

MARY WATER QUALITY PROGRAM

Achievements and learnings

August 2024



Australian Government

REEF TRUST



Great Barrier
Reef Foundation

Introduction

The Great Barrier Reef is globally renowned for its intrinsic beauty, immense spatial scale, outstanding biodiversity as well as its natural, social, economic, and cultural values. A healthy and resilient Great Barrier Reef is critical to protect the vast array of ecological communities and species that inhabit coastal, marine, and terrestrial ecosystems. However, the health of the Reef is at risk from a range of factors including climate change, expanding coastal development, direct human use and poor water quality from land-based runoff.

In a bid to significantly improve the health of the Great Barrier 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) – was awarded \$443 million to elevate and amplify efforts to build Reef resilience. As part of the Partnership, the Water Quality Program received \$199 million to address poor water quality from land-based runoff and respond to the priorities of the Reef 2050 Water Quality Improvement Plan (WQIP).



Mary Water Quality Program

The Mary Water Quality Program was one of ten regional water quality programs delivered under the Partnership between 2020 and 2024. Through major erosion control works on unstable banks of the Mary River, this \$10.2 million program aimed to prevent 28 kilotonnes of fine sediment lost from grazing lands from entering the Reef's waters every year.

The Mary is the largest river in the Burnett Mary region encompassing the Ramsar-listed Great Sandy Strait, between the mainland and the World Heritage listed K'gari, home to dugongs, migrating whales and migratory birds.

The Mary River Catchment is one of the most diverse catchments in Queensland covering 9,595 square kilometres from Maleny to River Heads near Hervey Bay. Grazing is the dominant land use, and the Mary River is one of the top five contributors to fine sediment loads flowing into the Great Barrier Reef.

The Mary Water Quality Program (the Program) was delivered by a consortium of organisations including Burnett Mary Regional Group (BMRG), Mary River Catchment Coordinating Committee (MRCCC), and Alluvium Consulting.

Progress to targets were tracked using the [Gully and Streambank Toolbox](#) and the Gully and Streambank Erosion Control Assessment Tools for prioritisation, design and implementation of erosion control activities.


Mechanical interventions were used to stabilise riverbanks and improve riparian habitat and function.

Rehabilitation works included riverbank reshaping and pile field configurations that consider the ecological, hydrological and fluvial geomorphology aspects. This, together with revegetation and maintenance, as well as improved land management are sustaining riverine restoration works.

The success of the Program is reflected by the 11 landholders who participated in the remediation of 11 large streambanks, over 100,000 native riparian species, and the 326 landholders engaged in field days, property inspections, workshops and training events delivered. These activities have increased knowledge of sustainable grazing systems and approaches, improved management practices and built knowledge of catchment dynamics and riverine processes and functions.

In total, the Program prevented over 26 kilotonnes of fine sediment from entering the Great Barrier Reef lagoon every year through streambank remediation works and the commitment of landholders involved to continue implementing improved grazing land management practices.





*“I think of the river as a living,
breathing thing, akin to a person,
so am thankful to everyone
contributing funds and the special
people who have worked together
to make a difference to the river,”*

Upper Mary Grazier Elizabeth King has been involved in early river
restoration work since the 1990s

