



National Environmental
Research Program



Australian Government



TSRA
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Biodiversity & Ecosystem asset trends



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TORRES STRAIT ECOSYSTEMS

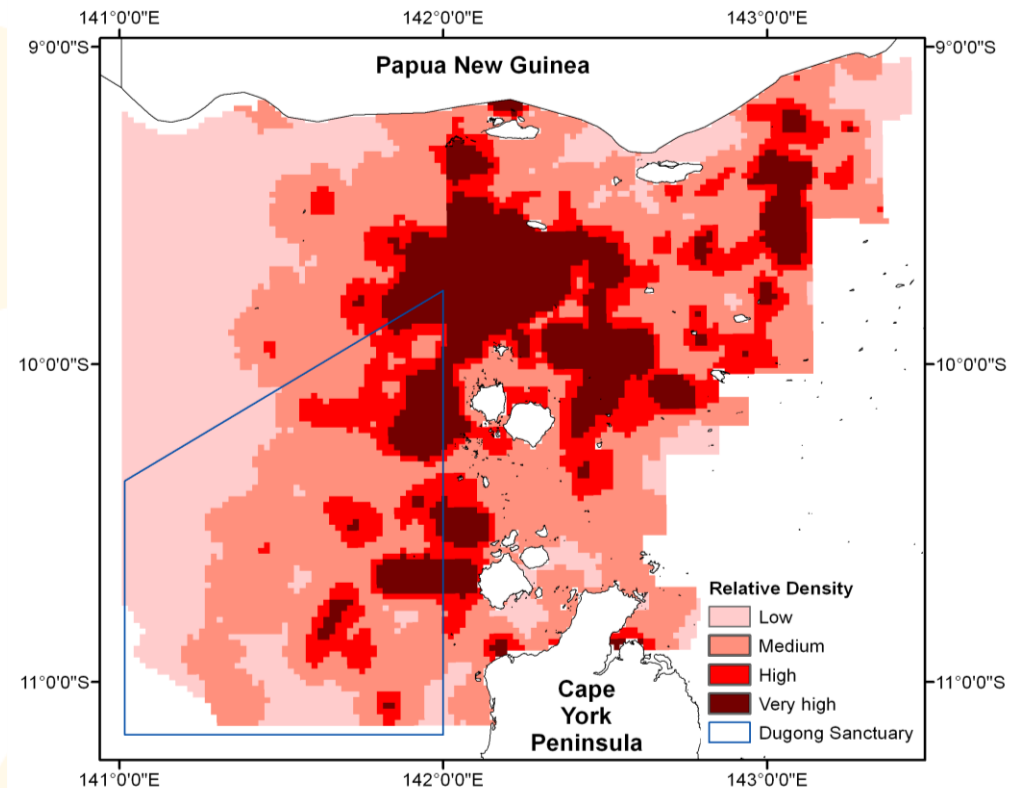
1. Dugong and turtles
2. Coral reefs
3. Seagrass habitats
4. Mangroves and freshwater wetlands
5. Fisheries resources





DUGONG POPULATIONS

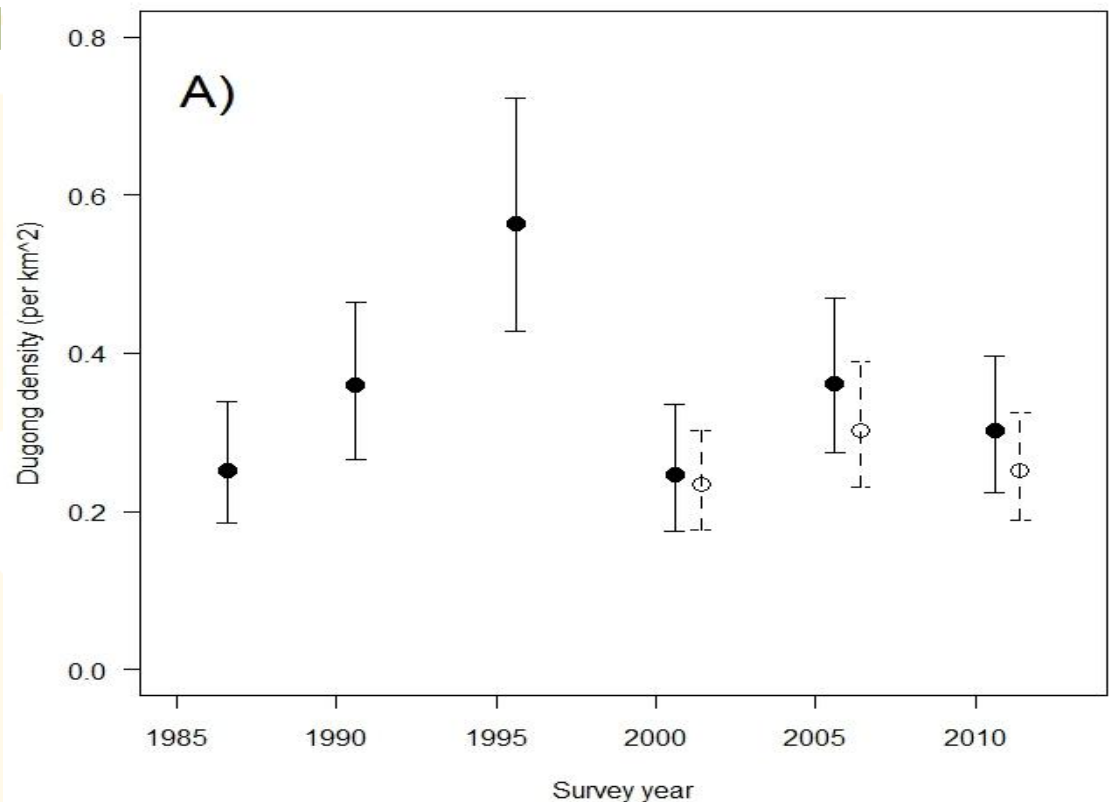
- Estimated dugong population in Torres Strait is > 12,000 animals (largest population in the world)
- Genetically healthy





AERIAL DUGONG SURVEYS SINCE 1987

- Indicate population density has not changed significantly over time
- However, low levels of decline difficult to detect, and some evidence that dugongs breeding at very small sizes/young ages (possible early signs of declining population)





