Great Barrier Reef Report Card 2014

Reef Water Quality Protection Plan

Wetland monitoring pilot project case study

About this case study

Wetlands play an important ecological and hydrological role in landscape function and water quality. They provide a natural filtration system and destruction of wetlands can result in increased sediment and nutrients flowing to the Great Barrier Reef.

The Reef Water Quality Protection Plan sets targets for improved water quality and land management practices and identifies actions to improve the quality of water entering the reef. Progress against these targets is detailed in the annual Great Barrier Reef Report Card. The Reef Water Quality Protection Plan 2013 wetland target is:

> *There is no net loss of the extent, and an improvement in the ecological processes and environmental values, of natural wetlands.*

Changes in wetland extent have been detailed in previous report cards. The Great Barrier Reef wetland monitoring program aims to report on changes in wetland environmental values and processes. A pilot project was carried out in 2014 to establish the monitoring program.

The objectives of the pilot project were to:

1. test the operational aspects of the newly developed Wetland Field Assessment Tool for Monitoring (WFAT-M): an instrument to monitor environmental values in Queensland's natural freshwater wetlands
2. trial a delivery model collaborating with regional natural resource management groups
3. test and evaluate WFAT–M indicators
4. test the performance of the index as a whole in discriminating across the range of disturbance in reef wetlands
5. inform the design of the ongoing monitoring program for reef wetlands.

Key findings

- The assessment methods were shown to discriminate across disturbance gradients for the wetland environmental values.
- The pilot project provided suitable data for underpinning the monitoring design and reporting on the wetland target across the Great Barrier Reef catchments.
- The state of the environmental values of individual pilot project wetlands ranged from natural and undisturbed to highly disturbed and modified.
- The pilot project wetlands were subject to a range of pressures including hydrological change, plant pests and disturbance of adjoining buffer areas.

Regional profile and pilot project locations

There are approximately 14,300 mapped vegetated swamps (palustrine wetlands including *Melaleuca* and *Eucalypt*; grass, sedge and herb and saline swamp) and lakes (lacustrine wetlands) across the 35 Great Barrier Reef catchments. The catchments, extending from the tropics to the sub-tropics, support diverse wetlands subject to various disturbances driven largely by climate and land use.

