

Reef Trust Partnership Water Quality

EASTERN CAPE YORK WATER QUALITY PROGRAM

Impact Report

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Australian Government

REEF TRUST



Great Barrier
Reef Foundation



Sunset over the mouth of the Endeavour River. Image Jessie Price



Reef Traditional Owners have been caring for land and sea Country for more than 60,000 years, using Traditional Knowledge passed down through ancestral lines for millennia. The Great Barrier Reef Foundation extends its deepest respect and recognition to all Traditional Owners of the Great Barrier Reef and its Catchments, as First Nations People, holding the hopes, dreams, traditions, and cultures of the Reef.

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The Challenge

Terrestrial influences are impacting water quality and the health of the Great Barrier Reef.

The World Heritage-listed Great Barrier Reef (the Reef) is a global icon with an economic, social, and cultural value of \$56 billion to Australia ([Deloitte 2017](#)). The largest living structure on the planet, its 3,000 reefs are home to a quarter of all known marine species. The Reef is the Sea Country home for over 70 Traditional Owner groups, and supports Australian livelihoods through the contribution of over 64,000 full-time jobs.

The health and resilience of the Reef are affected by the cumulative impacts of multiple pressures. The ecological changes of the Reef are driven by increased frequency and intensity of weather events and rising air and sea temperatures resulting from climate change. Sources of land-based pollution include industry, urban and public lands, but most of the water pollution comes from agriculture through sediment, nutrient and pesticide lost through runoff.





The Solution

Enhanced knowledge of water quality, modelling and related ecosystem health through an integrated catchment management approach.

Coral reefs can recover but need help. Improving water quality buys time for marine and coastal ecosystems to adapt to multiple stressors and increases the Reef's ability to withstand and recover from the challenges associated with climate change.

In a bid to significantly improve the health of the Reef, the Reef Trust Partnership (the Partnership), a landmark collaboration between the Australian Government's Reef Trust and the Great Barrier Reef Foundation (the Foundation), invested \$443 million to elevate and amplify efforts to build Reef resilience.

Through the Partnership, \$199 million was invested into a Water Quality Program (the Program) which addressed poor water quality from land-based runoff and responded to the priorities of the Reef 2050 Water Quality Improvement Plan ([Reef 2050 WQIP](#)).

The Program supported catchment-scale regional programs starting with early investment activities for on-ground interventions to reduce pollutants in priority catchments, Traditional Owner-led Reef protection initiatives, a Water Quality Innovation program, Technical Advice, and a Conservation and Protection program which included a focus on the less disturbed catchments of Far North Queensland's Cape York Peninsula (the Cape).

An \$8.5 million Eastern Cape York Water Quality program implemented best management practices to effectively control and reduce sediment from unsealed roads. Tools, guidelines and skills were developed to provide a legacy for land managers and communities ensuring more resilient maintenance and repair approaches.

Fire management led by Traditional Owner rangers and supported by elders further supported erosion control along primitive tracks ensuring traditional knowledge and techniques are incorporated as part of the care for Country.

A sophisticated water quality monitoring program quantified the sediment contributions from the Annan and Endeavour Rivers with greater confidence. Improved knowledge of catchment water quality challenged long held views on its current 'undisturbed' status to drive continued actions and discussion on its level of priority as part of the Reef 2050 WQIP.

Collaboration between partners, capacity building and supporting the aspirations of local communities was core to the program. The design enabled significant employment and upskilling for many indigenous locals and equipped organisations, especially Traditional Owner partners, to step up and lead erosion control and water quality projects.

Outcomes

The Eastern Cape York Water Quality program used an integrated catchment management approach to achieve the outcomes detailed in Figure 1.