DUGONG HABITAT

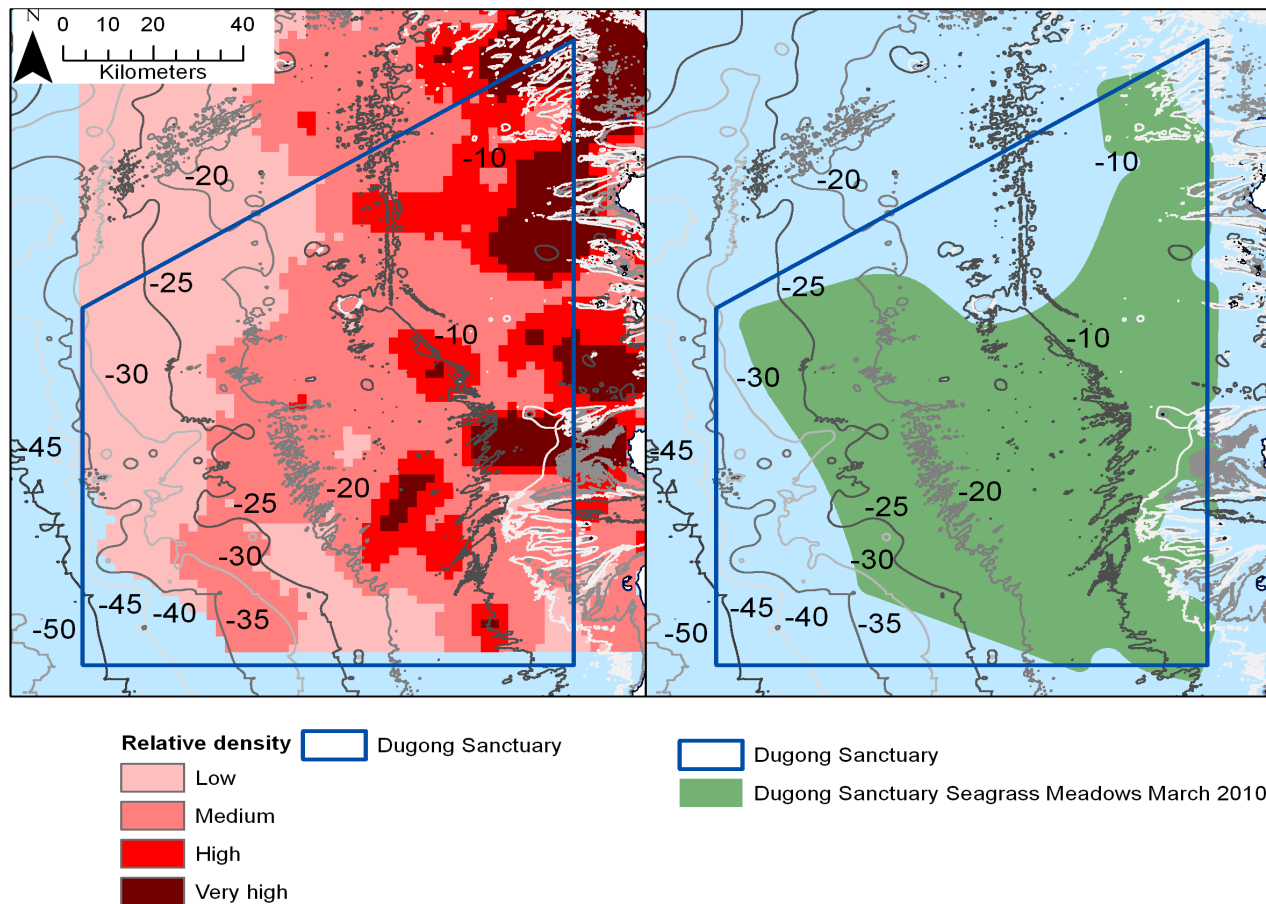
- Torres Strait is most important dugong seagrass habitat in Australia and probably the world
- Torres Strait contains 54% of the high and very high density dugong habitat in northeast Australia
- Most important dugong habitat is ~10,500 km² extending from Badu to Boigu Islands, east to Gabba Island and west to Warul Kawa Island
- 62% of high density dugong habitat is not hunted (too far & too deep)





