



# Impacts and Achievements of the MTSRF

Copy of abstract and presentation given at the  
2010 Annual Conference of the  
Marine and Tropical Sciences Research Facility (MTSRF)  
[http://www.rrrc.org.au/news/2010\\_conference.html](http://www.rrrc.org.au/news/2010_conference.html)

Showcasing the Australian Government's investment  
in the MTSRF for improved sustainability of the  
North Queensland region, and Australia

18-20 May 2010  
Pullman Reef Hotel & Casino  
Cairns, North Queensland



## Abstract

### [MTSRF Project Number 1.3.5](#)

#### Reporting marine ecosystem health in the Torres Strait

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MTSRF project 1.3.5 *Reporting Marine Ecosystem Health in the Torres Strait* has attempted to identify key indicators in the Torres Strait and their thresholds of concern to assist in the development of state of the environment reporting for the region. Marine resources are the primary natural capital for the region, and are under increasing pressure from legal and illegal fishing pressure, climate change, invasive species and environmental degradation, and therefore need to be monitored effectively. As a first step potential indicators for reporting were identified at two workshops with researchers and managers of various fisheries and other marine resources in the Torres Strait. These indicators were then aligned with the Torres Strait Regional Authority's (TSRA) Land and Sea Management Strategy to provide required information needs for decision-making. Indicators were further refined by the availability and confidence of data sets.

The resulting key indicators were then refined through discussion with the stakeholders of Torres Strait by identifying the existing management objectives associated with each indicator, and by identifying potential thresholds of status and trends for each indicator. Fact sheets of these key indicator species and their condition was chosen as an appropriate method for communicating such scientific information to communities, and tested on the islands of Erub and Warraber. An assessment was also made of data gaps, and those species where traditional knowledge of marine resources and their management could contribute to gap filling.

The next step of the project is to investigate how community-based monitoring can contribute to this reporting by exploring opportunities for monitoring at an island-base scale at Warraber and Erub. A community workshop is planned to establish the importance of marine ecosystem monitoring and explore the viability of island-based monitoring by these two islander communities. The co-management of their hand collectable fisheries can be encouraged and supported through a community-based monitoring program that also contributes to the marine ecosystem health reporting for the TSRA. This process will ensure that indicators selected will have had a bottom-up community-driven approach and a top-down reductionist and scientific approach to determining marine ecosystem health in the Torres Strait. In this presentation we will present the indicators of interest, their status, trends and thresholds, community priorities for monitoring ecosystem health and analyses of the potential contribution of traditional knowledge in monitoring.



Australian Government

Department of the Environment, Water, Heritage and the Arts



Marine and Tropical Sciences Research Facility

# *Reporting Marine Ecosystem Health in the Torres Strait*

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DEWHA - Donna Kwan, Jillian Grayson  
BRS – Gavin Begg, Neil Bensley  
Warraber and Darnley Island Communities



## OBJECTIVES

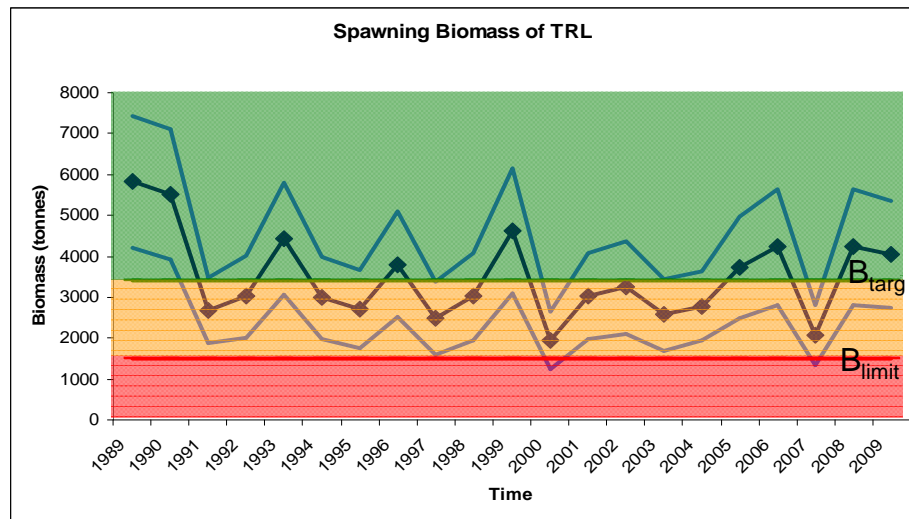
- Identify key indicators to report state of marine ecosystem health
- Identify thresholds of concern
- Return information to communities and agencies
- Explore future community-based monitoring for ecosystem health