Achievements



11

Streambank sites
remediated and
revegetated



326

attendees at Mary Water
Quality Program events



19

graziers and dairy farmers
taking direct action to
improve water quality



≈5

kilometres of degraded
streambanks rehabilitated



≈20

hectares of riparian area
revegetated

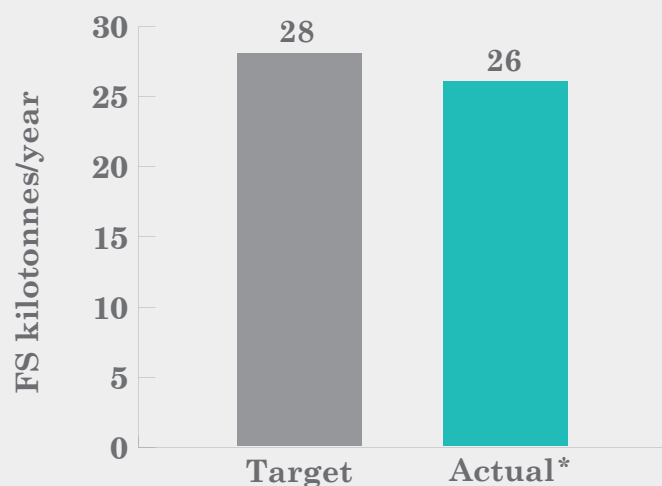


≈100K

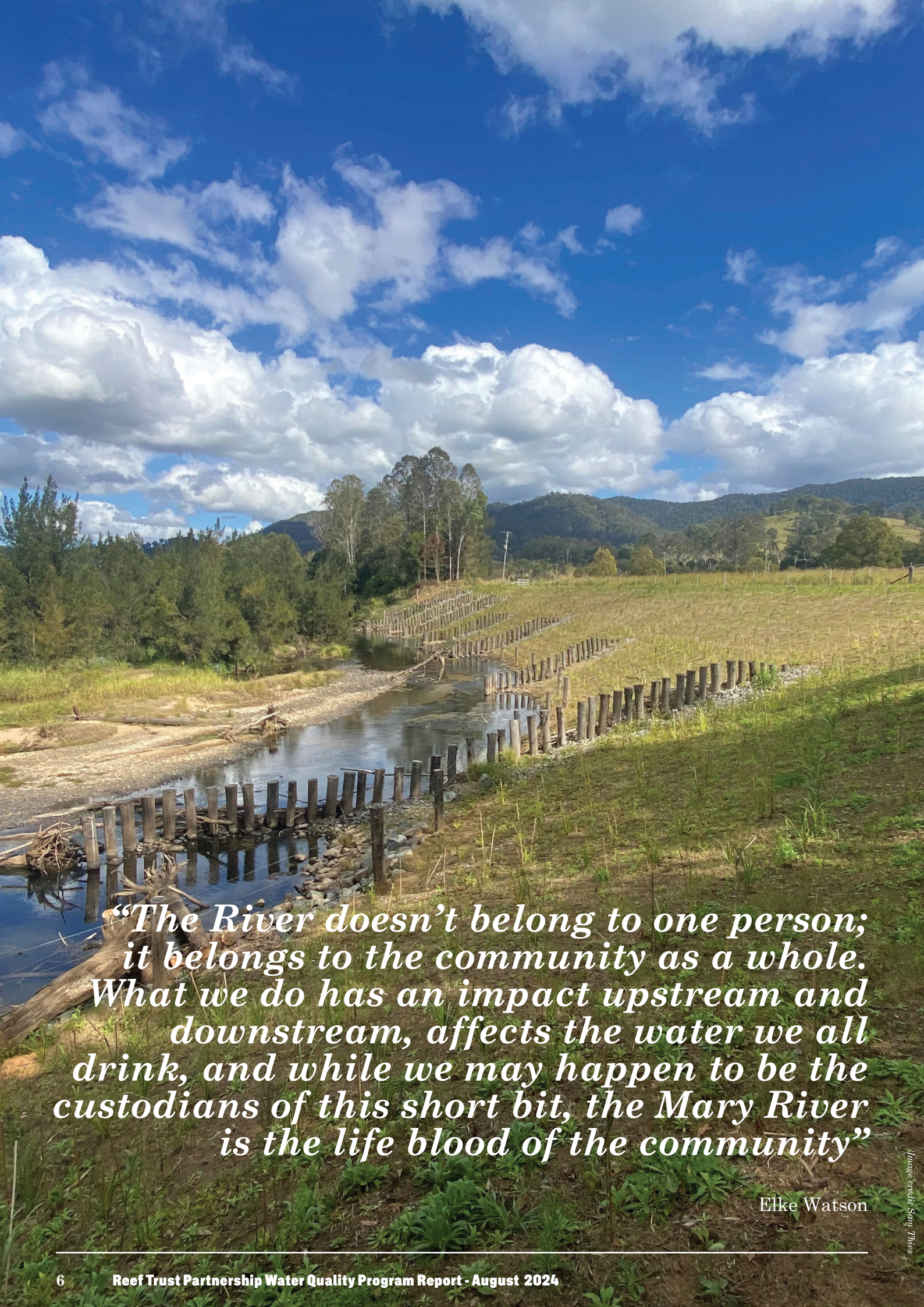
native riparian species
planted

PROGRAM IMPACTS ON THE MARY RIVER CATCHMENT

Progress against Fine Sediment reduction target