DUGONG SANCTUARIES

- Good match between dugongs and seagrass in Dugong Sanctuary





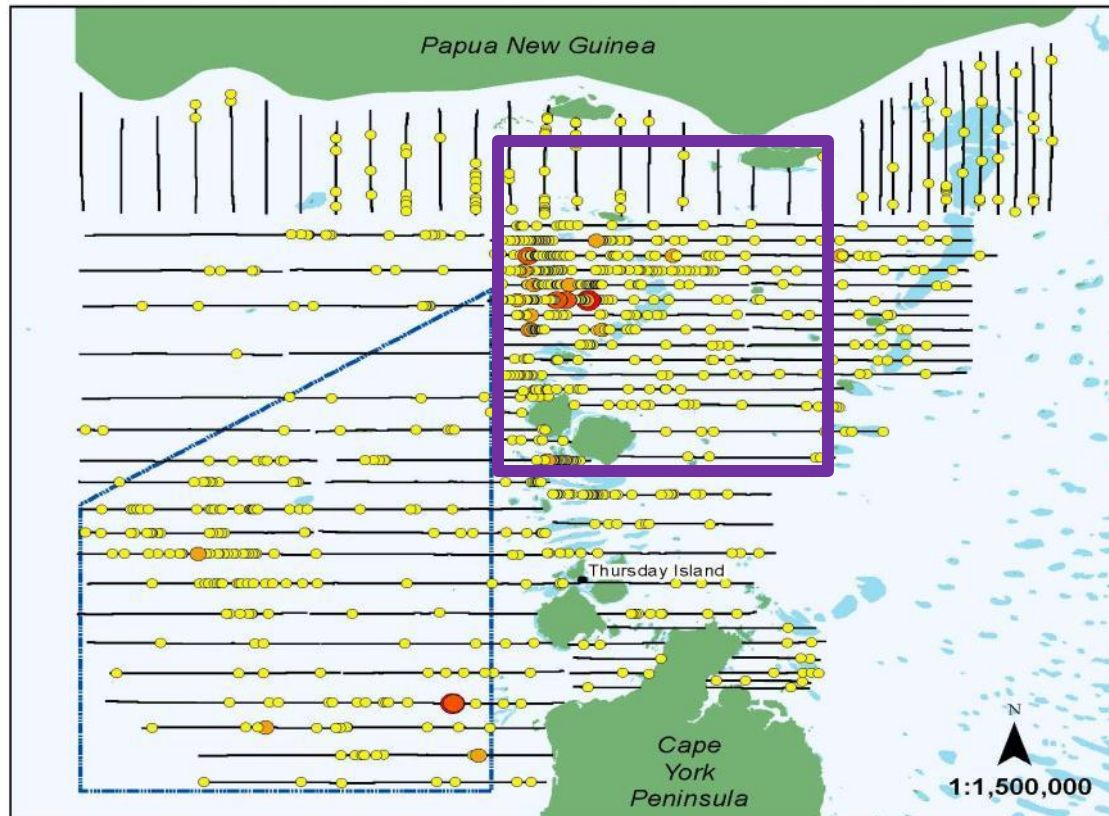
TURTLE POPULATIONS

- Green, hawksbill, flatback and loggerhead turtles reside in Torres Strait.
- Populations status – greens & flatbacks unknown, hawksbills decline, loggerheads are not common
- Turtles have strong site fidelity while foraging in seagrass and reef habitats.
- Adult females migrate to breed – including to areas outside TS



Turtle hotspot between Badu & Boigu

Turtles Observed by Aerial Survey, March 2011





GREEN TURTLE NESTING

- The Islands in the Mer group (Mer, Dauar and Waer) and Bramble Cay are the most significant green turtle rookeries in the Torres Strait.
- Nesting success (% of female turtles that emerge each night to lay eggs) at Dauar Island and Bramble Cay was 50–60% in 2008/09, 62% in 2007 and 33% in 2006.
- Data suggests that nesting female turtle size is declining.





FLATBACK & HAWKSBILL TURTLE NESTING

- The Islands in the central and western TS are the most significant flatback turtle rookeries— BUT Crab Island in the NE Gulf is the most important.
- The Islands in the central Torres Strait are the most significant hawksbill turtle rookeries – especially Sassie Island.





TURTLE & DUGONG: DRIVERS OF CHANGE

- In the short term (by 2030), sea level rise will cause inundation of turtle nesting grounds but by 2070 sand temperatures will have a greater impact on egg incubation.
- The impact of climate change on the frequency of seagrass diebacks will potentially affect dugong.
- We have few data to predict change in foraging areas of marine turtles.
- Ultimately, impacts on turtle and dugong populations will affect traditional harvest and cultural activities.



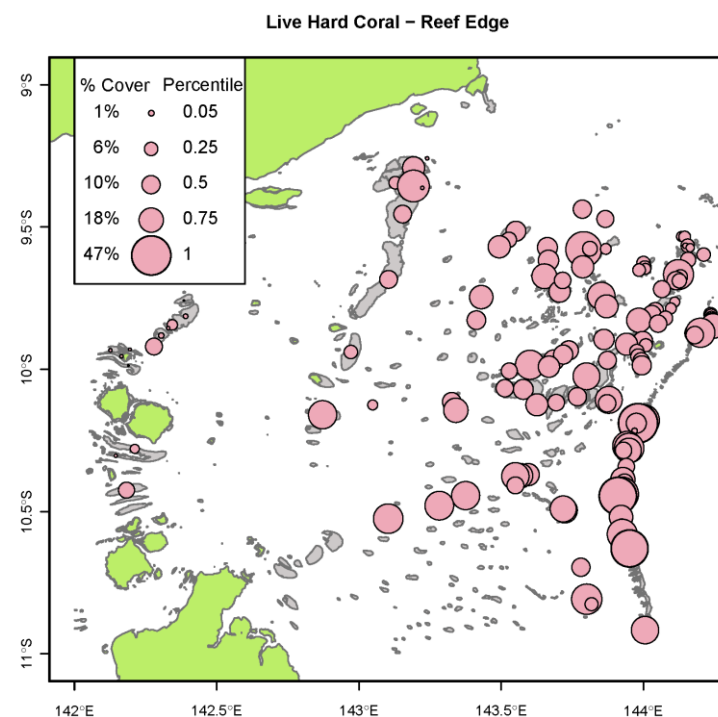


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CORAL REEFS

- Hard coral cover is greatest on reef edges in east Torres Strait (47%)
- Reef edges have higher coral cover (median 10%) than reef tops (median 5%)
- Coral community composition changes from east to west
- Branching, digitate and tabular corals most common form



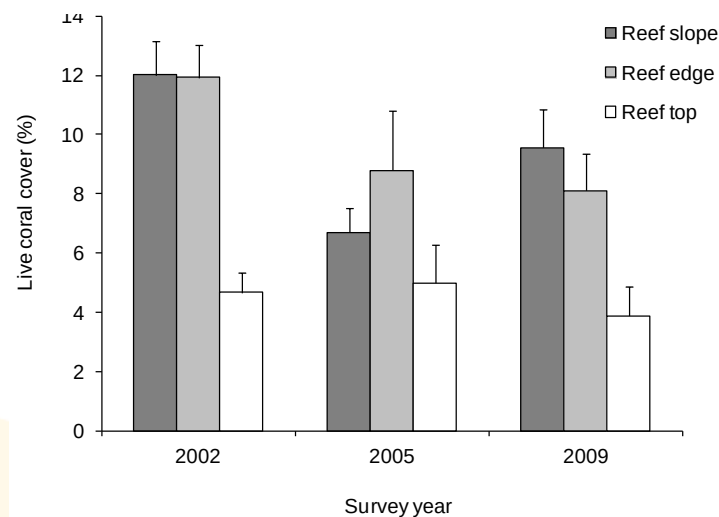
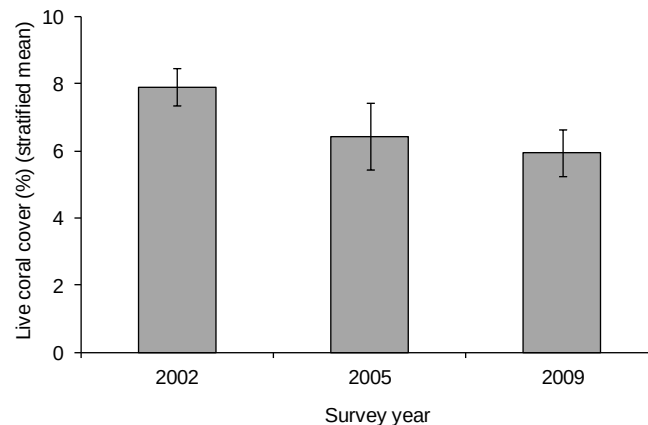


