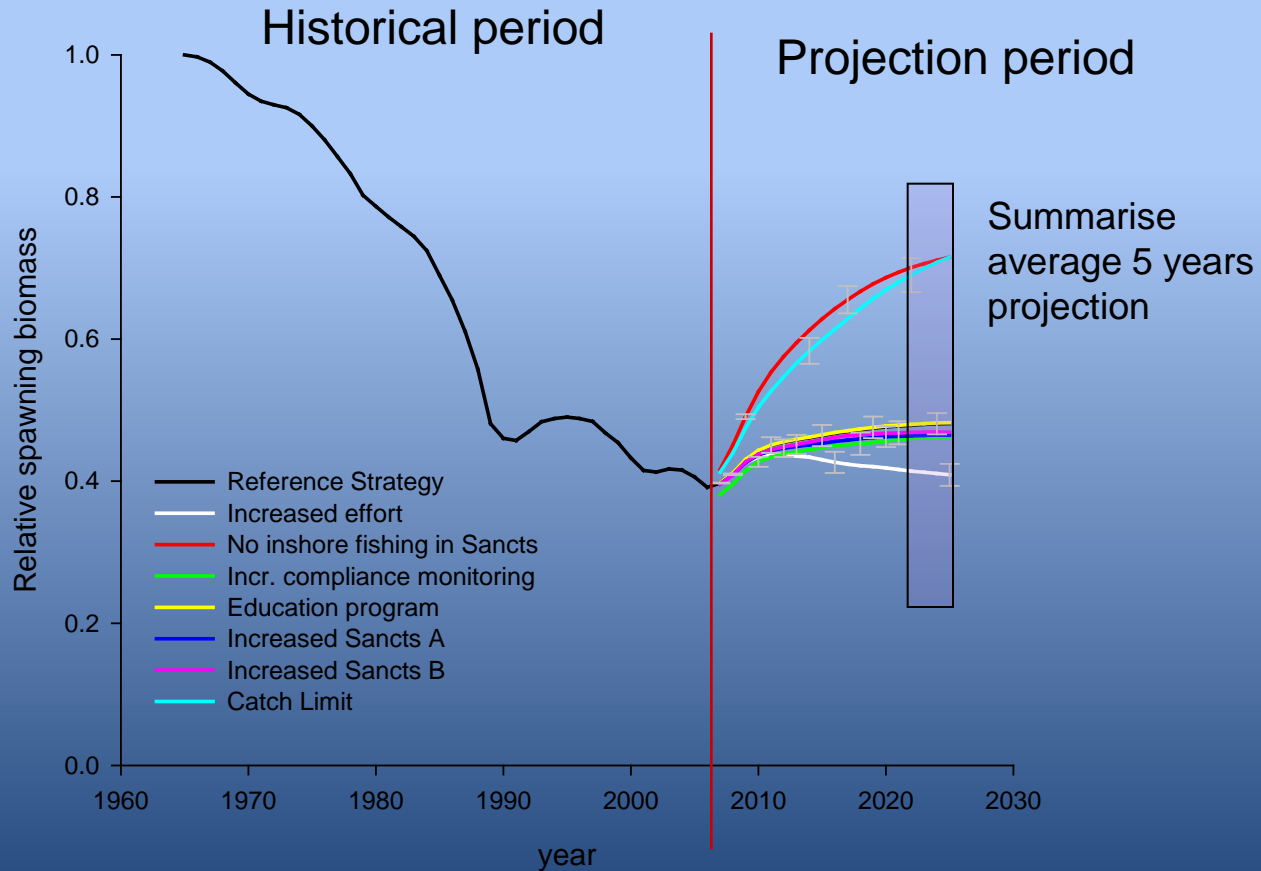
(reported in May 2009 WAMSI symposium)  
e.g. Biomass in sanctuaries