## APPROACH

- Assessment of current reporting system
- Listed potential indicators for marine ecosystem health
- Collation of existing data – indicators and TOC
- Feedback – Presentations and fact sheets to end users
- Consultation with 2 island communities



## Outputs



- List of possible marine ecosystem indicators and their individual status
- Fact sheets on indicator conditions for islander communities
- Field testing of communication products
- Final report - Recommendations for reporting marine ecosystem health in the Torres Strait

**Torres Strait Baiat (Warrior Reef Sandfish)**

Marine and Tropical Sciences Research Facility (MTRSF) | <http://www.mtrsf.org.au/mtrsf/> | Fact Sheet - May 2010

**Life Cycle**

**Sandfish stocks in the Torres Strait are currently at an **unhealthy** level.**

Sandfish stocks are **UNHEALTHY** because the number of sandfish in the water is less than the number of sandfish that are being taken to eat each year.

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**Healthy stocks of Baiat can be maintained by:**

- Prohibiting the commercial harvest of sandfish (TAC = 0)
- Having a ban on the use of hookabait or SIOBA gear during harvesting
- Having a ban on the use of hookabait or SIOBA gear during harvesting
- Having a bag limit of three (3) sandfish per person or six (6) sandfish per family during traditional fishing in the context of the fishery.
- Researching and testing strategies and community-based management.

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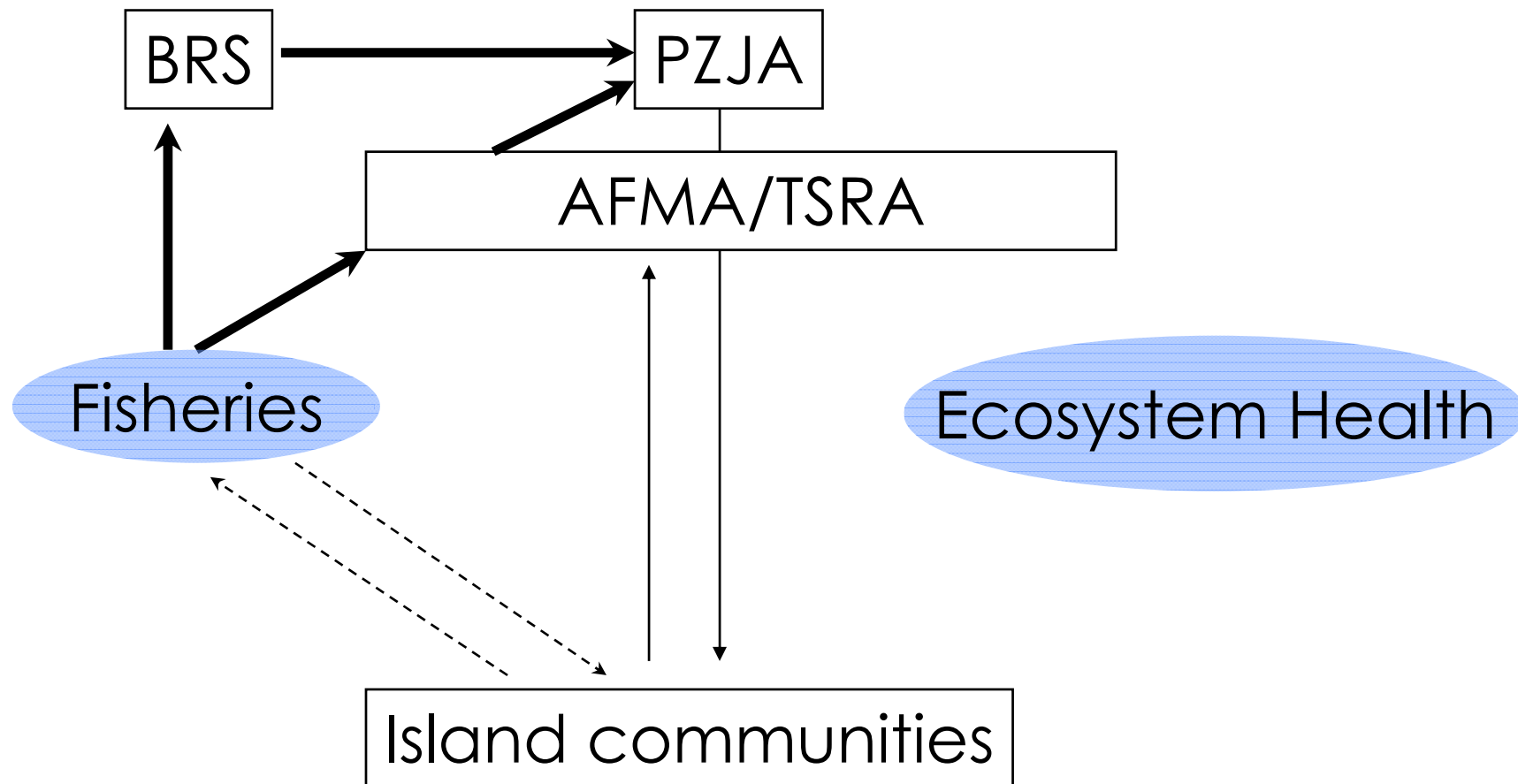
Further information about Program 3, including overview of each of the Torres Strait projects, visit [http://www.mtrsf.org.au/Status/Overview\\_S3Program\\_3.html](http://www.mtrsf.org.au/Status/Overview_S3Program_3.html)