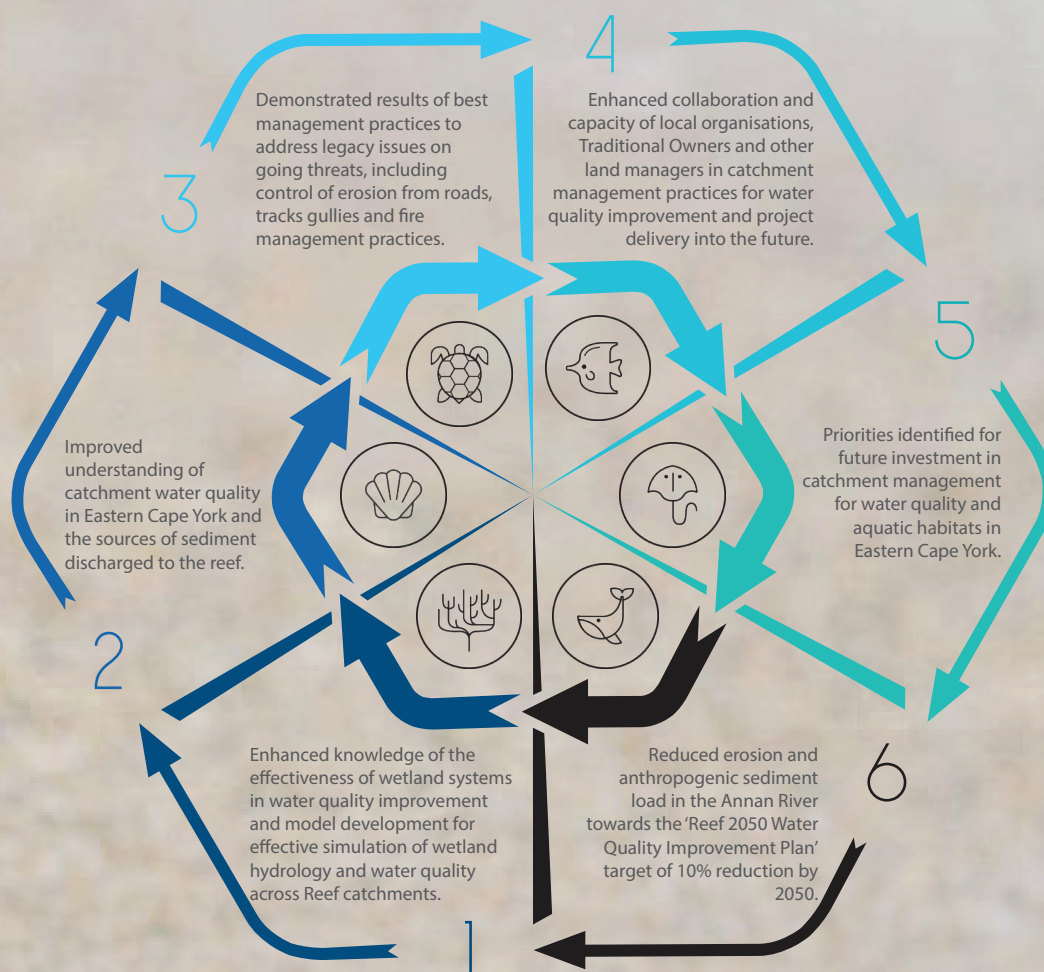


Figure 1. Water quality and catchment health outcomes were supported under the Partnership Conservation and Protection program which included a \$3 million Wetlands Initiative and the \$8.5 million Eastern Cape York Water Quality program.





Yuku Baja Rangers monitoring sea grass. Image Yuku Baja Muliku Landowner & Reserves

Eastern Cape York Water Quality program

Improving water quality to enhance catchment, coastal and marine ecosystem health, and resilience.

Cattle grazing with low stocking rates, on generally marginal country, is the main land use in the Cape. Other land uses include mining (which dominates the economic sector) horticulture, tourism and commercial fishing ([Reef Plan](#)). In recent decades, many pastoral leases have been converted to either National Parks under indigenous management arrangements or Aboriginal freehold land. In 2021, over 50% of the population were Aboriginal and/or Torres Strait Islander people ([ABS](#)) with 55 languages and approximately 150 dialects ([PAMALC](#)).

In the Cape, monsoonal rain and cyclonic activity dominates the wet season which extends from December through to March. The eastern catchments of Cape York (43,000 square kilometres) drain to the Reef (Figure 3) and represent the largest catchment area reporting to the inshore Reef while being located geographically close to the outer Reef.