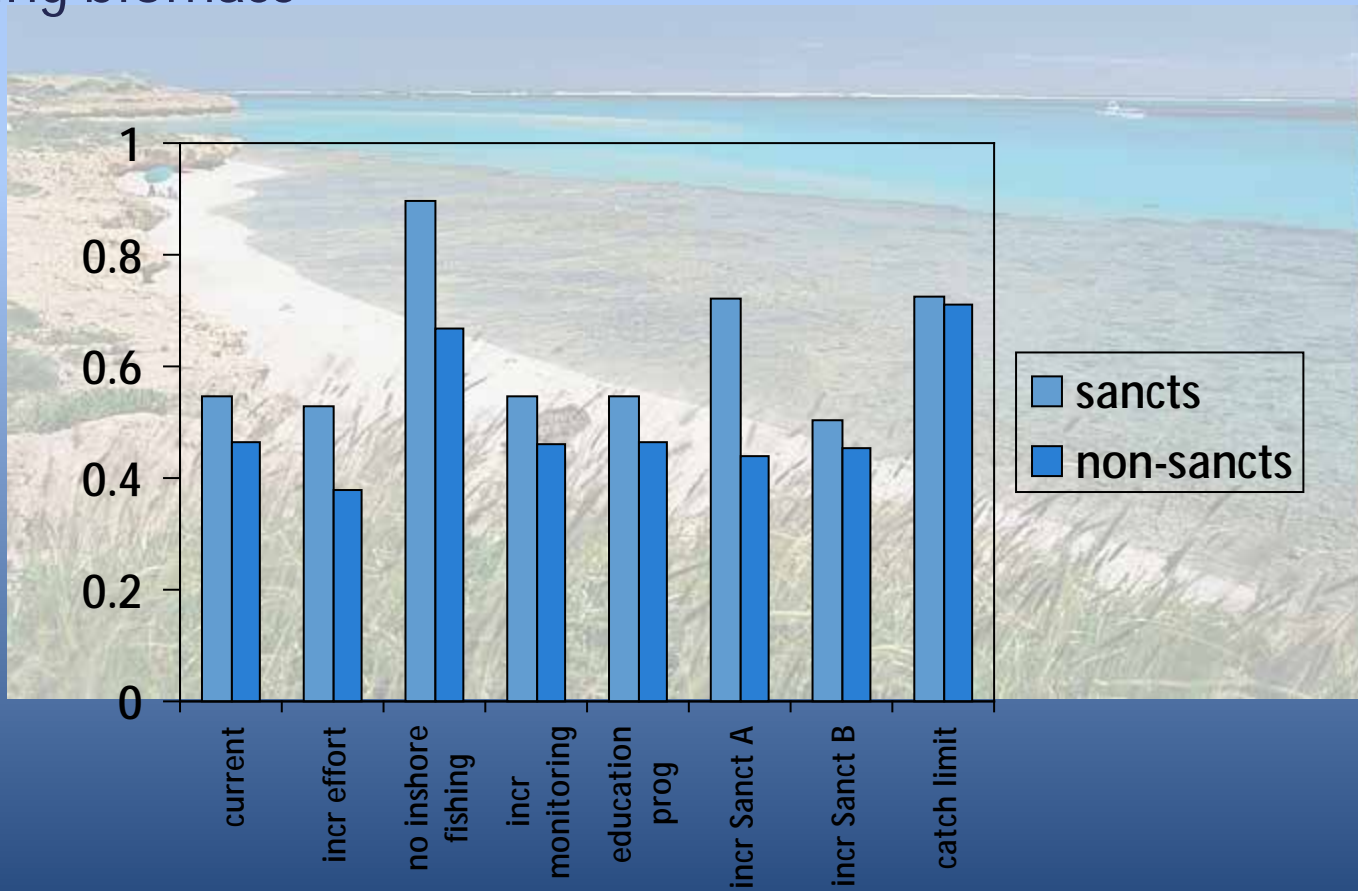
# Results (final report **current conditions**)