To download this and other MTRSF fact sheets, visit [http://www.mtrsf.org.au/publications/fact\\_sheets.html](http://www.mtrsf.org.au/publications/fact_sheets.html)





# Current Reporting Systems



# Potential indicators

INDICATORS	ORGANIZATION & AGENCIES	LENGTH OF DATA	UNIT OF MEASURE	THRESHOLD OF CONCERN
Tropical rock lobster	CSIRO	1989 - 2009	Biomass (tonnes)	Biomass target and limit levels
Sandfish and other sea cucumber species	CSIRO	1992 - 2004	Numbers per ha	Biomass target and limit levels
Trochus	CSIRO	1988 - 2006	Estimated total catch	Unknown
Green turtle	QEPA	1976 - 2005	Ave. Carapace length of Nesting females Annual census	Unknown Unknown
Hawksbill	QEPA	1984 - 2004	Annual census	Unknown
Dugong	JCU	1987, 1991, 1996, 2001,2006	Estimated Number	Unknown
Spanish mackerel	QDPI&F	1985 - 2005	Standard CPUE	Unknown
Blue Endeavour Prawns	QDPI&F	1989 - 2007	Proportion of Virgin Biomass	Biomass target and limit levels
Brown Tiger Prawn	QDPI&F	1989 - 2007	Proportion of Virgin Biomass	Biomass target and limit levels
Seagrass	CSIRO SEAGRASS WATCH	1989 - 2004 2004 - 2006	Mean % cover % cover	Unknown Unknown
Coral cover	CSIRO	1994 - 2009	Mean % cover	Unknown
Gold-lipped pearl	CSIRO	1989 - 2009	Mean number	Unknown
Algae	CSIRO	1994 - 2009	Mean % cover	Unknown
Sea surface temperatures	CSIRO, AIMS	1990 - 2006	Daily SST, Yearly SST at Thursday Is.	Coral bleaching threshold
Wind speeds	CSIRO	1986 - 2006	Annual averages	Storm speeds
Heavy Metal Pollution	GBRMP, JCU	2002	Level of trace metals	Toxic levels
Traditional Fisheries Catch	CSIRO	1976 - 2005	Estimated dugong and turtle catch per yr	Unknown
Shipping traffic	AMA	1997 - 2009	# of voyages (Prince of Wales passage)	Unknown
Illegal fishing - # of apprehensions	AFMA Torres Strait	1989 - 2008	# of apprehensions in TSPZ	Unknown
Marine Pests - Crown of thorns	CSIRO	2002, 2005, 2009	# per ha in Eastern Torres Strait	Dangerous levels
Licensing	AFMA Torres Strait	2001 - 2009	# of TIB and TVH licenses	Unknown



# Marine Ecosystem Health Criteria

DATA WITH KNOWN THRESHOLDS		DATA WITH TRENDS	
<b>HEALTHY</b>	Species/fishery is <b>healthy</b> when abundance is above $B_{\text{targ}}$	<b>HEALTHY TREND</b>	Species/fishery is <b>healthy</b> if trend is increasing by $\geq 20\%$ /year.
<b>STABLE / VULNERABLE</b>	Species/fishery is <b>stable</b> when abundance is between $B_{\text{targ}}$ and $B_{\text{limit}}$ .	<b>STABLE TREND</b>	Species/fishery is <b>stable</b> if trend is either increasing or decreasing by $< 20\%$ .
<b>UNHEALTHY</b>	Species/fishery is <b>unhealthy</b> when abundance is below $B_{\text{limit}}$	<b>UNHEALTHY TREND</b>	Species/fishery is <b>unhealthy</b> if trend is decreasing by $\geq 20\%$ .