The Eastern Cape York Water Quality program comprised of seven projects delivered by four local organisations. This integrated catchment management program addressed erosion from fire, roads, tracks, and gullies, significantly reducing sediment run-off into waterways and the Great Barrier Reef.

The program implemented a range of erosion control measures to effectively control and reduce sediment loads including leaving a legacy of tools and skills for land managers and communities. [BMP guidelines](#) for unsealed roads and informal tracks were developed and trialed. These trials provided valuable evidence to support the implementation of more resilient maintenance and repair approaches.

A large-scale water quality and ecosystem health monitoring program filled significant knowledge gaps quantifying the actual sediment contribution from the Annan and Endeavour Rivers. Improved understanding of catchment water quality challenged the existing data, models and narrative in relation to the extent of the 'undisturbed' status of these catchments and their impact on the Reef. The project has prompted continued actions and discussion regarding the catchment's priority within the [Reef 2050 WQIP](#).

Core to the program was collaboration between partners, capacity building, and supporting local communities'

aspirations. The initiative enabled significant employment and upskilling for many local Traditional Owner partner organisations and individuals. Through this, it is hoped that in the future more Traditional Owners will lead erosion control and water quality projects.

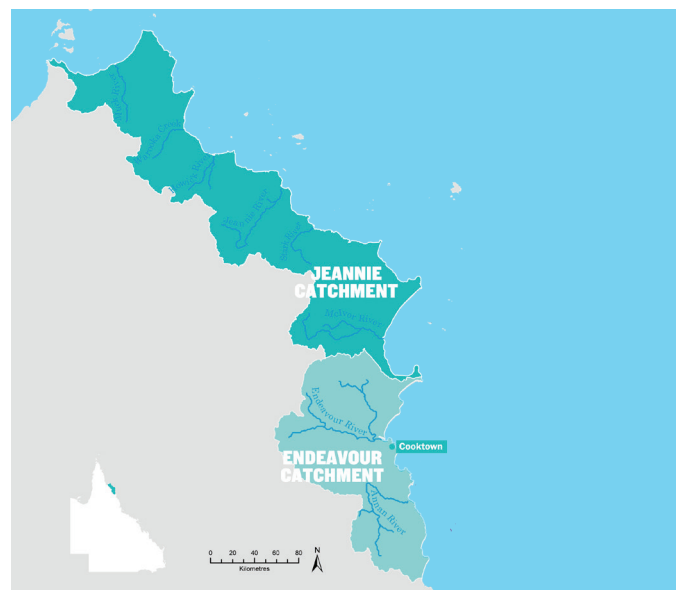
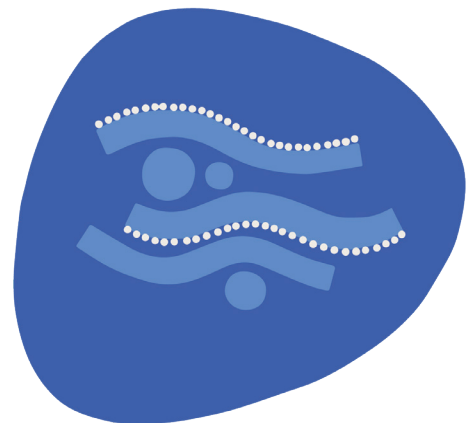
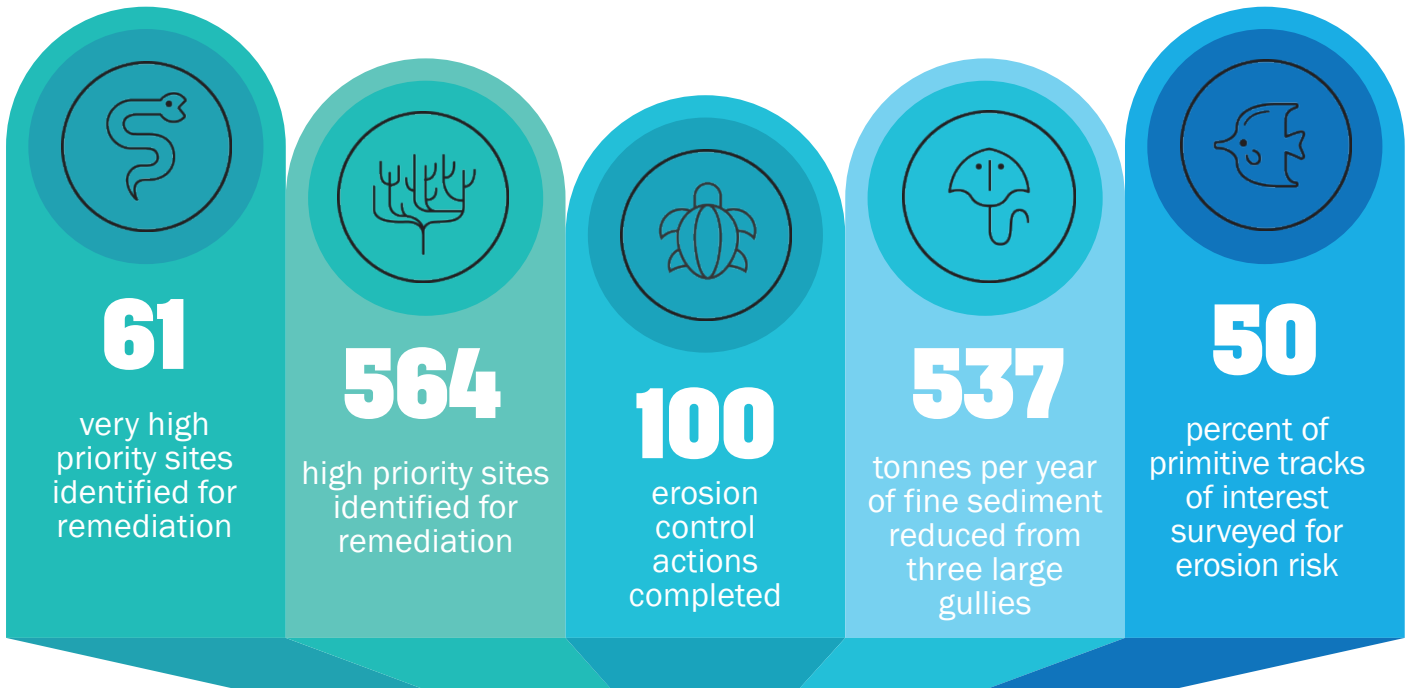