*The small short-fall in the regional-level sediment target set by the [Alluvium Report](#) was due to disparity between sediment calculation tools and the underestimation of the original costs associated with on-ground activities to meet the Program.



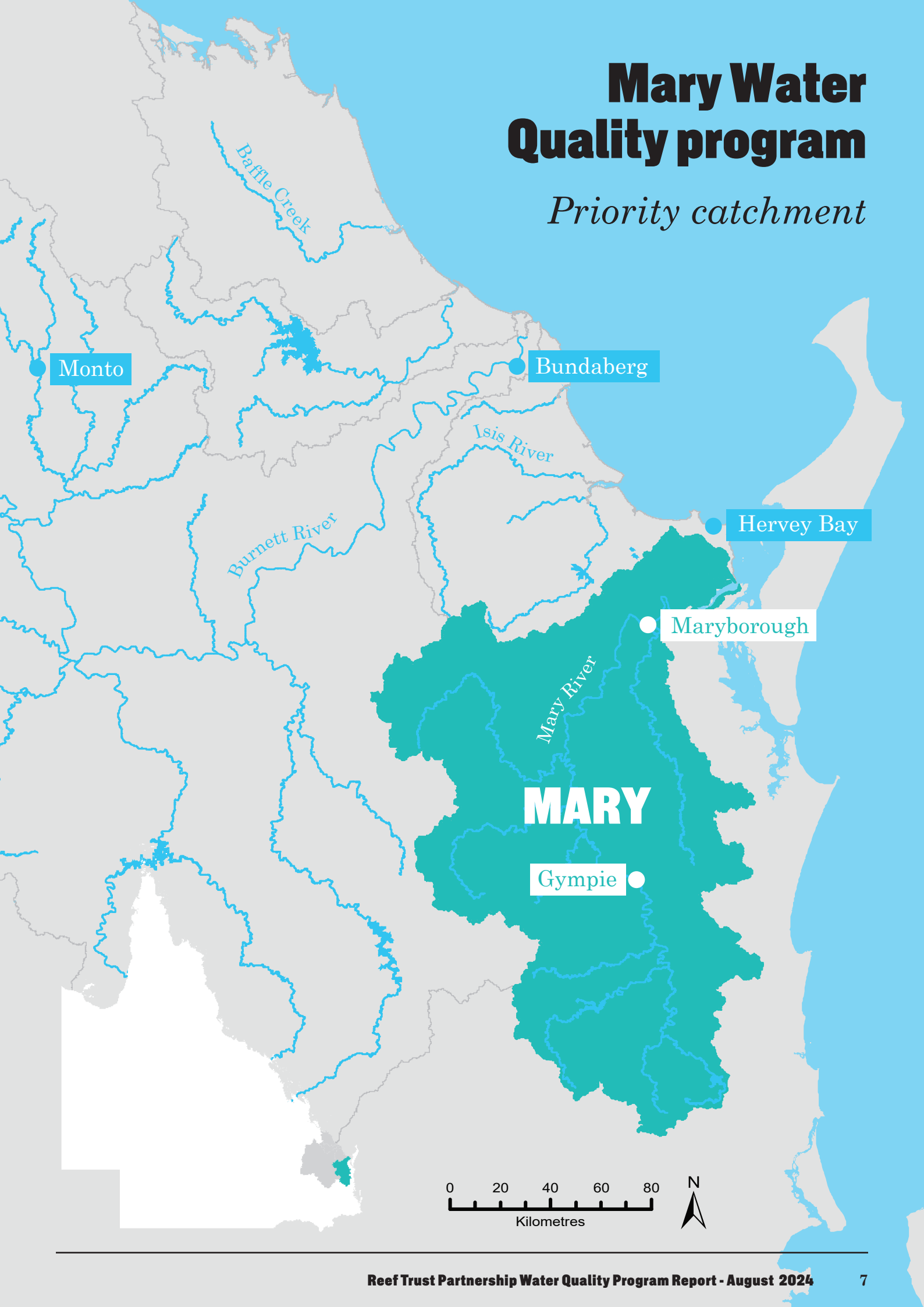
“The River doesn’t belong to one person; it belongs to the community as a whole. What we do has an impact upstream and downstream, affects the water we all drink, and while we may happen to be the custodians of this short bit, the Mary River is the life blood of the community”