spawning biomass



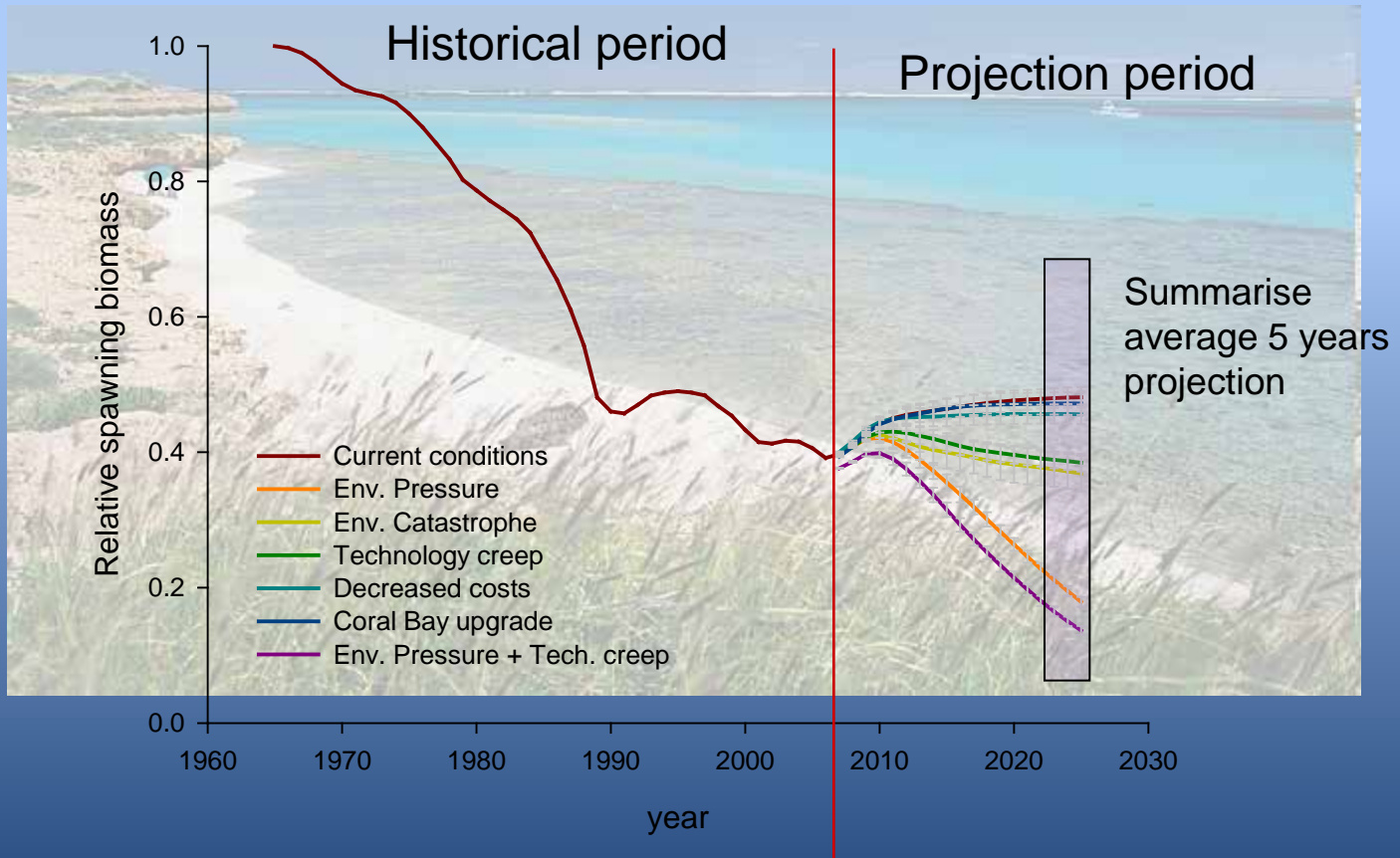
# Results (final report **current conditions**)