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CORAL COVER CHANGE

- East Torres Strait live coral cover from beche-de-mer surveys
- General decline in coral cover between 2002 and 2009
- Largest decline in reef edge and reef slope habitats



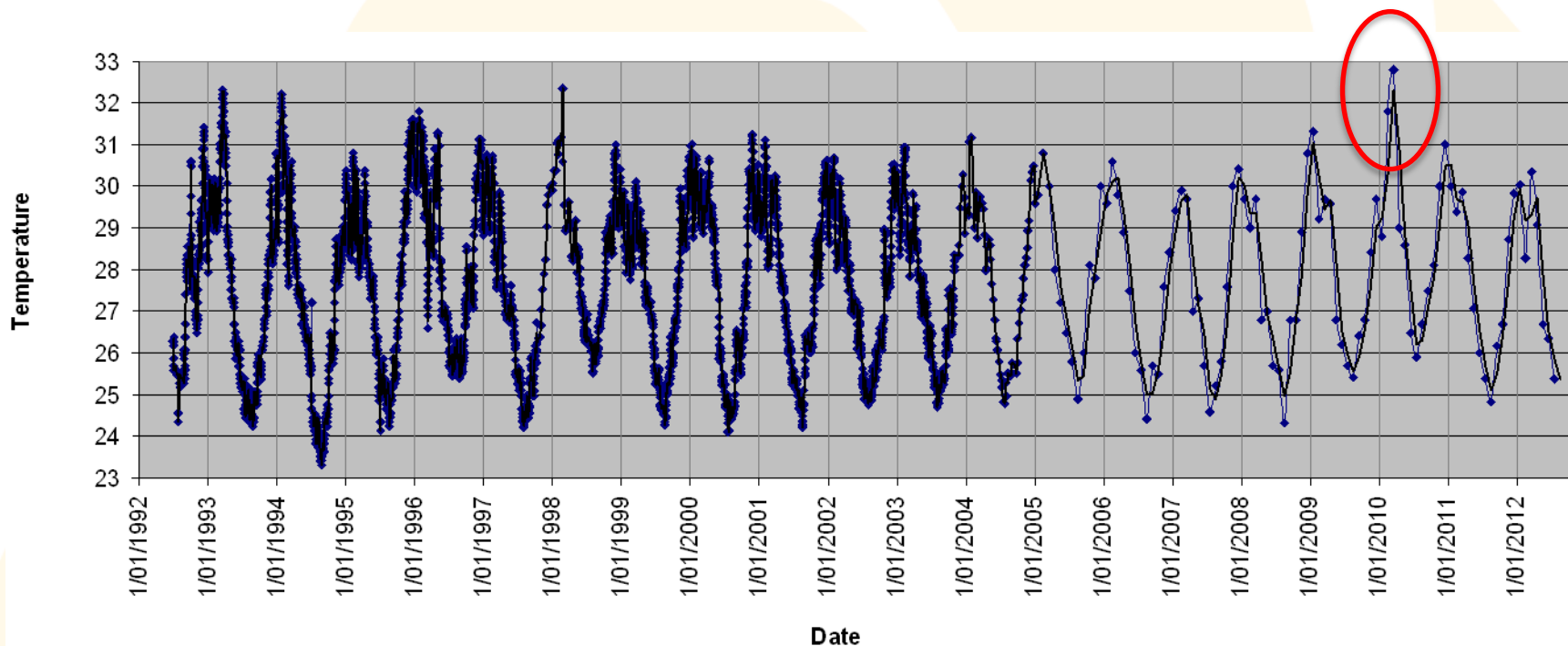


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CORAL REEFS

- Coral bleaching was reported in Western Torres Strait in 2010
- This coincides with high water temperatures at the time



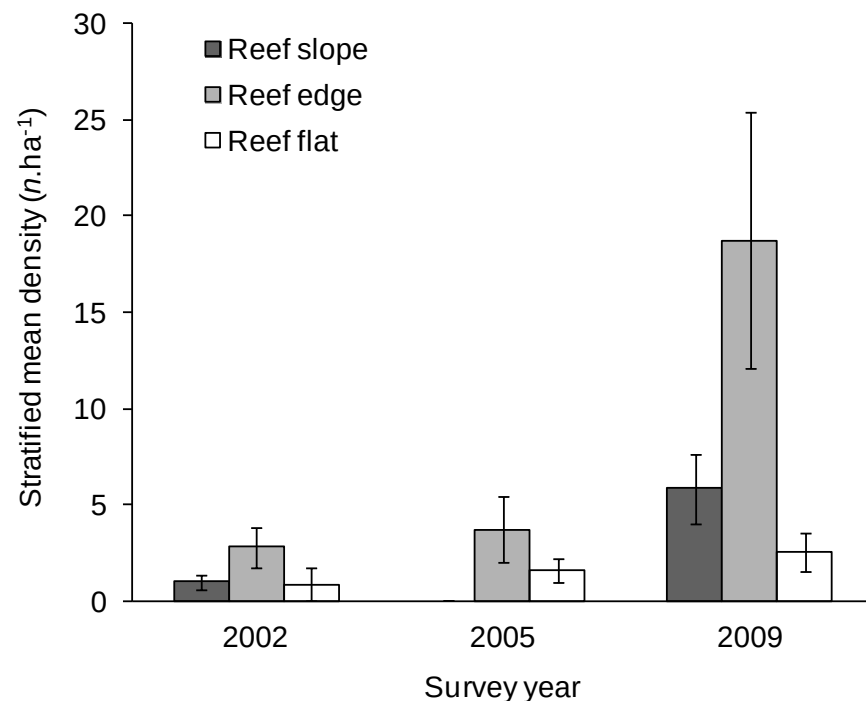


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CORAL REEFS

- Crown of thorns starfish
- High densities observed in 2009 in East Torres Strait
- Indicated a potential outbreak
- Some coral damage observed