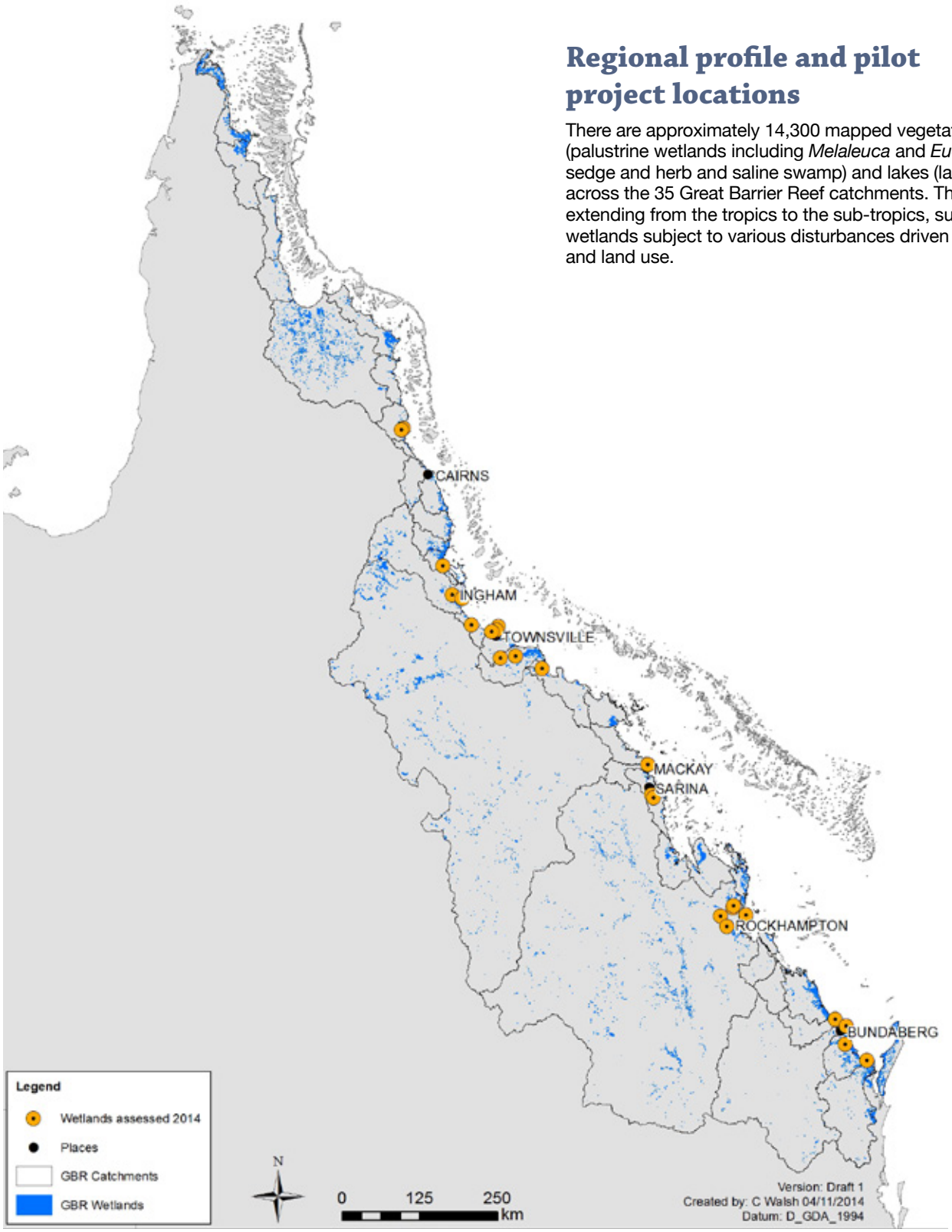

Figure 1: Location of the 27 pilot study wetlands.

For the pilot project, 27 wetlands nominated by the regional natural resource management bodies (Terrain Natural Resource Management, NQ Dry Tropics, Reef Catchments, Fitzroy Basin Association and Burnett Mary Regional Group) were assessed. The 27 wetlands were selected for their accessibility and to capture a range of land uses and disturbance. The sample was optimised to test the capabilities of the WFAT–M. The wetlands were located relatively close to the coast and accessible to regional centres (see Figure 1).

The pilot project wetlands included three lakes (lacustrine wetlands) and 14 vegetated swamps (palustrine wetlands including *Melaleuca* and *Eucalypt,* grass, sedge and herb and saline swamps). They comprised 15 floodplain and 12 non-floodplain wetlands. The sample spanned a range of broadly mapped hydrological disturbance classes. Seventeen of the wetlands were mapped as having no observable hydrological modifications. Four were mapped as having some hydrological disturbance. The remaining six were estuarine wetlands that had been converted into freshwater wetlands. Land uses directly influencing the pilot project wetlands included conservation and natural environment protection, extensive grazing, forestry production, dry-land and irrigated cropping, urban development and transport.

Pilot project findings

The data support some generalisations about the 27 wetlands assessed with the WFAT–M. These wetlands were subject to land use-driven pressures that influenced the state of wetland environmental values (WEVs). The natural values that were assessed comprised the ecological components and processes of those wetlands at the local and landscape scale (see Figure 2).