spawning biomass



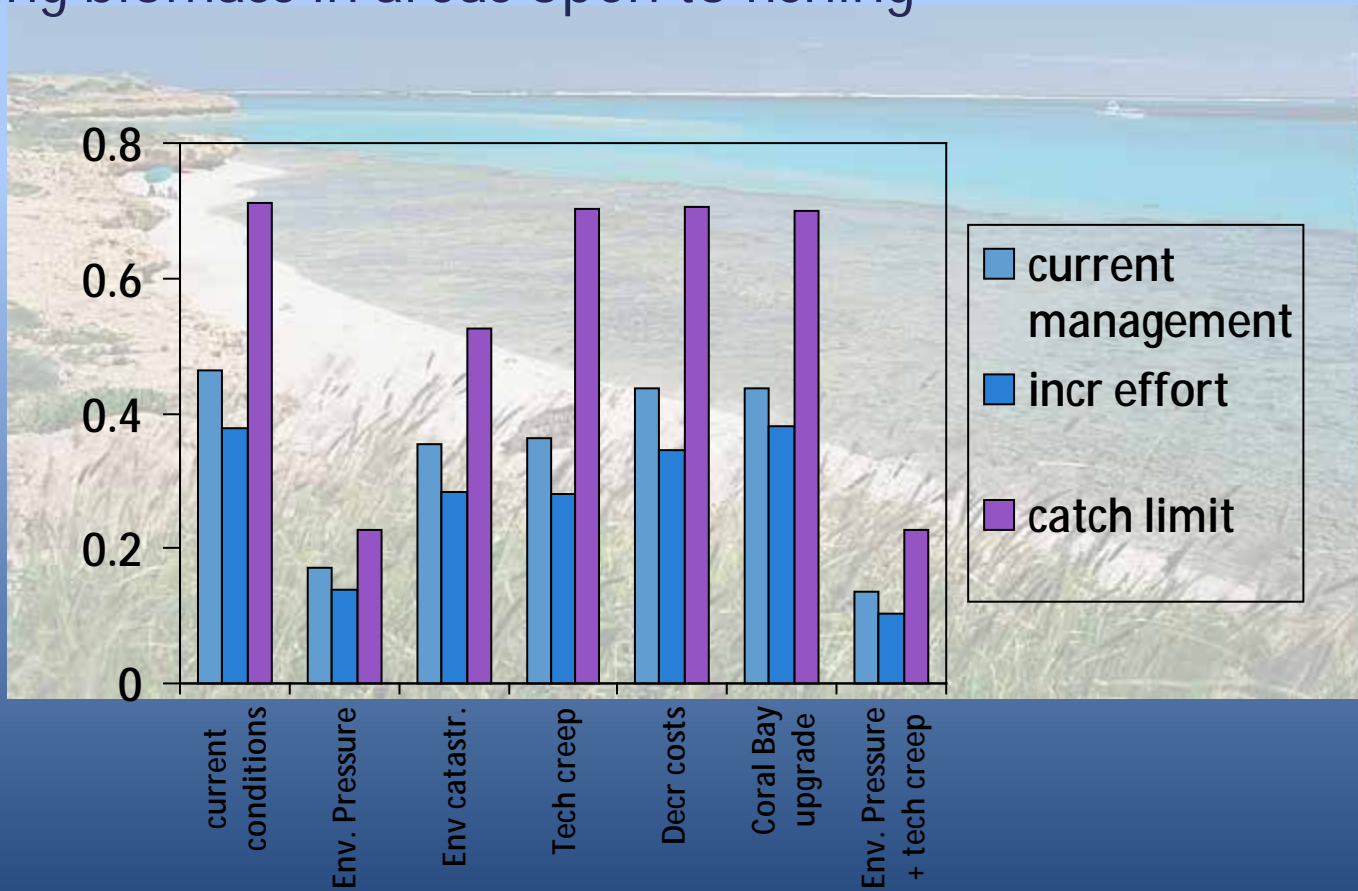
# Results (final report *alternative future scenarios*)

(current management strategy)



# Results (final report *alternative future scenarios*)

spawning biomass in areas open to fishing



# Summary

- Alternative management strategies (**current conditions**)
  - Inshore fishing results in low sanctuary biomass
  - Increased compliance measures had little effect because of assumed high compliance
    - Sims with lower compliance were performed and they performed better
- 3 strategies (**Alternative future scenarios**)
  - Sanctuaries are less effective in future scenarios that affect the entire population life history
  - Limiting fishing mortality (catches) would have a great effect