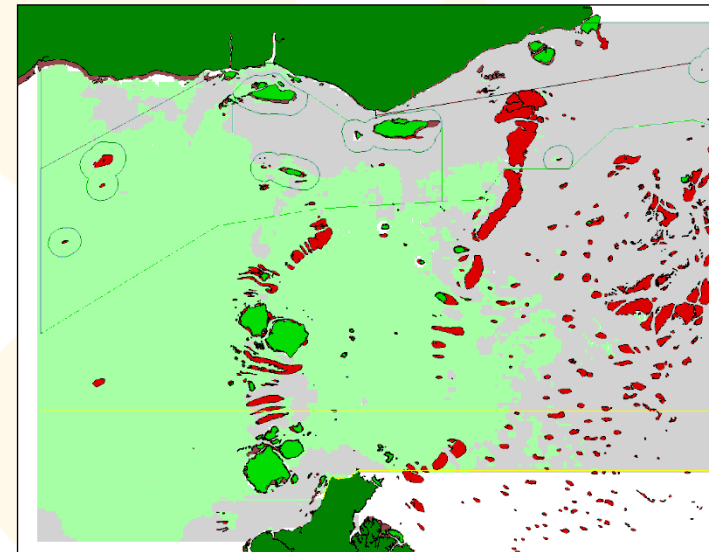




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SEAGRASS HABITATS

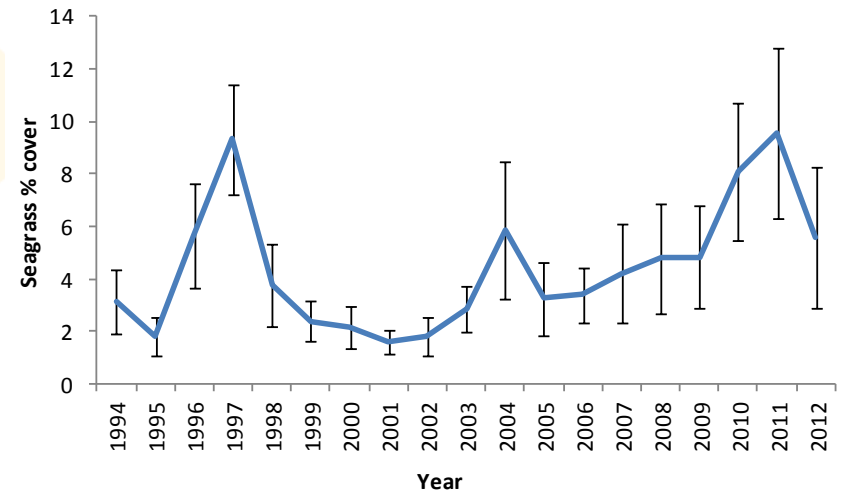
- Australia's largest continuous seagrass meadow mapped in the Torres Strait
- Surveys in 2010 documented high density, diverse seagrass persisting in both wet and dry seasons
- Over 50,000 ha of intertidal seagrass has been mapped in central and western TS
- Studies of recovery, productivity and drivers of change show that sexual and asexual reproduction together determine recovery.





SEAGRASS DYNAMICS

- Average density from 38 repeated sites in the lobster fishery
- Diebacks observed in the mid 1990s and early 2000's





MANGROVES & FRESHWATER WETLANDS

Importance of Wetlands to Torres Strait Islanders

Direct Use

Mangrove Wood – building, firewood, carving

Food source – fish, mangrove clam, hunting

Indirect Use

Shoreline protection and coastal buffer –
erosion, storm surge

Coastal kidneys – water quality maintenance

Habitat – seafood, birds (tourism), crocodiles

Coastal productivity – seagrass & coral reefs





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MANGROVES & FRESHWATER WETLANDS

CURRENT STATUS



Biodiversity

~ 124 wetland species, including >39 mangrove species

2 new mangrove species for Australia

2 new species for Torres Strait.

Extent

31,390 ha of wetland area within Torres Strait,

21 vegetation communities

3 are unique to the region.

Boigu and Saibai islands have the largest areas

Biomass

Mean Mangrove Biomass = 360t/Ha*

= 268tC/Ha Carbon Storage



*Data from Boigu & Saibai Islands

Source: TropWater, JCU



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MANGROVES & FRESHWATER WETLANDS

PREDICTED CLIMATE CHANGE IMPACTS

More severe storms

Lightning and wind disturbance

Sea Level Rise

Loss of seaward mangrove and mangrove encroachment – already occurring.

Increased temperature and altered rainfall

Species migrations from New Guinea

- Mangrove species range extension
- Pest fish species into wetlands e.g. Climbing perch



Source: TropWater, JCU



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MANGROVES & FRESHWATER WETLANDS

OBSERVED CURRENT DRIVERS OF CHANGE

Obviously human related

- Clearing and cutting
- Root burial – dredge spoil
- Pollutants – albino mutations in Rhizophora
- Fire (freshwater wetlands)

Not Obviously human related

- Shoreline Erosion
- Mangrove upland migration (SLR)
- Storms damage – wind, lightning & sediment deposition
- Feral animals & weeds (pigs, deer, pond apple)





FRESHWATER WETLANDS

CURRENT STATUS

Importance

- Fishing, birdlife
- Drinking water
- Irrigation water
- Swimming holes
- Cultural values

Current Projects

- Assessing the extent and condition
- Biodiversity
- Water quality
- Impacted by weeds and feral animals (pigs, deer, cane toads)





FRESHWATER WETLANDS

FRESHWATER ANIMALS AND PLANTS

Current Status

- No formal surveys, only occasional collecting
- 30 fish species known
- Exotic fish from PNG (climbing perch) on Saibai and Boigu
- Exotic fish (guppies, mosquitofish) found in dams on Thursday Island
- Project currently examining how to control the spread of these exotic fish





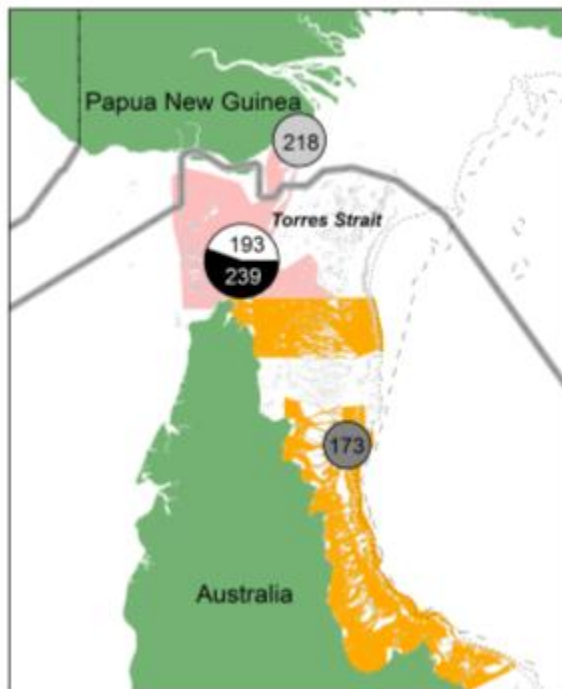
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TROPICAL ROCK LOBSTER (TRL) FISHERY