Figure 3. Map of the Jeannie and Endeavour priority catchments in Eastern Cape York.



Yuku Baja Muliku (YBM) Rangers caring for Country.
Image YBM

Program Impact



Key Achievements

The success of the program was measured through a Monitoring and Evaluation plan developed in consultation with participating delivery organisations. Key achievements are derived from reports and a face-to face synthesis workshop.

Knowledge Generation

Unprecedented scientific insights are reshaping existing assumptions about Cape York's contribution to Reef water quality:

- Sediment load data from the Annan and Endeavour rivers revealed loads approximately five times higher than previous Source Catchment models predicted
- Successfully documented extreme sediment discharge during Cyclone Jasper, providing rare data on catastrophic weather events
- Created comprehensive seagrass mapping for the first time since 1985 to 2014, establishing baseline data for blue carbon market opportunities
- Developed Best Management Practice Guidelines for tracks, roads, and fire management specific to Cape York conditions

Erosion Control

Demonstrated effective, cost-efficient erosion reduction:

- Three large gullies successfully treated, reducing an estimated 537 tonnes per year of fine sediment at approximately \$1,600 per tonne per year
- Primitive tracks project mapped and prioritised all accessible tracks across the region, with early repair interventions showing promising results
- Council roads project demonstrated alternative maintenance methods showing significant reductions in sediment concentrations compared to traditional approaches, opening the path for better council-management of roads.
- Fire management achieved a notable decrease in late dry season wildfire damage through coordinated early burning