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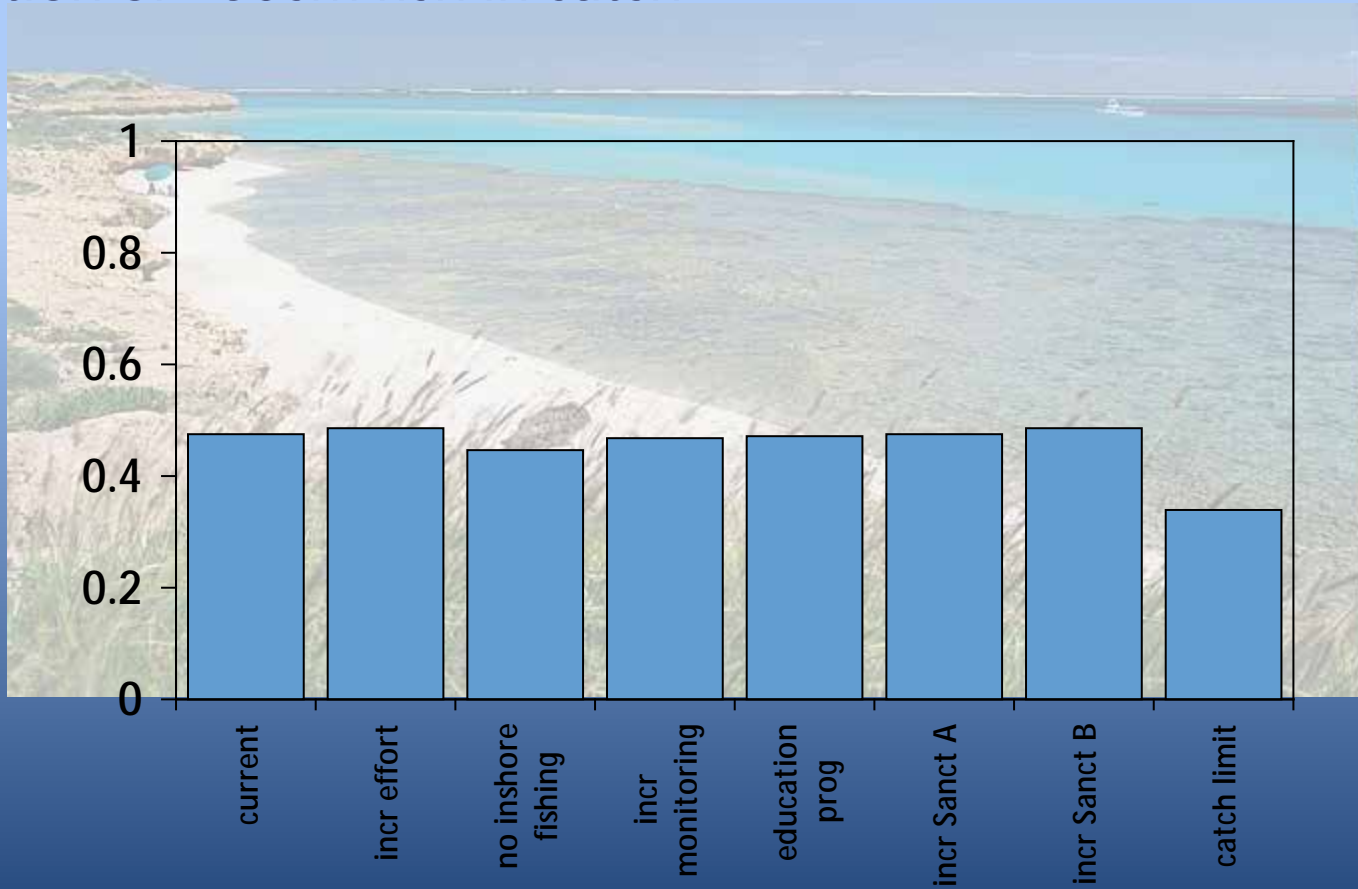
# Thank you