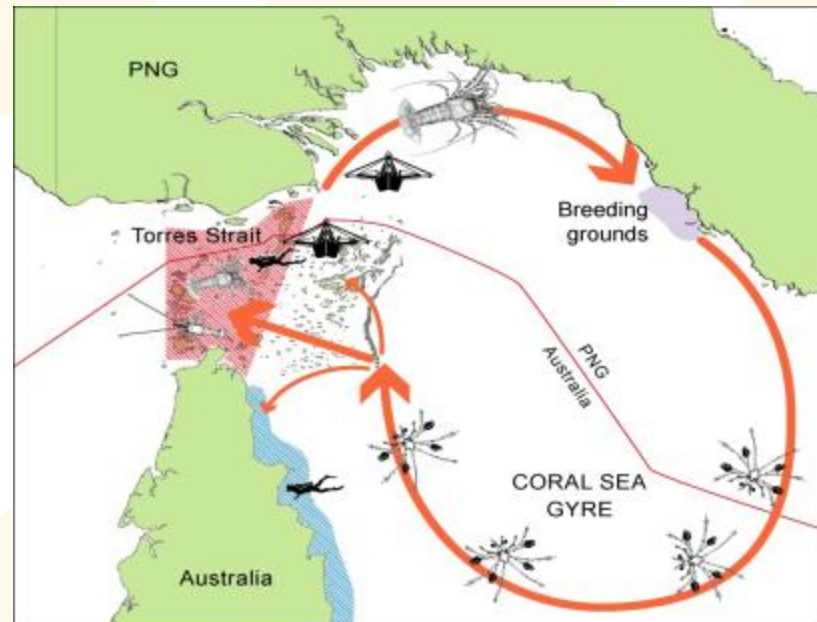
- Stock status and allowable catch of the TRL fishery are assessed using a sophisticated population model, surveys and commercial catch data.



Four sectors



Life Cycle



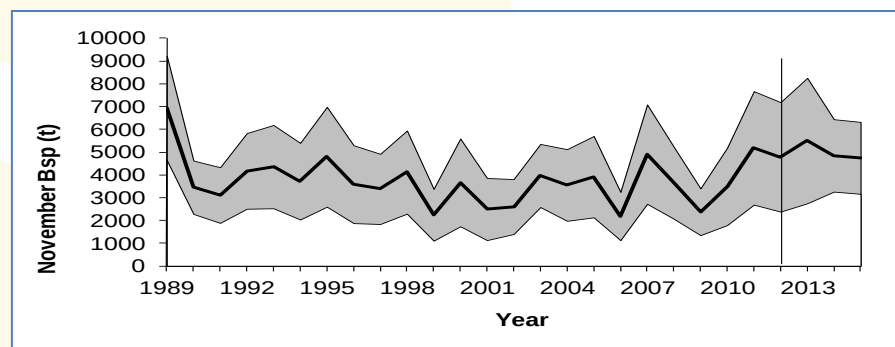
Source: CSIRO



TROPICAL ROCK LOBSTER (TRL) FISHERY



- Recent biomass estimates are above the long-term average
- The fishery model predicts above average future spawning biomass
- Recent TAC estimates have been high and consistent
- Control rules are considered sustainable for this fishery for all sectors



	Year			
	2010	2011	2012	2013
TAC (t)	853	803	964	871
Catch	763	869	-	-

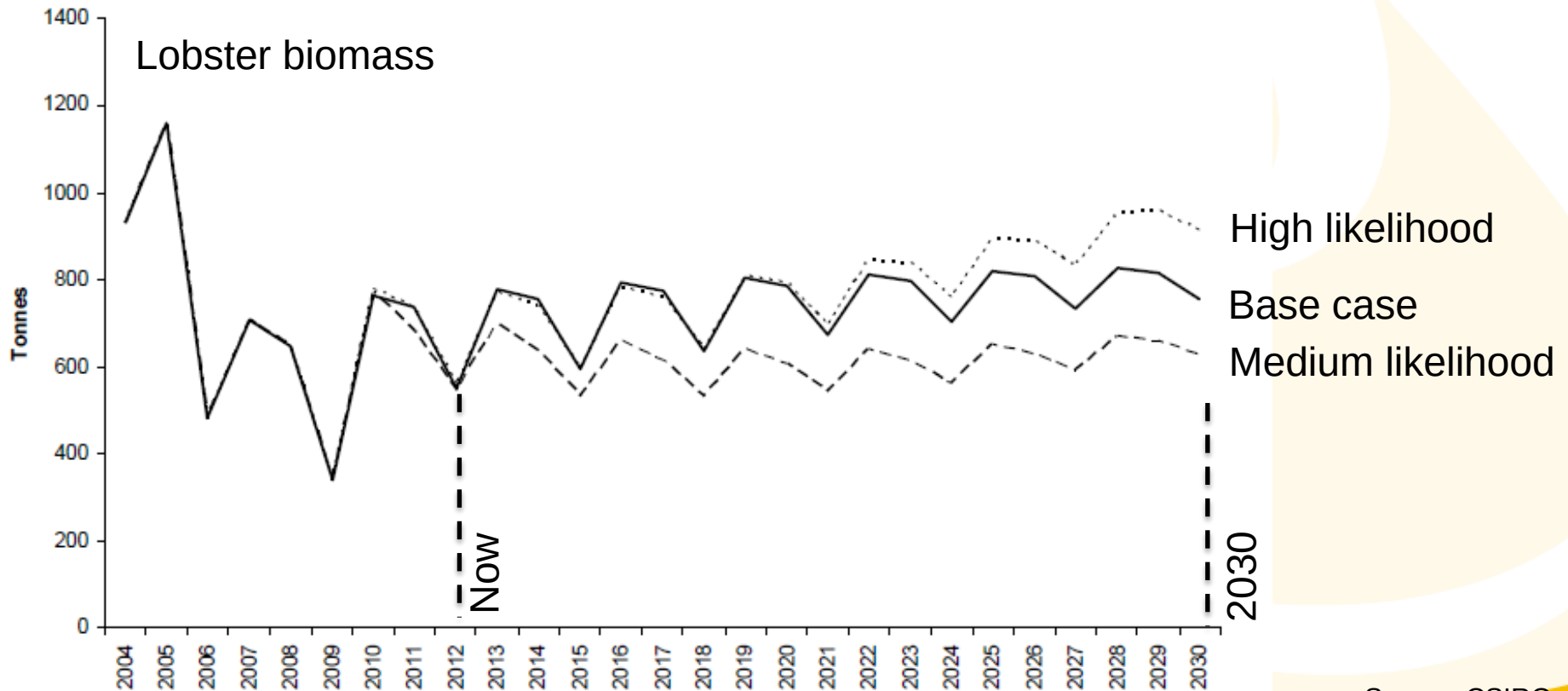


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TROPICAL ROCK LOBSTER (TRL) FISHERY