Elke Watson

Image credit: Sam Thies

Mary Water Quality program

Priority catchment



Program Model

Governance arrangements for the program ensured the project delivering on the ground reported directly to the Foundation. This model, shown in Figure 1, increased the transparency of progress and outcomes while also facilitating agility to manage contractual commitments.

The management committee made up of consortium partners including BMRG, MRCCC, and Alluvium reported directly to a regional steering committee that included representatives from consortium organisations, an independent advisor and the Foundation.

Each consortium partner played specific roles with BMRG acting as the program manager, MRCCC leading the on-ground coordination, landholder engagement, riparian design and M&E, and Alluvium providing the

engineering advice, design and construction management.

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.

As part of the Program oversight, an independent verification initiative was implemented by inspecting the extent and quality of the on-ground projects and ensured they were accurately represented in the spatial dashboard developed by the Foundation.

The design of the governance approach recognised the importance of local leadership and oversight, as well as strategic and technical guidance.

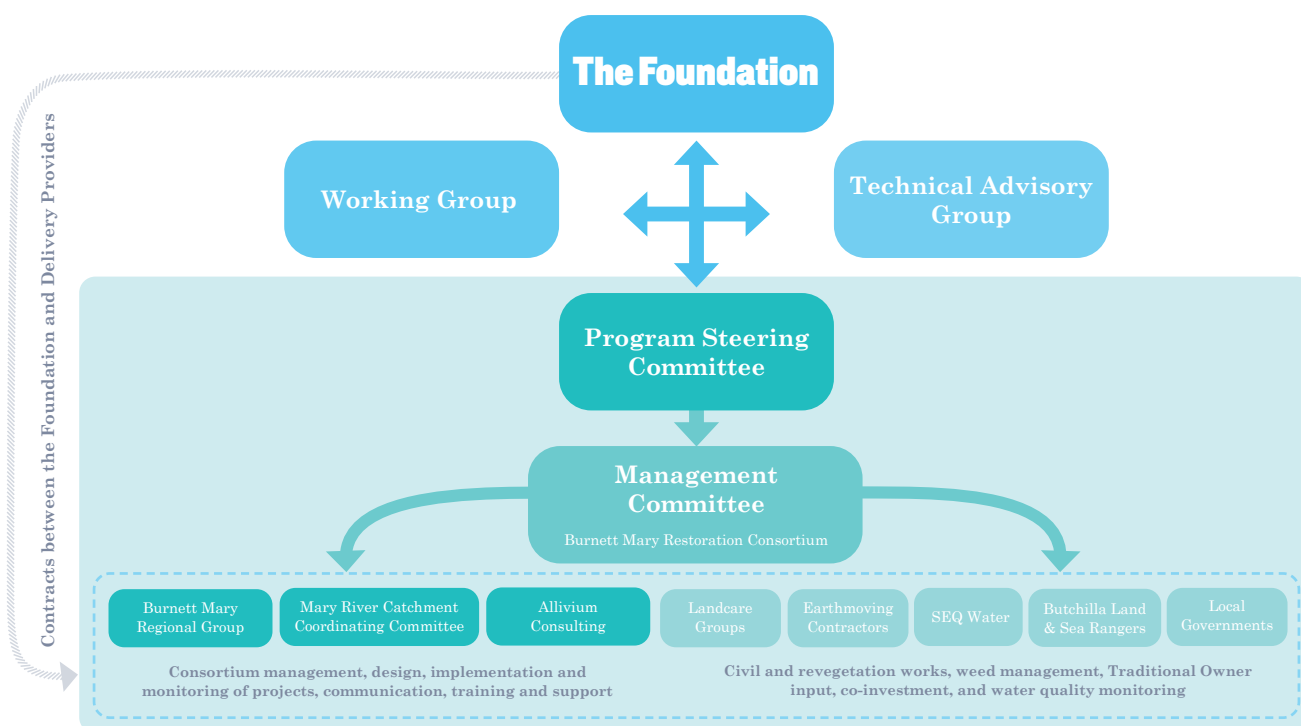


Figure 1. Reef Trust Partnership Mary Water Quality Program governance model



Image credit: Scott Thies



Program Activities

The Program prevented over 26 kilotonnes of fine sediment from entering the Great Barrier Reef lagoon every year through streambank remediation works and the commitment of landholders involved in continuing to implement improved grazing land management practices.

Landscape remediation

Remediation sites were carefully selected based on comprehensive technical information and the use of advanced tools such as LiDAR (remote sensing technology) to prioritise the most significant sources of fine sediment. Riverbank stabilisation works and native vegetation restoration has been completed on 11 sites. The rehabilitation approach used replicated the natural processes of the river.

Interventions