## Heat Maps

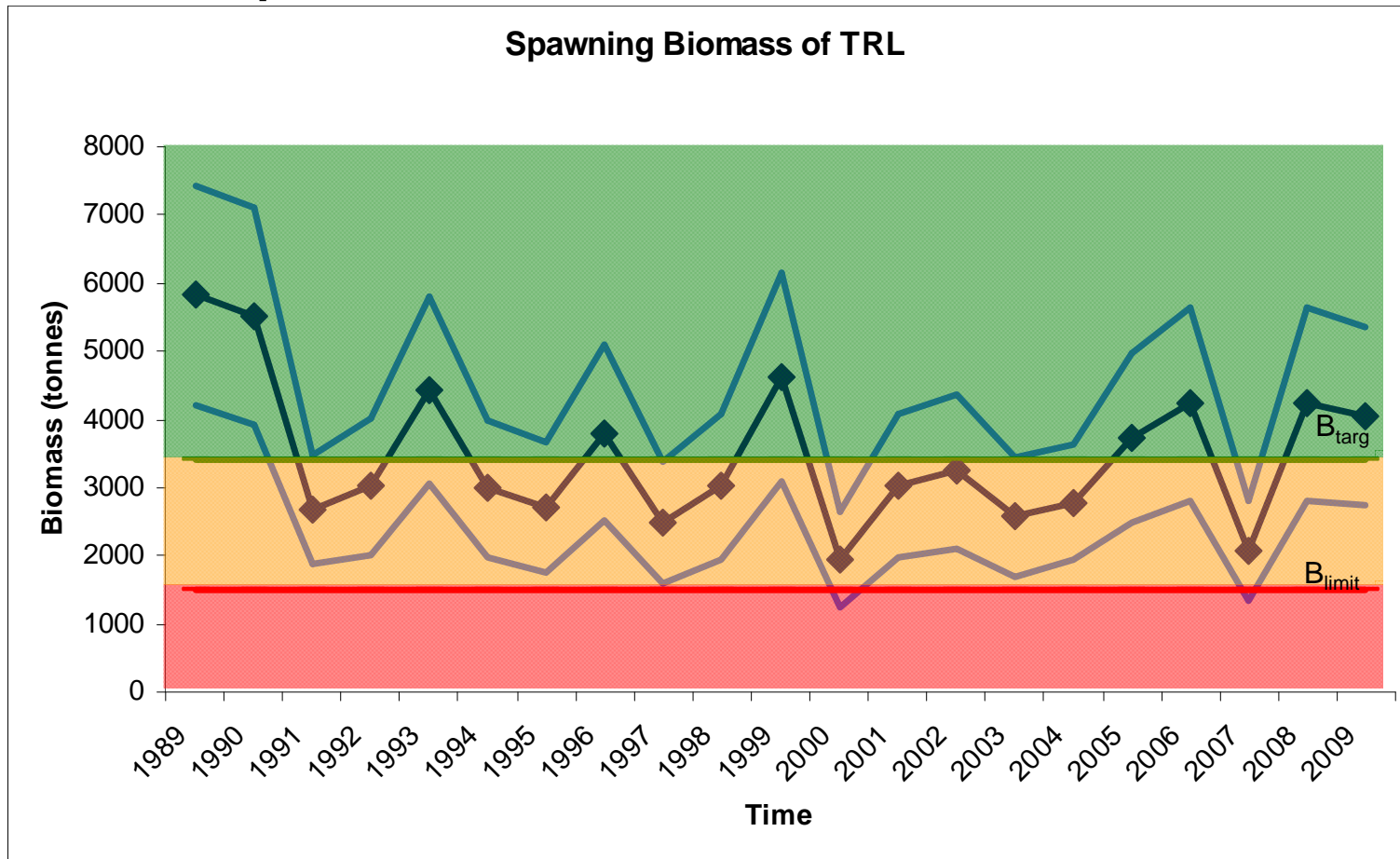
Indicators	Pre 1989	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
TRL western TS	Green	Green	Green	Orange	Orange	Green	Orange	Orange	Green	Orange	Orange	Green	Orange	Orange	Orange	Orange	Orange	Green	Green	Orange	Green	Green
Sandfish - Warrior Reef					Green			Red			Red		Red		Red		Red					
Tiger Prawns		Green	Green	Green	Green	Green	Orange	Green	Green	Green	Green	Green	Orange	Orange	Green	Green	Green	Green	Green	Green	Green	Green
Endeavour prawns		Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Indicators	Pre 1989	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
TRL eastern TS																		dec				
Black teatfish eastern TS																		dec				
Surf redfish eastern TS																		dec				
White teatfish eastern TS																		dec				
Deepwater redfish eastern TS																		inc				
Prickly redfish eastern TS																		inc				
Tigerfish eastern TS																		inc				
Blackfish eastern TS																		inc				
Lolly fish eastern TS																		inc				
Dugong - Aerial survey Western TS				inc					inc					dec					inc			
Spanish M - Comm. catch			dec	dec	dec	inc	dec	dec	inc	inc	dec	dec	inc	inc	inc	dec						
Green - Raine Island	dec	inc		dec	dec	inc	dec	inc	inc	dec	dec	inc	dec	inc	dec	inc	inc	dec	inc	dec	inc	
Hawksbill - Milman Island				inc	dec	inc	dec	inc	inc	dec	dec	inc	dec									
Trochus - Traditional Catch	inc								dec	inc		inc						dec	inc	dec		
Pearl shell in western TS				dec	dec	inc	dec	dec	nil	inc	dec		nil	inc	dec	inc	dec	inc		inc	inc	
Seagrass western TS				dec				dec	inc	inc	dec	dec	nil	dec	inc	inc	inc	dec		dec	dec	nil
Seagrass eastern TS																		inc				
Algae western TS								inc	dec	inc	dec	nil	nil	inc	nil	dec	inc	dec		nil	nil	nil
Algae eastern TS																		dec				
Live coral western TS				dec				nil	dec	inc	dec	inc	dec	inc	dec	dec	nil	nil		inc	inc	dec
Live coral eastern TS																		dec				