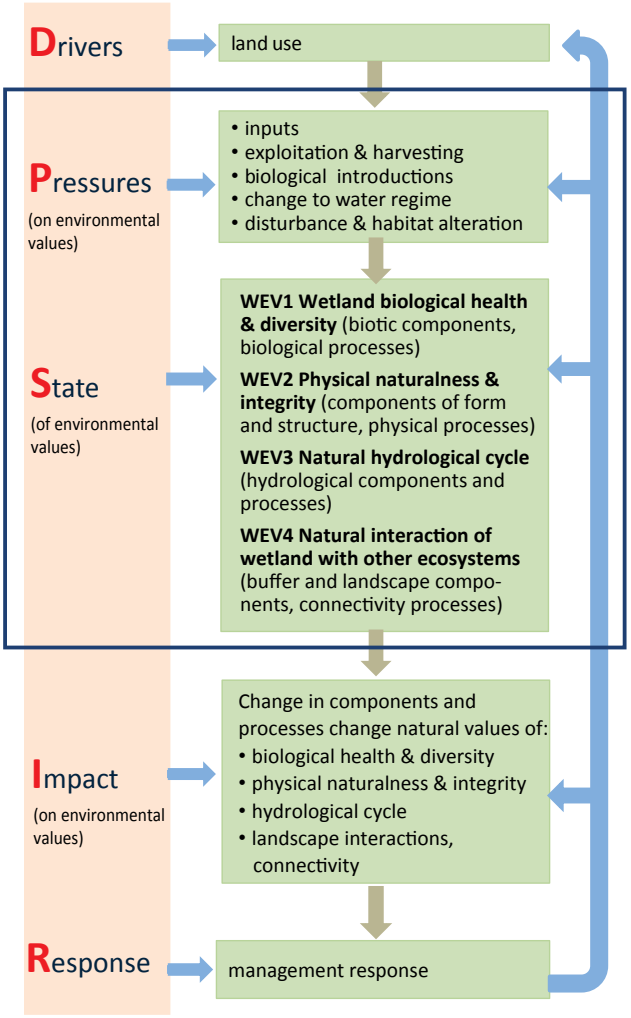

Figure 2: Driver-Pressure-State-Impact-Response framework that underpins WFAT-M assessment of wetland environmental values.

Hydrology

Around 60 percent of the wetlands assessed had moderate to extreme pressure on the naturalness of their hydrology. This included a number of wetlands that had been converted from estuarine to freshwater to support ponded pastures.

Buffer zones

Intact buffer areas play an important role in maintaining wetland biodiversity and protecting wetlands from a variety of pressures. Wetland buffer zones were generally disturbed and in poor condition. Buffer areas were subject to a variety of land uses, for example, cropping and heavy grazing. Pressures on buffers included loss of native vegetation, disturbances to remnant vegetation and weeds (see Figure 4).

Pest animals

Pigs thrive where food, water and connected natural habitats are available. Those wetlands close to areas of low intensity land use showed signs of pig damage (see Figure 3).

Figure 3: Typical pig-digging in a wetland.

Pest plants

Pest plants occur in buffer areas and within wetlands. They were found in all wetlands except Dismal Swamp which is a remote, non-floodplain wetland generally isolated from human disturbance factors. The sample included estuarine wetlands converted to freshwater wetlands which were used as pastures for cattle. These were generally covered with weeds of national significance in particular Hymenachne and Para grass.

Figure 4: Wetland buffer zone cleared and infested with Chinee apple.

Pilot project findings about two individual wetlands

Pressure scoring system

A	B	C	D	E
Very low	Low	Moderate	High	Very high

State scoring system

A	B	C	D	E
Very good	Good	Moderate	Poor	Very poor

Dismal Swamp

Dismal Swamp in the Shoalwater Bay Training Area (see Figure 5) is particularly significant for its biodiversity values because it is one of the few patterned fens – a wetland that accumulates peat deposits – in Queensland. This wetland was the closest to a wetland that could be considered in 'reference' condition, although there was some pig digging at one sampling site. There is potential for pigs to have widespread access to this wetland; however numbers are being managed through an ongoing feral pig management program. The pressures on and state of environmental values (see Figure 6) were rated negligible except for the pressure on naturalness values. While rated low, this is probably negligible also, which should be better reflected in future assessments when the WFAT-M is updated.