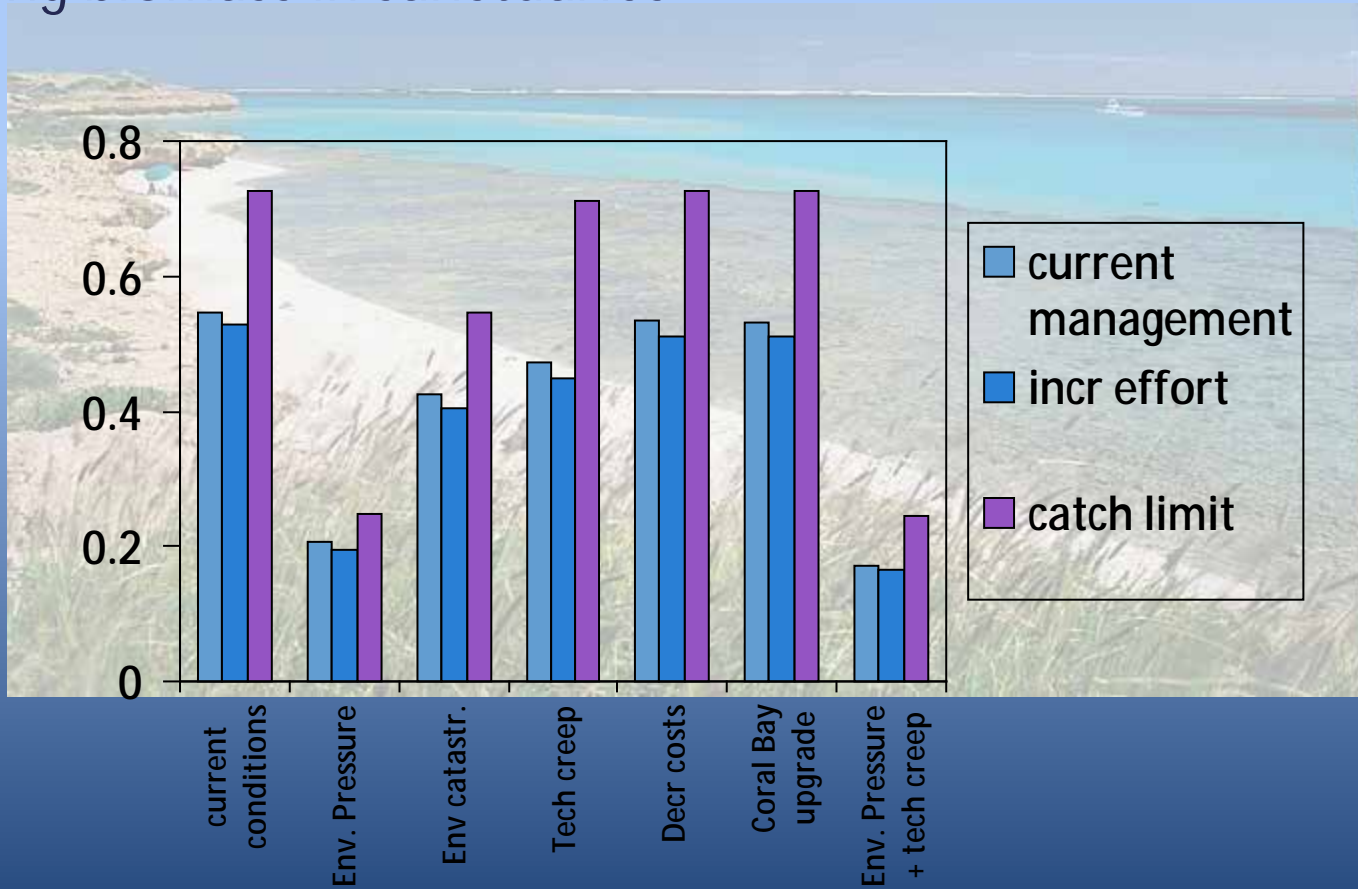
# Results (final report **current conditions**)

proportion of >50cm fish in catch



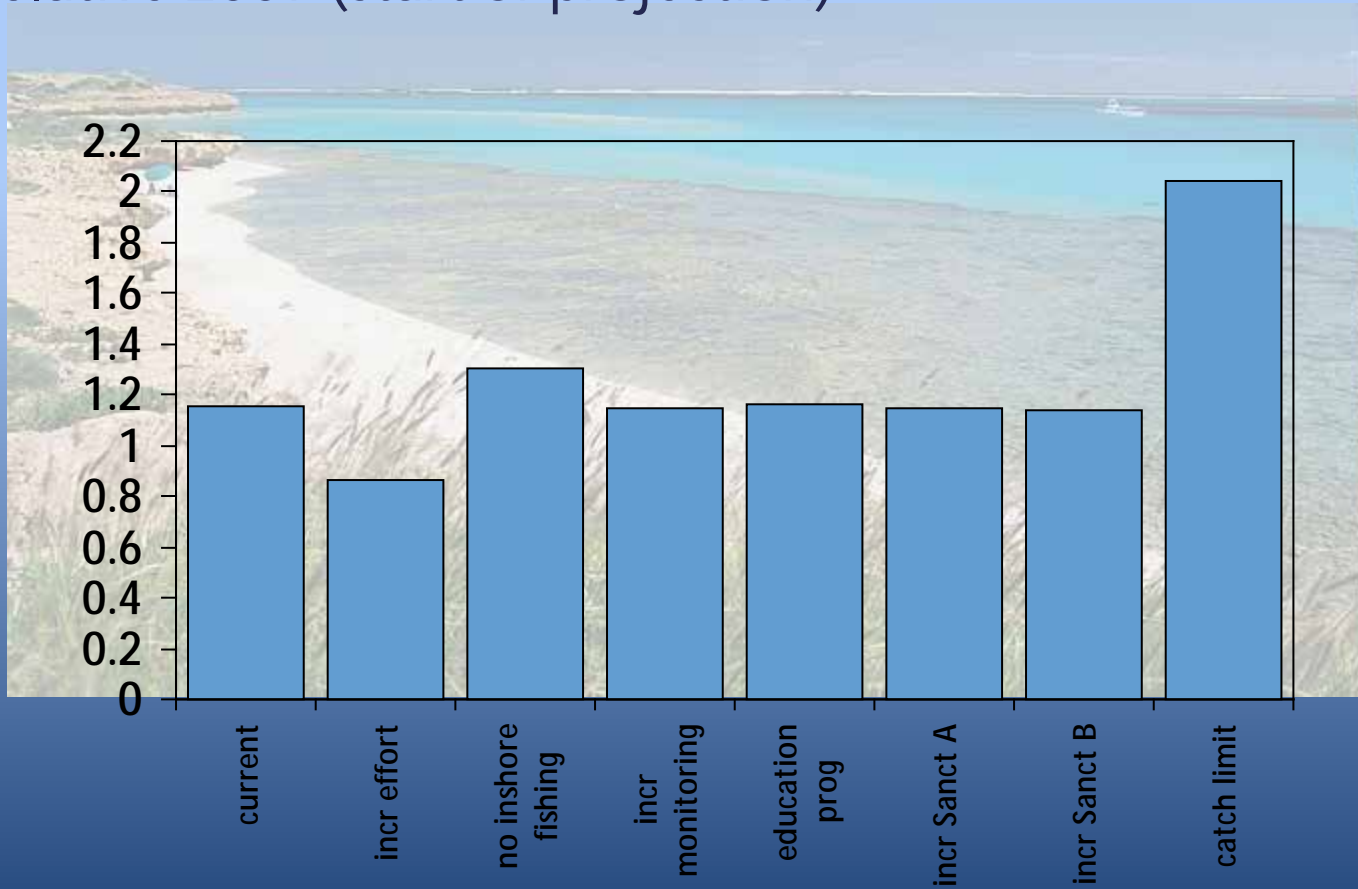
# Results (final report *alternative future scenarios*)