# Tropical Rock Lobster

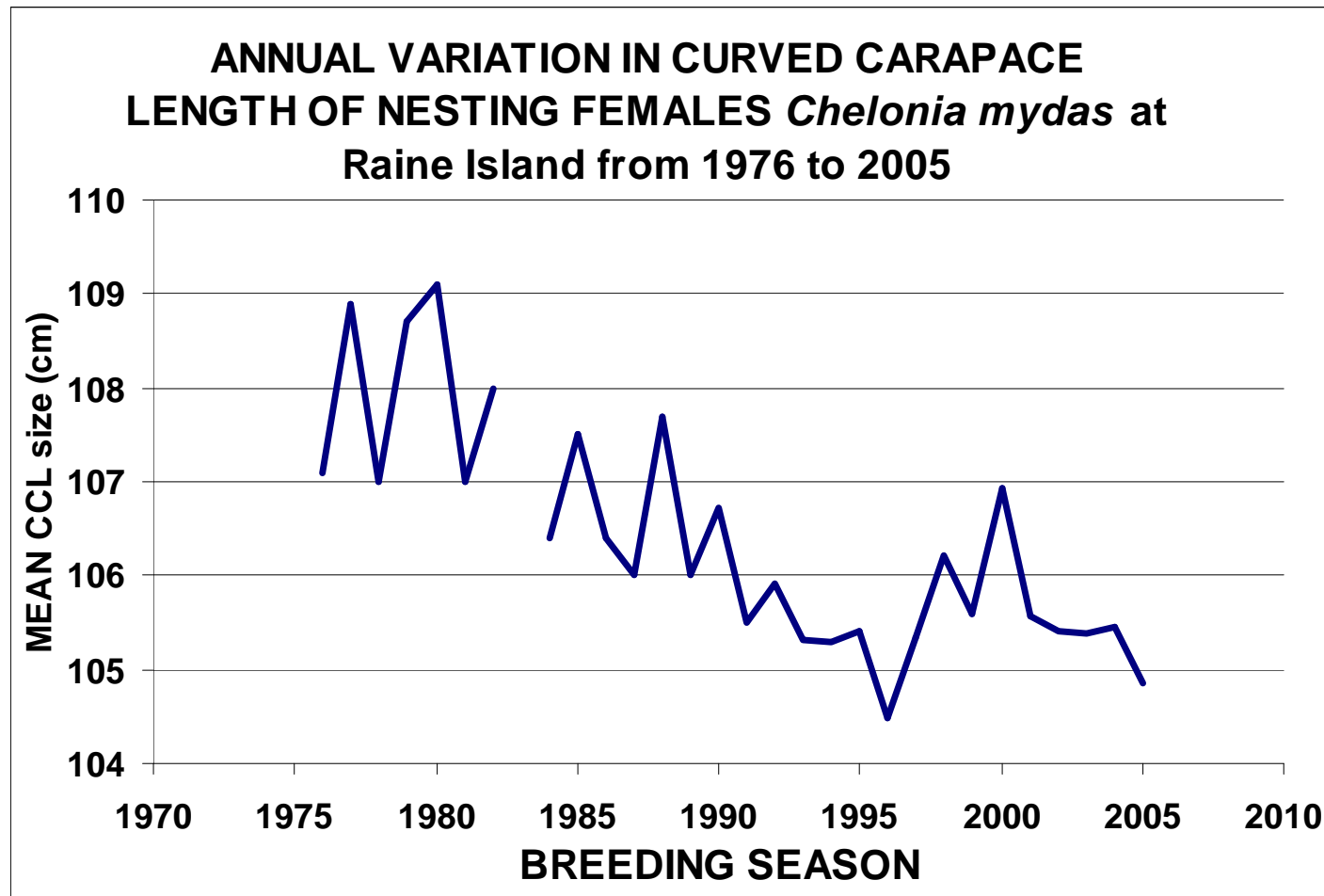


Source: Darren Dennis, CSIRO





# Green Turtle

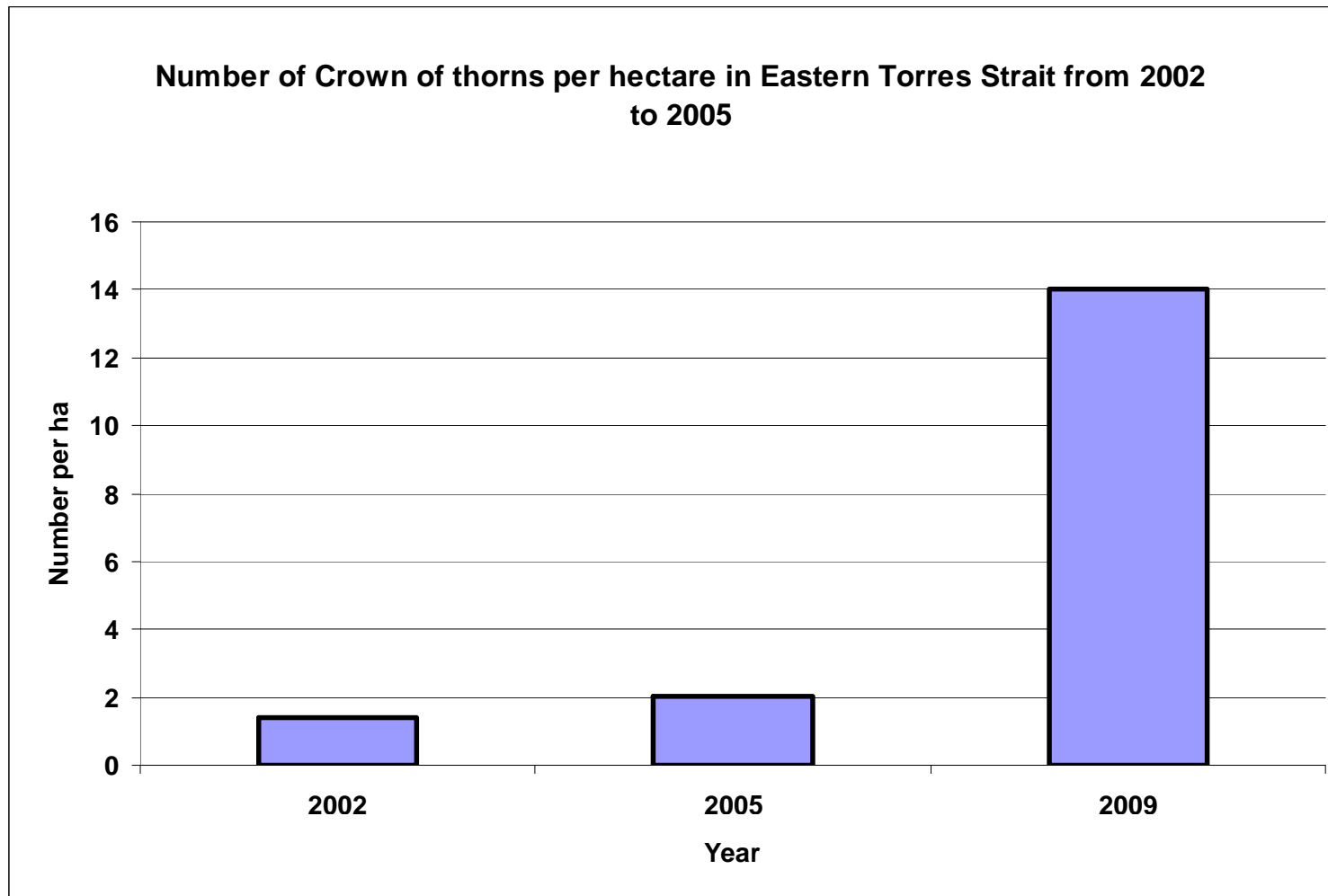


Source: Collin Limpus, QEPA





# Crown of thorns

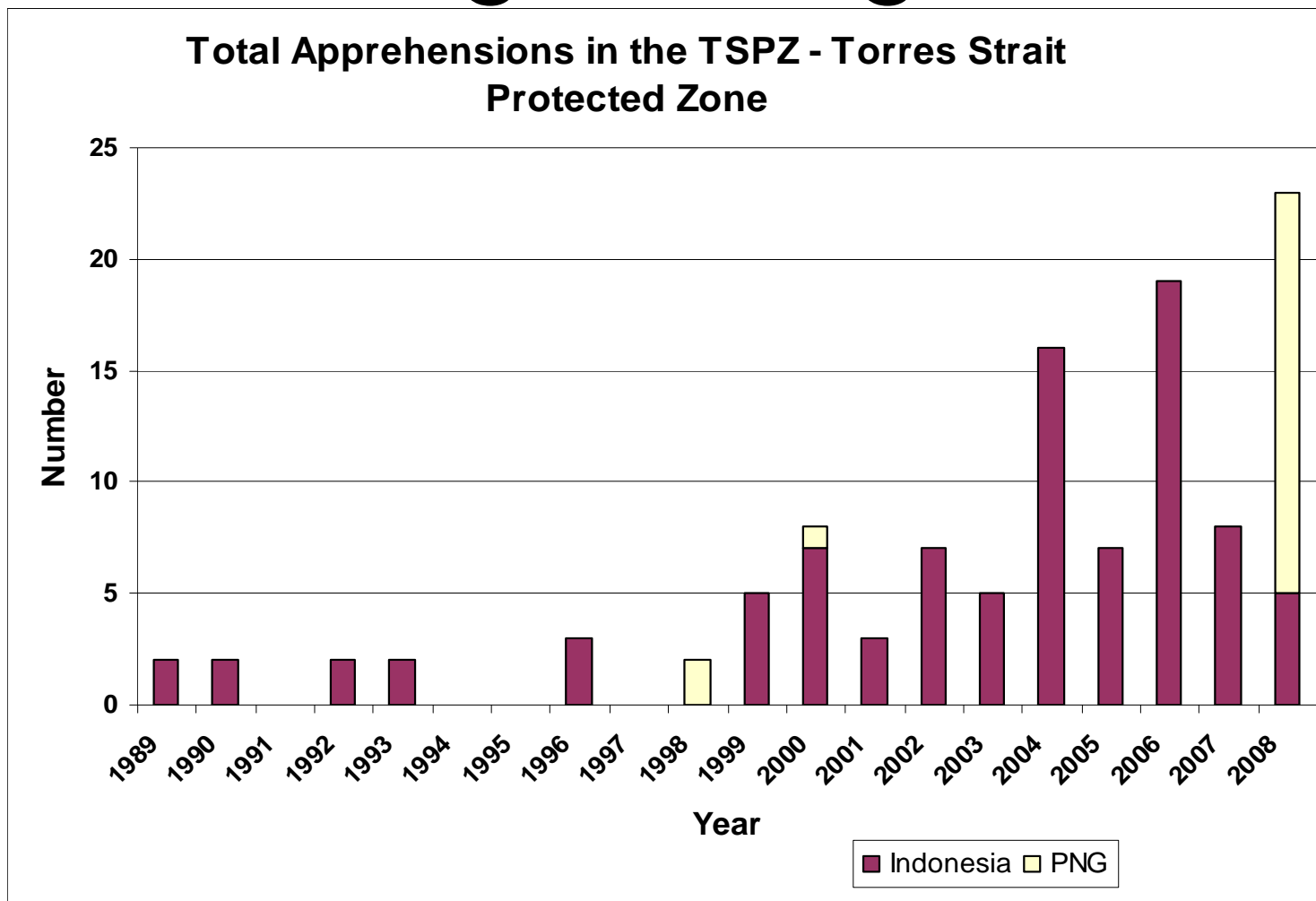