Relationship Building and Capacity Development

The collaborative approach generated substantial social and economic co-benefits:

- Built an extensive network of 29 organisations and 33 private landowners, including 11 Indigenous entities
- Trained eight Traditional Owners to Level 1 fire management standards and was instrumental in establishing the Juunjuwarra Rangers program
- Facilitated collaboration between private landowners and Traditional Owners who hadn't engaged for 40 to 50 years
- Enabled significant organisational transformation, with one group evolving from having "no governance or funding" to becoming "a self-governed fully funded ranger group"

Most Significant Changes

Participants identified three key transformation themes:

1. Empowerment of Traditional Owner organisations through skills development and deepened connection to Country
2. Strengthened collaboration between program partners and regional stakeholders
3. Enhanced sense of purpose from participating in a co-designed program aligned with local needs

Detailed information can be found in the Evaluation of ECYWQ Program Governance ([Mosaic Insights, 2025](#)) report.

Program Model

A novel, transparent and efficient program model ensured outcomes were delivered.

The design of the Eastern Cape York Water Quality program governance model recognised the importance of local leadership, as well as strategic and technical guidance. This model increased transparency of outcomes and ability to manage contractual commitments while providing access to local support to manage risk, coordinate activities, identify synergies, and promote the program to the wider regional audience.

Governance arrangements for the program (Figure 4) ensured the projects delivering on the ground reported directly to the Foundation with support from the regional Program Manager, the Cape York Water Partnership (CYWP). CYWP reported to a regional Steering Committee made up of stakeholders from the CYWP, CSIRO, Bromley Aboriginal Corporation, James Cook University, the Department of Climate Change, Energy, Environment, and the Foundation. The Steering Committee was supported by a Technical Advisory Group and the Water Quality Working Group, which provided technical and strategic advice across the whole of the Water Quality Program.

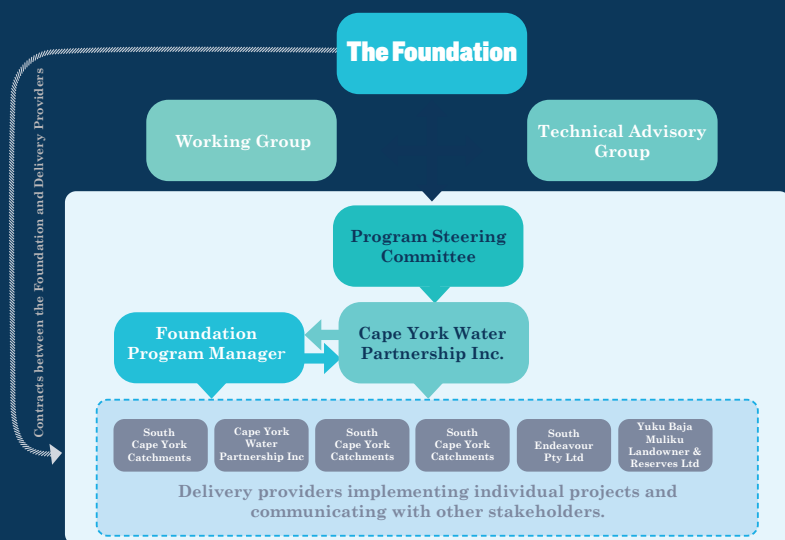


Figure 4. Conservation and Protection program governance model



Funded Projects

The integrated catchment management program significantly reduced sediment run-off into local waterways and the Reef.

Water quality and aquatic ecosystem monitoring

A \$1.1 million integrated water quality and aquatic habitat monitoring project delivered by the CYWP engaged Traditional Owners in water quality monitoring data collection in the Annan and the Endeavour Rivers. The project filled a critical knowledge gap, defined baseline conditions, established local water quality improvement objectives, assessed and quantified potential water quality impacts, and calculated sediment loads delivered to the Reef. Sediment load estimates were quantified with greater confidence, critical data improved catchment water quality models, and water quality targets in the Reef 2050 WQIP were revised.