Intervention activities involved mechanical stabilisation of steep eroded banks including reprofiling, rock armoring, and pile field installation for long-term erosion protection. These approaches were used to reduce near bank velocity and shear stress. Native plants were planted to create an environment suitable for the establishment of rigorous and diverse riparian vegetation. Land managers supported the landscape remediation with land management practices such as exclusion fencing to address active bank erosion, riparian fencing to protect and manage the remediated area, and environmental weed control to support riverine restoration works.

Custodians of change

Landholders were key to the success of the Program. They embraced the responsibility to make property changes and improved land management practices that will protect and restore their land, the river and the Reef. Consortium partners provided one-on-one advice, property visits and training courses and workshops. This collaborative effort has demonstrated that sustainable land management is achievable.



Image credit MRCCC

Before

Tiaro

Alan (pictured right) and Kerry Robinson have been grazing on the Mary River in Tiaro for over 40 years and have witnessed significant loss of valued grazing lands following multiple flood events. Their bank reprofiling occurred across 310 metres of riverbank with the installation of over 900 piles and 9,529 native plants.

They did not hesitate to join in on the program having witnessed the damage done, and loss of land and infrastructure over multiple flood events. Their site has saved over 8,700 tonnes of fine sediment from leaving the eroded banks and making its way to the Reef.



Image credit Sam Thies



Image credit Alluvium

After

“If there were no works done, the river would have taken more land. The (streambank rehabilitation) process not only helps the river but also helps the graziers and farmers.”

Upper Mary Grazier Elizabeth King, pictured with Caroline King



Image credit: Sam Thies



Image credit MRCCC

Upper Mary

One of the best legacy stories of true stewardship and an ongoing commitment to land restoration to ensure generational impact comes from an 85-year-old Upper Mary grazier, Elizabeth King (pictured).

A true trail blazer, Elizabeth has been involved in early river restoration work since the 1990s. The work \approx 2 hectares of riverbank with pile field installation and the planting of over 2,718 seedlings completes a section of 30-year-old mature forest either side that Elizabeth planted long ago, creating a continuous corridor of riparian vegetation. Elizabeth is a firm advocate for practice change, along with her family, to reduce impacts to the river from cattle.



