Case Study

OAKY CREEK

Restoring Riparian Resilience

Figure 1: Near vertical bank between 2–3m in height which is actively eroding as part of meander migration process just upstream of the Oakenden School Road crossing (June 2017)

Restoring Riparian Resilience along Oaky Creek
A Natural Disaster Relief and Recovery Arrangements
Funded Project Following Severe Tropical Cyclone Debbie

Australian Government

Queensland Government

REEF CATCHMENTS

INTRODUCTION

Oaky Creek is located approximately 30km south-west of Mackay in the Sandy Creek Sub-catchment. A reach scale remediation program was funded under the Natural Disaster Relief and Recovery Arrangements (NDRRA) Category D Environmental Recovery Package to assist with environmental recovery and repair from the impacts of Severe Tropical Cyclone Debbie and its associated rainfall and flooding (Fig 2).

An initial community consultation (Fig 3) and **site assessments were completed to form the Restoration Plan for Oaky Creek.**

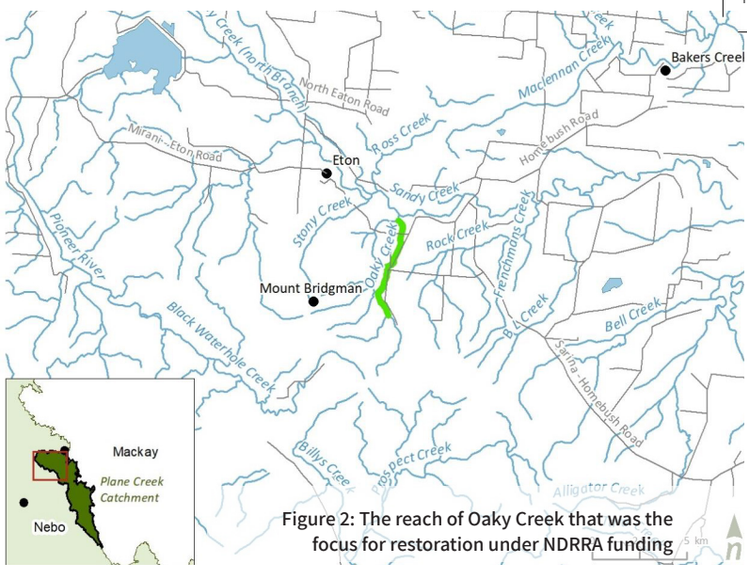

Figure 2: The reach of Oaky Creek that was the focus for restoration under NDRRA funding

The Restoration Plan reported that:

- Oaky Creek generally had poor riparian vegetation condition downstream of Oakenden Road crossing. The vegetation cover has potentially been degrading since the 1930's where a borer killed many trees.
- During flood events in the second half of the 20th century there was significant channel change in Oaky Creek. In 1988 a major flood event occurred associated with Cyclone Charlie which resulted in widespread channel change.
- Throughout the years various repair works and gravel extraction have been undertaken in the channel.

Cyclone Debbie Impact

In March 2017, Severe Tropical Cyclone Debbie and associated floodwaters caused **major erosion along Oaky Creek**:

- Active bank retreat was occurring throughout. **The dominant processes appeared to be meander development and migration**. Numerous outside meanders were 2–3 m high, near vertical and threatening adjacent land and assets (Fig 1 and 5). The bank stratigraphy consists of a cohesive silt/clay layer overlaying a gravels and cobble matrix. The depth of the cohesive silt/clay layer varies substantially along the creek.
- Previous rock revetment bank stabilisation works have been undertaken with mixed results (Fig 6).
- Two major crevasses splays occurred upstream of the Oakenden Road crossing resulted in significant volumes of coarse sediment deposited on floodplains (Fig 4).
- Infrastructure including the Sunwater Siphon (site O-BM1), a council road (site O-BM4) and an Ergon power pole (site O-BM4 – see Fig 3) were at threat due to ongoing erosion.

Figure 3: Community Consultation at Oaky Creek

Figure 4: Remnants of a crevasse splay from the 2017 flood event upstream of the Oakenden Road crossing – the landholder had undertaken significant sediment removal prior to the photo being captured

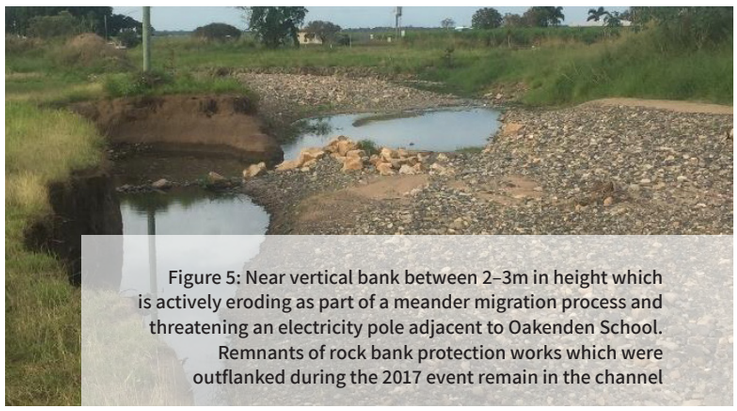

Figure 5: Near vertical bank between 2–3m in height which is actively eroding as part of a meander migration process and threatening an electricity pole adjacent to Oakenden School. Remnants of rock bank protection works which were outflanked during the 2017 event remain in the channel

Figure 6: Previous rock revetment bank stabilisation works downstream of Sievers Road which limited bank retreat during the 2017 flood event however there was retreat immediately downstream of the works

Funded Remediation

A reach of Oaky was funded for remediation under Stage 1 funding in December 2017. LiDAR data was collected to accurately capture site details and enable detailed site assessment including hydrological modelling to be undertaken. This information was used to develop the Restoration Plan for Oaky Creek and produce detailed designs for each site.

