Biodiversity & Ecosystem asset trends
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
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.
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.
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

Source: CSIRO
Coral Cover Change

- East Torres Strait live coral cover from beche-de-mer surveys
- General decline in coral cover between 2002 and 2009
- Large decline in reef edge and reef slope habitats
Coral bleaching was reported in Western Torres Strait in 2010. This coincides with high water temperatures at the time.
CORAL REEFS

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

Source: CSIRO
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.

Source: JCU, QDPI, CSIRO
SEAGRASS DYNAMICS

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

Source: CSIRO
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

Source: TropWater, JCU
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
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
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)

Source: TropWater, JCU
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)

Source: TropWater, JCU
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

Source: TropWater, JCU
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

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<th>Year</th>
<th>TAC (t)</th>
<th>Catch</th>
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<td>2010</td>
<td>853</td>
<td>763</td>
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<td>869</td>
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<tr>
<td>2012</td>
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<td>-</td>
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<td>2013</td>
<td>871</td>
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</table>

Source: CSIRO
TROPICAL ROCK LOBSTER (TRL) FISHERY

- Climate impacts expected to be moderate

Lobster biomass

Source: CSIRO
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
BECHE-DE-MER

Source: CSIRO
BECHE-DE-MER

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

Source: CSIRO
BECHE-DE-MER

Black teatfish recovery

Source: CSIRO