spawning biomass in sanctuaries



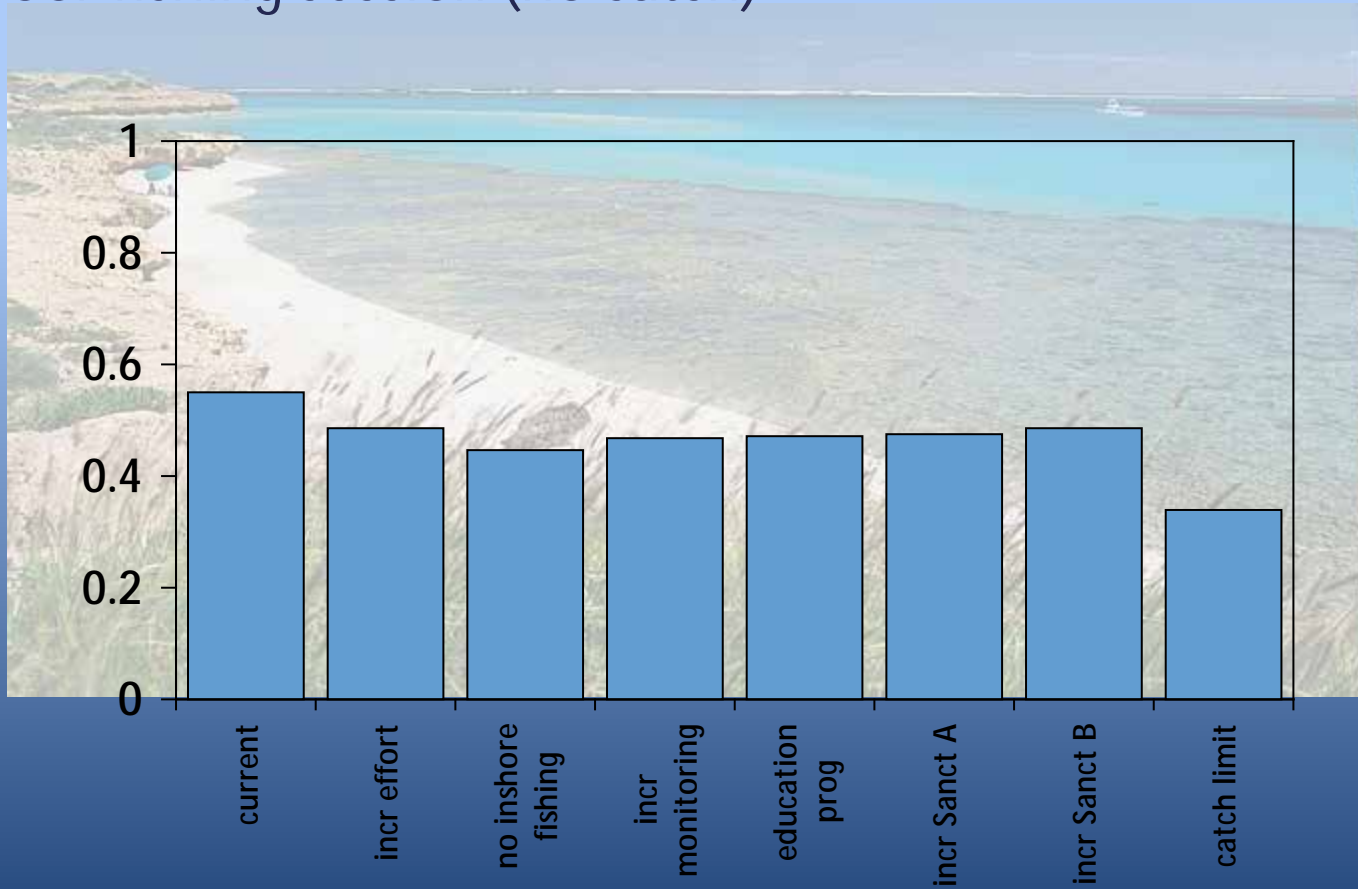
# Results (final report **current conditions**)