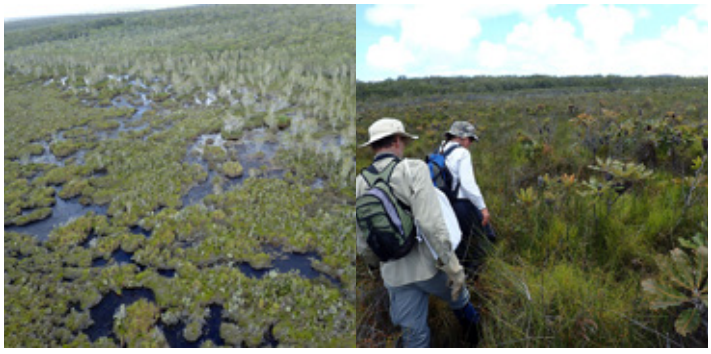

Figure 5: Dismal Swamp in the Shoalwater Bay Training Area.

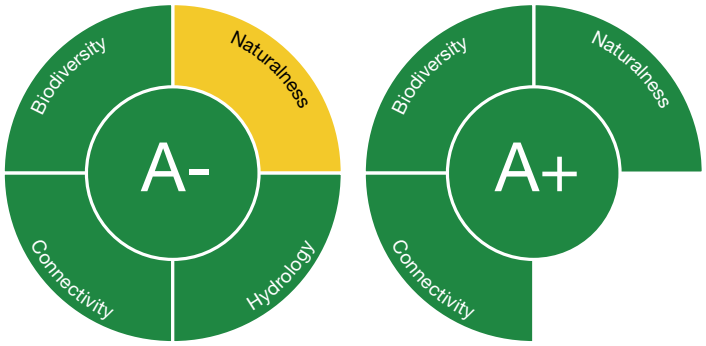

Figure 6: Pressure and state results for Dismal Swamp.

Mon Repos typha wetland

Mon Repos typha wetland (see Figure 7) is a small non-floodplain wetland lying behind the sand dunes of the Mon Repos turtle rookery. Towards the east of the wetland are revegetated dunes; towards the west the wetland watershed is used for sugarcane cropping. This 2.7 hectare wetland is one of the most disturbed wetlands assessed. It has significant pressure on its hydrology with drains running through the centre of the wetland and skirting much of the western boundary. It also rated very poorly for biodiversity values (see Figure 8). Future assessments will include indicators for the 'state' of hydrological values and this wetland would rank as very poor. Recognising the important location of this wetland, the local community has initiated a revegetation program.

Figure 7: Mon Repos typha wetland.

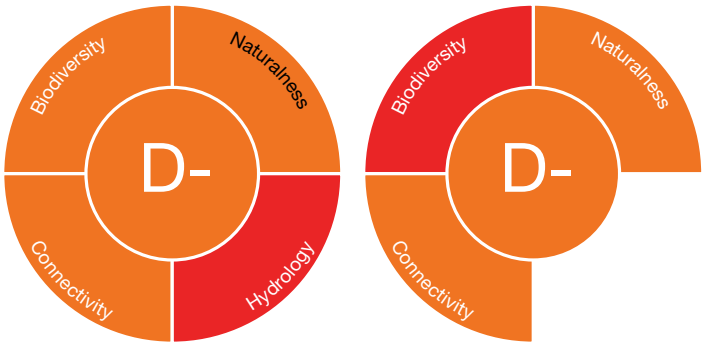

Figure 8: Pressure and state results for Mon Repos typha wetland.

Relationship of the pilot project to the ongoing Great Barrier Reef wetland monitoring program

The pilot project tested the WFAT–M and the operational design for the ongoing monitoring program. It has informed program design, helping to determine sample size and optimise future use of resources across time and space. The resulting methods will be used to collect baseline data in 2015 and 2016 and to assess the status and trend of Great Barrier Reef wetland environmental values.