Integrated fire management

The \$596 thousand Integrated Fire Management project delivered by South Cape York Catchments (SCYC) increased late dry season ground cover through a coordinated early dry season (EDS) burning regime. The new collaborative planning and implementation partnership delivered a balance between cultural heritage protection, habitat protection, and asset protection. Through practical application and training, Traditional Owners and landholders increased their capacity to undertake fire management to reduce erosion and associated sediment flow to the Great Barrier Reef.

Fire management and primitive road erosion control

The \$400 thousand Fire Management and Primitive Road Erosion Control project delivered by the South Endeavour Trust (SET) occurred on over 46,000 hectares of SET's landholdings on Caloola, Alkoomie, South Endeavour and Kings Plains Stations. The project area accounts for over 70% of the sub-catchments of Oakey and Scrubby Creeks, the highest fine sediment sources to the Reef in the Annan catchment. The project tackled significant sources of sediment including erosion from tracks and associated gullies, and fire management to reduce late dry season burning decreasing the amount of bare ground susceptible to erosion at the start of the wet season.



Yuku Baja Rangers completing water quality monitoring training. Image YBM



Early dry season burn with Juunju Peter on drip torch. Image SCYC



Fire management training group. Image SCYC



Fire training underway to reduce impacts of late season burning. Image SCYC

Traditional fire and land management

The \$1.04 million Traditional Fire and Land Management project delivered by Yuku Baja Muliku Landowner & Reserves (YBM) focused on YBM owned lands adjacent to the Annan River and its estuary and the mangrove-lined coastline that runs through their traditional estates, including Grave Point, Archer Point, Spring Creek, Walker Point, and the southern part of Walker Bay.

YBM Rangers, supported by elders (as key knowledge holders) mapped, assessed, and controlled erosion along roads, tracks, fire breaks, fence lines. Erosion control pilot projects included known road/track segments where sediment is delivered directly to local fringing reefs and a main track and fire break through the Cape York Peninsula Aboriginal land (CYPAL) National Park land was targeted for erosion control with earthen bunding and gully control.

Erosion control on primitive roads and tracks

The \$1.08 million Erosion Control on Primitive Roads and Tracks project delivered by the CYWP mapped over 4000 kilometres and assessed erosion along nearly half of these primitive (informal) roads, tracks, and fence lines over the whole-of-program area.

Erosion control was demonstrated at several pilot sites and [BMP guidelines](#) for tracks for primitive road and track maintenance were developed in collaboration with local landowners and land managers. The guideline has been used to implement best practice erosion control in high priority erosion hotspots, particularly on hastily constructed

fire breaks in steep topography. These BMPs can now be applied across the program area to all primitive tracks on all land tenures.

Erosion control on council roads

The \$1.4 million Erosion Control on Council Roads project delivered by SCYC in partnership with the Cook Shire Council, developed and demonstrated practical and implementable [best management practices](#) (BMPs) for road construction and maintenance to achieve a measurable reduction in soil erosion along unsealed Council roads.

Several pilot treatments were trialled along Oakey Creek Road in the Annan Catchment, an identified hotspot for sediment erosion and delivery to the Reef Lagoon. Additionally, this project demonstrated the [costs and benefits](#) of different road maintenance practices that reduce sediment run-off to the Reef while still meeting road use standards.

The current 'business as usual' annual road maintenance treatments were shown to be the least cost-effective maintenance regime over the medium term.

Gully erosion control

The \$2.16 million Gully Erosion Control project delivered by SCYC addressed gully erosion from past developments, over grazing, and poorly directed road runoff contributing large amounts of sediment to the Reef lagoon. Erosion was controlled via remediation projects in the highest priority gullies in the Annan River catchment at identified and accessible hotspots in the Oaky, Scrubby and Esk sub-catchments.



Jarvis Darkan, Juunju completing early season burning. Image SCYC

PROJECT HIGHLIGHT

Better roads for the Reef

Erosion and sediment runoff from land uses in Reef catchments reduces water clarity, slows coral growth, and smothers sea grass meadows and inshore coral reefs. In regional and remote areas, many roads are and will remain unsealed as they do not attract the volume of traffic to justify sealing.