Image credit Alluvium



Before

Image credit: MRCCC

Upper Catchment

Landholder Danny Marr is based in the Upper Catchment of the Mary River and was a keen advocate to protect the fragile banks. Marr was one of the earlier adopters under the program, commencing works in 2021. The restoration works included bank reprofiling, installation of pile fields, and rock protection over 260 metres of riverbank with over 5,000 native species planted.



After

Image credit: Sam Thies

Mid-Mary River



Image credit: Alutrium

Landholder Terry Schiefelbein and his wife Jackie are third-generation graziers at Munna Creek, Miva. Terry has watched the riverbank subside from the sheer force of the flood waters, and was keen to help repair 600 metres of actively eroding riverbank. This was the largest site in the Mary River Recovery Program with 3 hectares of riverbank restored between August 2022 and May 2023.

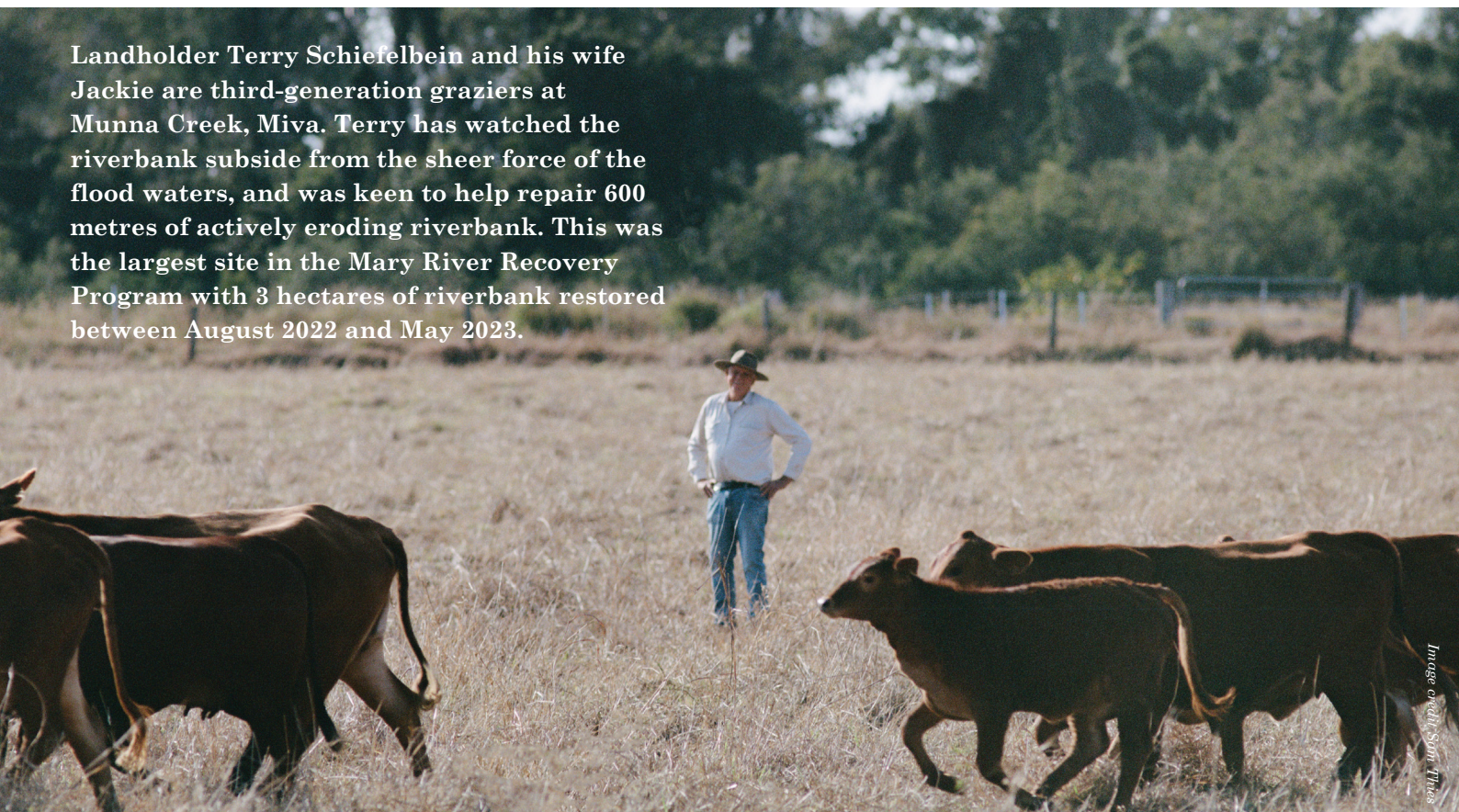


Image credit: Scott Thies



The installation of 661 wooden piles and over 23,000 native plants are helping solve erosion problems along this section of the Mary River. The vegetation established around the timber piles will act as a long-term erosion control measure, stabilising the bank as these piles eventually break down.

Image credit: Alutrium



Learnings

1. Landscape repair programs require a robust maintenance plan in place to protect the investment and longevity of the project's intent. This could be achieved by continuous engagement beyond completion of the restoration works to assess performance and provide any support for the landholder as the steward to continue to protect and maintain the area. Ongoing maintenance, even at low levels, secures engagement and commitment, and captures impacts from droughts and floods early before these become major issues.