- Climate impacts expected to be moderate



Source: CSIRO

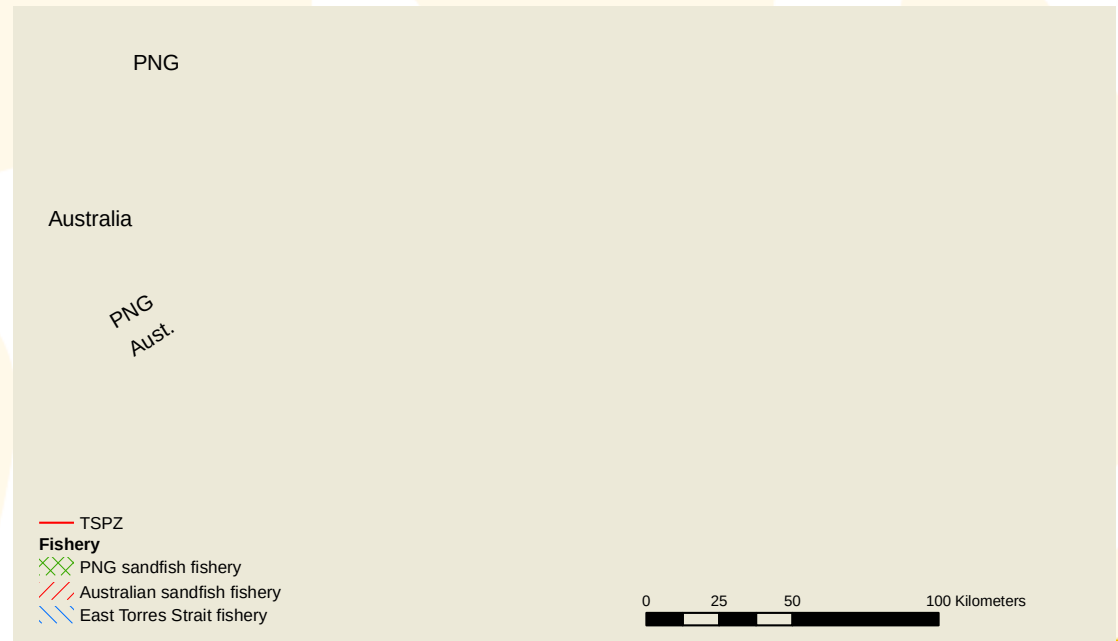


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BECHE-DE-MER



- Fishery in Torres Strait includes:
 - The sandfish fishery shared with PNG
 - The east Torres Strait fishery for several other species that is mostly Australian