Challenge

Among some local catchment and water quality groups, there was emerging evidence that the surface and roadside drainage of unsealed roads in Eastern Cape York were exporting high volumes of fine sediment to the Reef. However, without any prior investigations, the extent of this was unknown, with little or no reporting into the actual impacts of this land use.

Solution

The project investigated and measured the sediment loads in one unsealed road segment in the Annan catchment known for its high sediment discharge. This included the development and implementation of road surface and drainage treatment trials and comparing the erosion outcomes to the 'business as usual' approaches.

Results

The trials conducted in the Annan catchment along Oakey Creek Road demonstrated the erosion mitigation benefits of implementing alternative treatment measures

rather than standard bare earth grading of the drains and batters. Measurements taken before and after a wet season indicated that the alternative treatments reduced fine sediment volumes transported to the Reef by between 14% and 72% when compared to the control (business-as-usual practices). Importantly, a [Cost Benefit Analysis](#) conducted on these trials showed a positive trend over the medium to longer term period against the control.

For the first time, scientifically robust monitoring data has been collected and verified, quantifying the fine sediment loss from road erosion and deposition onto the Reef lagoon with greater confidence. This has had two significant outcomes; firstly, increased awareness within Cook Shire Council regarding the extent of road erosion and a greater willingness to seek ways to implement alternative treatments. Secondly, through advocacy to both the Queensland and Australian Governments, road funding agencies (particularly those responsible for disaster relief) are more aware of the need for alternative treatment works to be implemented under their funding guidelines.

Outcomes

[Best Management Practice \(BMP\) Guidelines](#) for road and road drainage maintenance were developed incorporating the learnings of the trials and the methods to reduce erosion.



South Cape York Catchments undertook erosion control trials in collaboration with Cook Shire Council. Image SCYC



Learnings

The Eastern Cape York Water Quality Program was a unique water quality initiative that provided key lessons:

1. Investing in a conservation and protection portfolio as part of a water quality program is significantly important to complement the more traditional landscape remediation and pollution reduction projects.
2. The regional program manager's role was critical to leveraging existing partnerships and collaborations within the Eastern Cape York region. This allowed the program to deliver targeted solutions to the region's unique needs and situation.
3. Project contract management was administered directly by the Foundation – allowing flexibility and accountability with a focus on outcomes. This approach also allowed the Foundation to build strong relationships with project teams.
4. Using the expression of interest process for both the regional program manager role and projects allowed for collaboration between organisations and a well-designed, locally focused program.
5. Sufficient time and resources were required to build trusting relationships with the delivery partners, including Traditional Owners. Agreements about ways of working, coordination arrangements, and payment structures should occur upfront.
6. Active engagement of Traditional Owners from the commencement of the program and for each project (design & implementation) supported cultural and social outcomes.
7. A water quality monitoring program not only provided updated data on sediment load in the region but also provided evidence supporting the need for an ongoing monitoring program focused on sediment reduction.
8. Innovative solutions were required to address sources of sediment with the Eastern Cape York region including addressing erosion from land use sources other than gullies and streambanks, particularly unsealed roads and tracks, and reducing catastrophic late dry season hot fires.





Eastern Cape York Water Quality Program Impact Report

Author/s: Greg Oliver, Colleen James, Jessica Cawley, Milena Gongora, Catalina Reyes

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Designed by Colleen (CJ) James.

Acknowledgements

The Water Quality Program was funded through the \$443 million Reef Trust Partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation. This report focuses on the outcomes of the Eastern Cape York Water Quality program within the \$11.5 million Conservation and Protection program and consolidates the work undertaken over the last six years acknowledging the huge role the Water Quality Working Group played in overseeing the Program for the duration.

The Great Barrier Reef Foundation's Water Quality Team acknowledges the significant contributions of researchers, industry, primary producers, Traditional Owners, State and Federal governments, independent consultants, and environmental organisations in the delivery of the Program.



Pictured left: Norma Jacko and Tiara Darkan monitoring the Starke River. Image Cape York Water Partnerships.



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