2. Restoration efforts will only ever be as good as the maintenance regime is established after the work is completed. Mechanisms and resources to allow for longer-term monitoring and maintenance after project completion must be incorporated in future landscape remediation programs. This lesson has repeatedly been raised as a major need to ensure sustainability of outcomes.
3. Continuous and meaningful engagement of participating landholders are key for them to understand the implications of the projects identified on their properties and the roles and responsibilities of each party to successfully implement on-ground works.
4. Engagement with and knowledge transfer to landholders are also critical for them to recognise the importance of the riparian zone and ensure best land management practices are maintained resulting in the long-term integrity of the project sites.



Learnings

5. Building trust and good working relationships, focused on common goals for restoration is essential, not only between extension officers and landholders, but also between NRM partners and government.
6. The floods of 2022 and the extended dry season of 2023 provided significant lessons on sediment deposition impacts and plant survival responses.
 - Double planting in the same hole (eg. Lomandra and bottlebrush) in the lower toe area was an effective method for reducing scour around young seedlings (lomandra provides a shield during floods), and reducing maintenance requirements after a year of establishment.
 - Chemical application for grass control near establishing seedlings is minimised in the lead-up to flood season to maintain an optimal level of groundcover that reduces scour and minimises annual weeds establishment.
 - Timing of chemical application prior to flood season to reduce grass growth has been refined to Spring to reduce competition early in the season which pays dividends in Summer.