Ten sites were identified as being priority for remediation within the Oaky Creek Restoration Plan. In consultation between Reef Catchments, the landholders and river restoration engineers, **a combination of earthworks, rock toes and large woody debris were concluded as being the best solutions for the sites** (See Fig 7 design example).

At most sites rock toes were constructed using a combination of imported quarry rock and available bed material. The rock was placed against the existing bank and keyed into the bank and bed.

Any existing mature trees on sites were worked into designs to avoid removal. On some sites large woody debris (LWD) were used to provide in-channel roughness and promote sediment deposition and, together with the rock, protect the banks while vegetation establishes (Fig 10 shows LWD placement on site before site finalised). Coir net was installed to further strengthen sites while vegetation established.

The process of channel recovery relies heavily on the establishment of riparian vegetation within the channel and along the riparian zone. All sites were seeded or hydromulched immediately on completion to bind surface sediments.

Sites were planted with over 10,000 native plants from the regional ecosystem of the area and planted to link in with existing mature vegetation at either end of sites with an aim to create a continuous riparian vegetative buffer (Fig 10). **Conservation Volunteers engaged local school children and community volunteers** in planting and maintenance activities (Fig 12 & 17).

Works were completed by the 30th of June 2019.

Detailed designs are available on request.

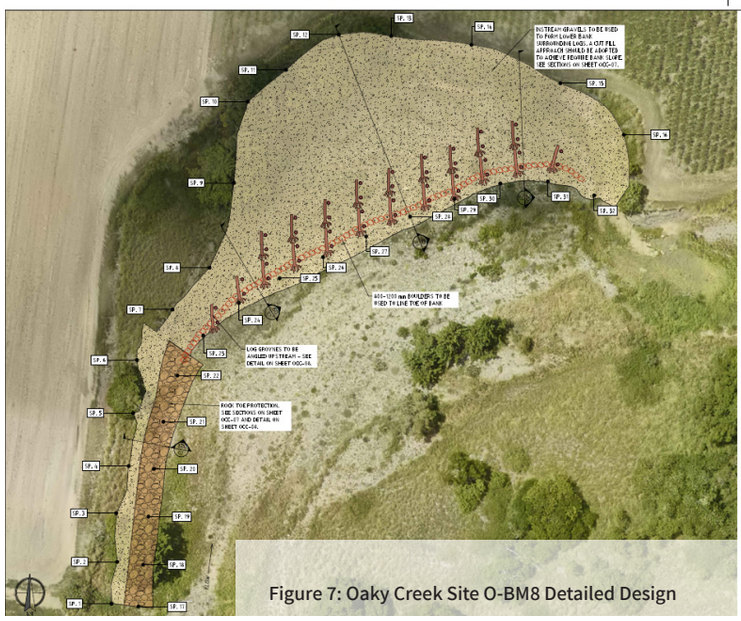

Figure 7: Oaky Creek Site O-BM8 Detailed Design

Figure 8: Site works underway on O-BM8

Figure 9: Landholder Col Sievers inspects work at Oaky Creek Site O-BM8

Figure 10: Oaky Creek site O-BM8 with grass cover and native plants established April 19

Figure 11: Site O-BM7 with good cover and native plants thriving April 19 (left) & Oaky Creek site O-BM7 in wet season 2018/19 (right)

Figure 12: Oakenden State School Children Planting at Oaky Creek

PROJECT OUTCOMES

- Reducing approximately 1962 tonnes per year of fine sediment being exported to the Great Barrier Reef Lagoon.
- Protecting productive agricultural land from further loss through erosion.
- Protecting farm infrastructure from loss through erosion.
- Connecting riparian vegetation and enhancing environmental value.

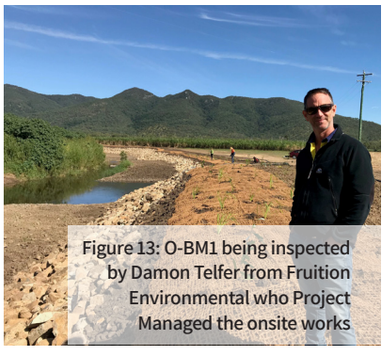

Figure 13: O-BM1 being inspected by Damon Telfer from Fruition Environmental who Project Managed the onsite works

Figure 14: O-BM3 with good vegetative cover April 2019

Figure 15: O-BM4 Jock from Mackay Green Solutions finalising planting June 19

Figure 16: O-BM5 with good native plant cover April 2019

Landholders Testimonial

We appreciate the work Reef Catchments has provided under the Natural Disaster Recovery Program.

Stabilising the damaged creek banks with rocks and vegetation should be a major benefit to all stakeholders.

We hope to have the opportunity to work with Reef Catchments again in the future.

Bruce and Jim McFarlane
Landholders along Oaky Creek

Figure 17: Conservation Volunteers Australia Planting at Oaky Creek

Figure 18: Landholder John Muscat and his grandson on site O-JM1 on his property

This program is funded by the Australian and Queensland Government's Natural Disaster Relief and Recovery Arrangements. Obtaining this funding was only made possible due to initial investment from Reef Catchments, Canegrowers Mackay and the Whitsunday River Improvements Trust to undertake the rapid assessment of the impacts of Cyclone Debbie and quantify works required.