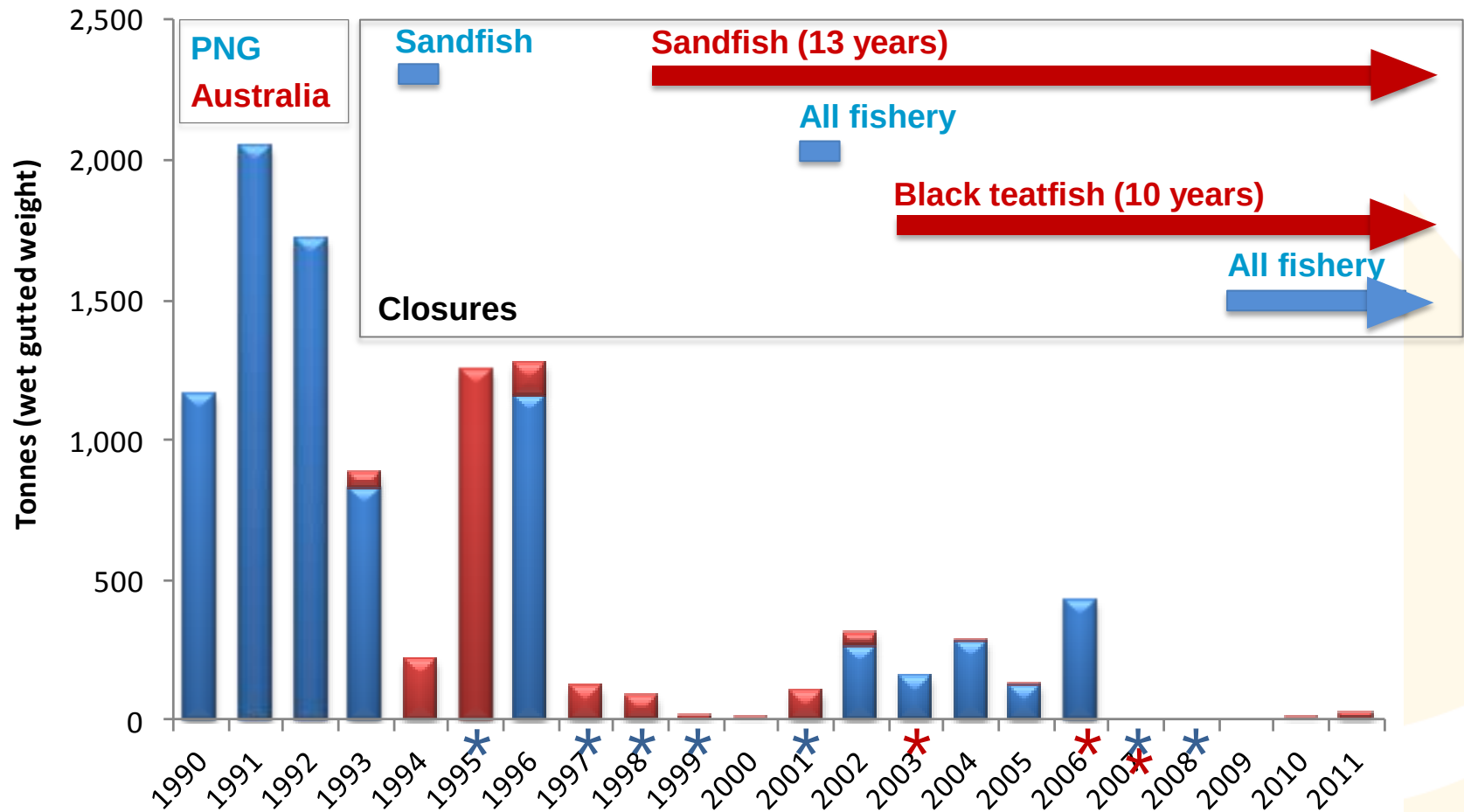
Source: CSIRO



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BECHE-DE-MER



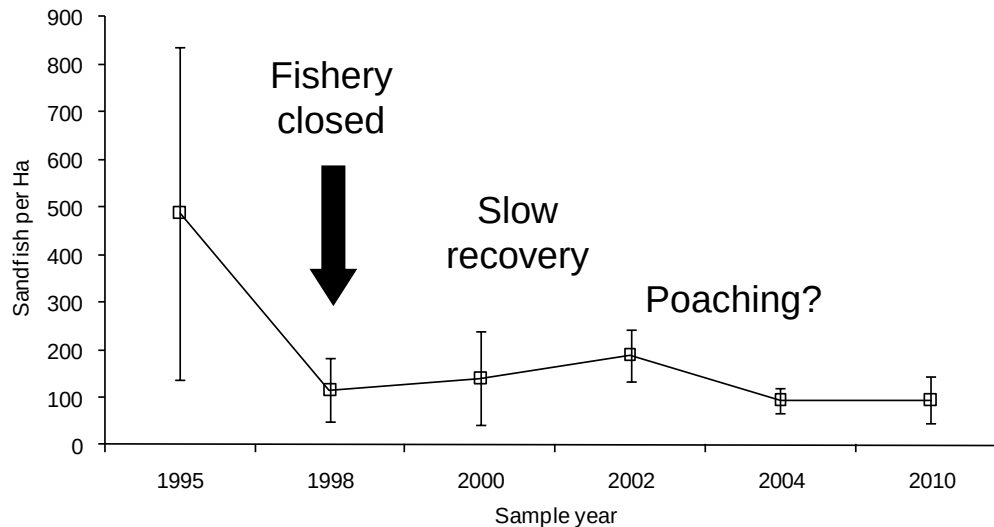


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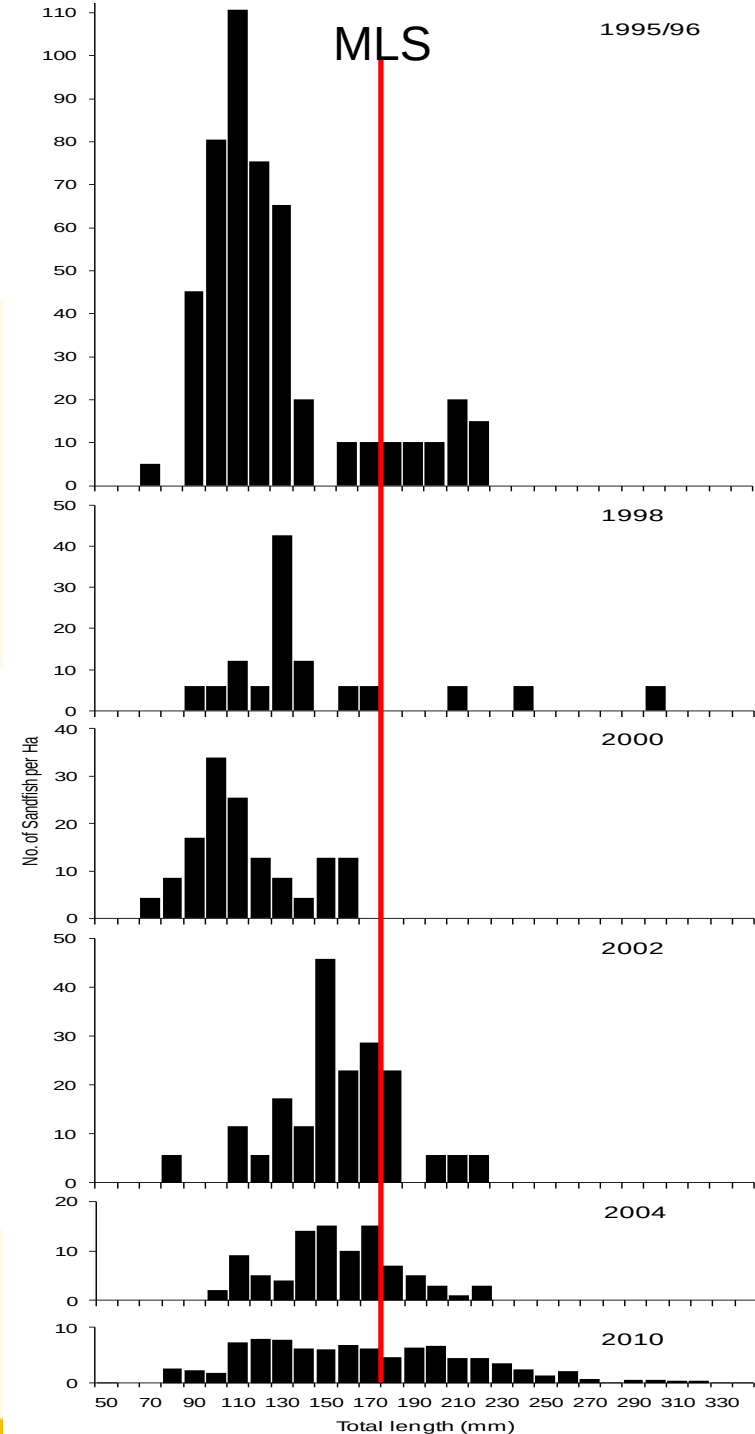


BECHE-DE-MER

- Sandfish shows a slow recovery
- Size is getting larger and Islanders report higher densities



Source: CSIRO





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BECHE-DE-MER

Black teatfish recovery