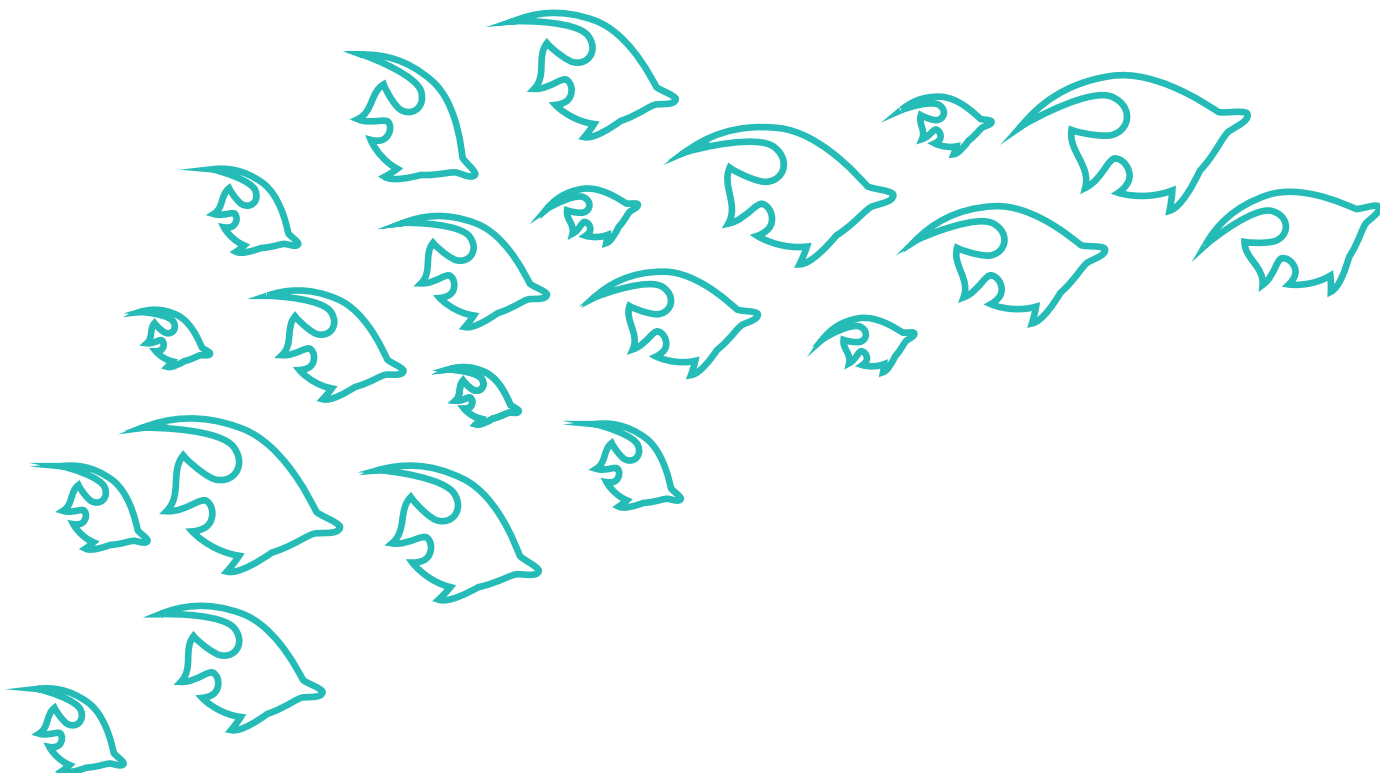
Summary

Over the four years of the Reef Trust Partnership Water Quality Program, this project built upon the experience and significant system understanding and past river restoration work in the Burnett Mary region. Five kilometres of the Mary River were rehabilitated across 11 sites supported by 11 fully committed landholders. Strong relationships with regional landholders supported by capacity building and knowledge transfer activities enhanced program outcomes. Increased understanding of the importance of catchment dynamics, and riverine processes and functions supported good land management and stewardship.

A combination of streambank remediation, riparian zone rehabilitation and protection, revegetation, maintenance, and improved grazing land management practices resulted in reduced erosion and sediment losses. Sites were systematically selected based on comprehensive technical data and advanced tools. Fencing was installed to address active bank erosion, weed control undertaken to support riverine restoration works, appropriate riverbank stabilisation works implemented, and native vegetation planted to restore the natural river processes.

Key lessons highlighted the importance of robust monitoring and maintenance plans and the need for long-term support to protect the investment and ensure the sustainability of outcomes. Continuous consultation, engagement and commitment from participating landholders was key to ensuring the longevity of rehabilitation works. Despite major rainfall and flood events in 2022, the civil works held extremely well demonstrating the robustness of designs and on-ground actions.

The combination of all the above has contributed to the Program reducing more than 26 kilotonnes of fine sediment per year. This has resulted in a more sustainable Mary valley grazing industry, better water quality in the river, local waterways, and the Great Barrier Reef lagoon.





Acknowledgements

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.

The Mary Water Quality Program was funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Great Barrier
Reef Foundation