Source: Tim Skewes, CSIRO





# Illegal fishing



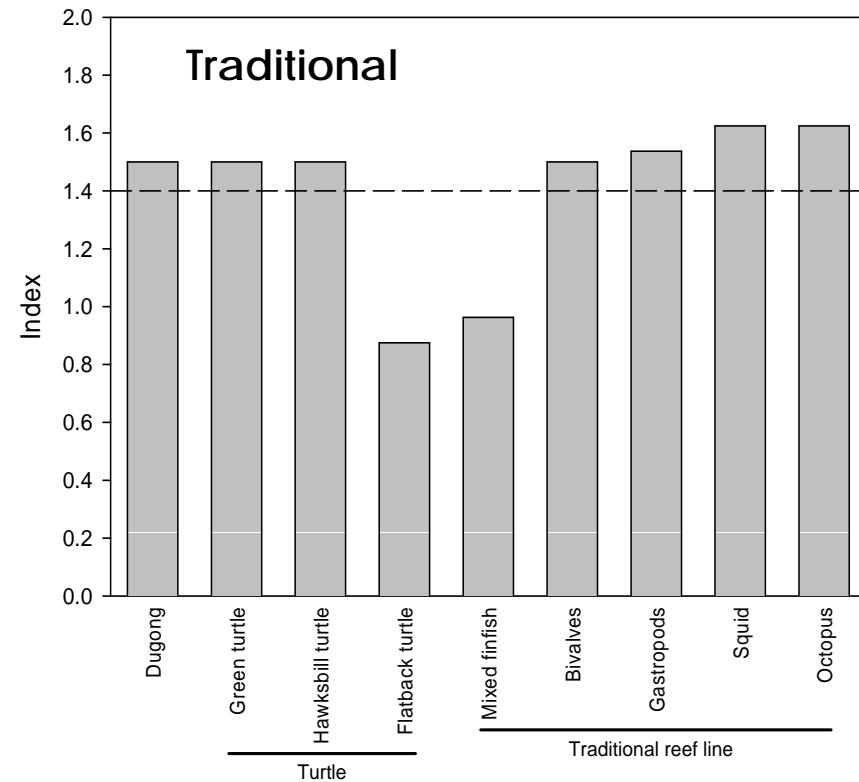
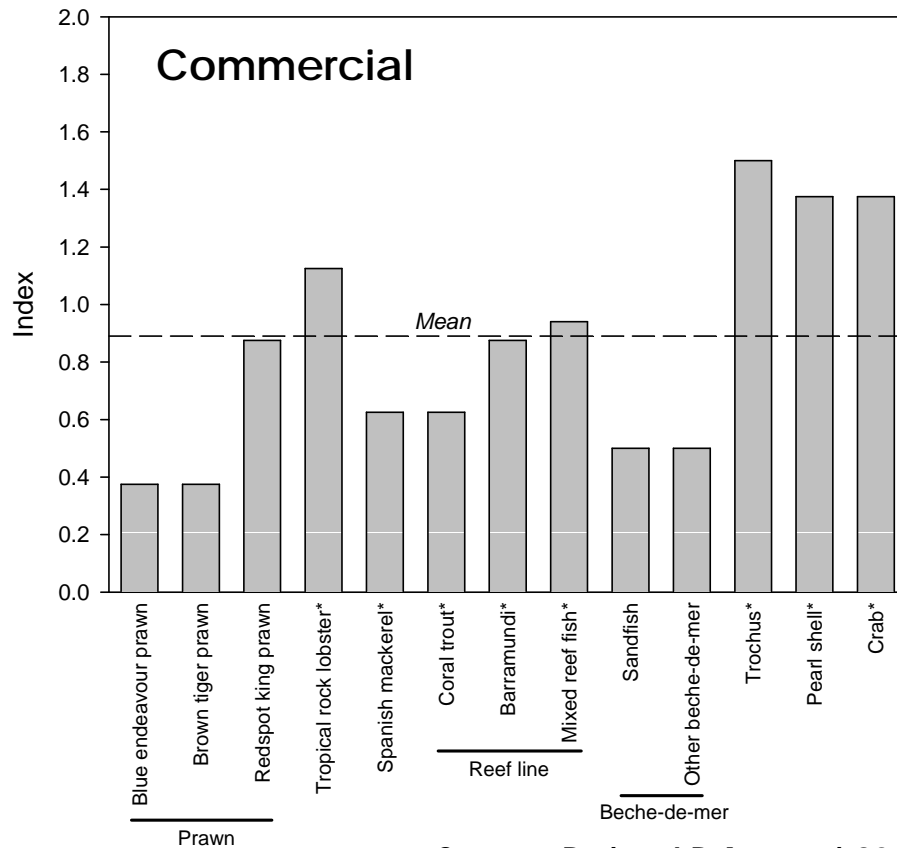
Source: Shane Fava, AFMA







## Potential for TEK in monitoring



Source: Butler, J.R.A. *et, al.* 2010. (In review)





# Recommendations (Final report)

- **Marine Ecosystem Health (MEH) is uncertain**
  - MEH?
  - MEH Index for Torres Strait
  - More monitoring and research
- **Community-based monitoring driven by co-management of fisheries.**
  - Direct relevance to communities
  - Island scale is easier
  - Adds value to regional scale monitoring
  - Needs trialling
- **TEK**
- **PZJA/TSRA as the central hub for reporting**





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# Esso

# Thank you