CPUE relative 2007 (start of projection)



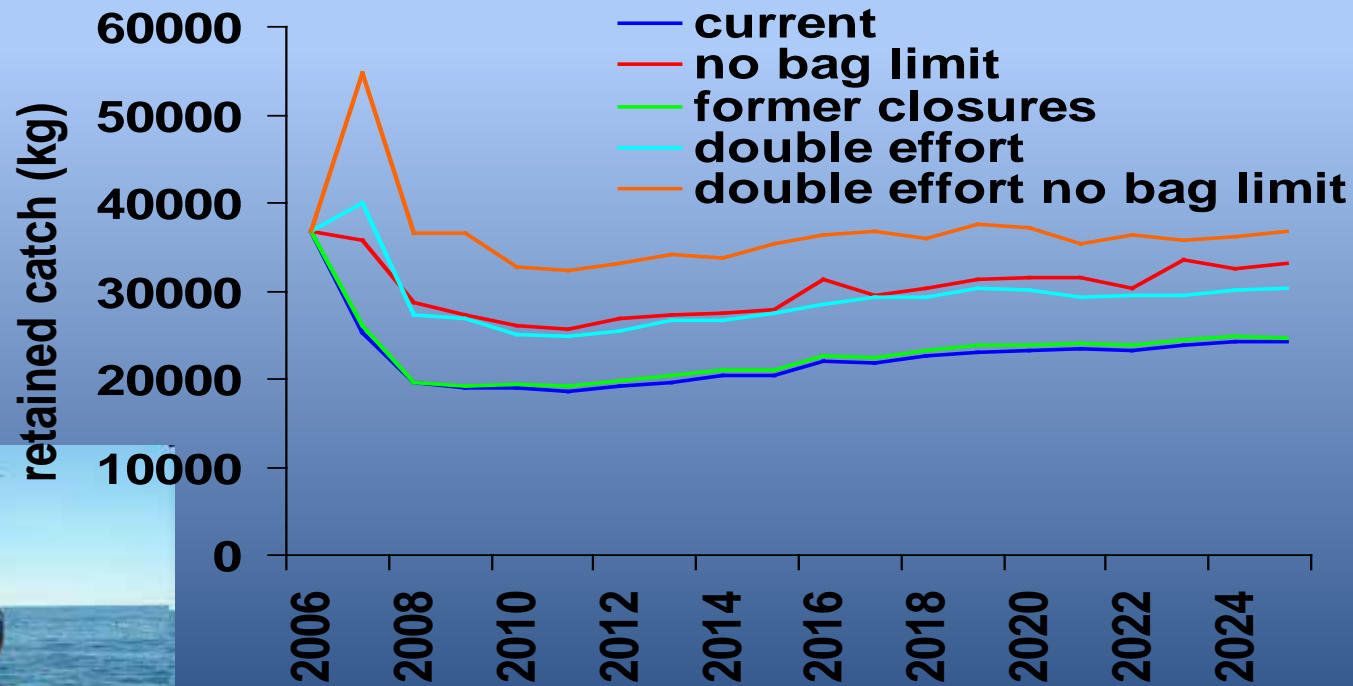
# Results (final report **current conditions**)

prob. poor fishing session (no catch)



# Results (mid-term)

Catch (recreational)



# Alternative sanctuaries.

