

December 2015

Editor's Welcome

Daniel O'Keefe



Welcome to our Christmas edition of Land and Water. In this edition we have brought you a selection of stories from across the Reef Catchments Natural Resource Management region and projects.

Reef Catchments staff are privileged to work with diverse community groups within natural, agricultural and urban settings. We hope that you enjoy these updates on our work traversing our dynamic and beautiful Mackay Whitsunday Isaac region, from the coast, through to the rivers and streams to rich farming lands and ranges.

Launch of first report card for Mackay Whitsunday waterway health

A new pilot report on the health of Mackay-Whitsunday waterways has highlighted data gaps and the need for more action to be taken to secure the long-term health of our basins, estuaries and the Great Barrier Reef.

The Healthy Rivers to Reef Partnership pilot report card was launched on 22 October in Mackay. Still in the early phases, the report clearly highlights missing links in water quality monitoring and research, while also identifying regional strengths and key areas of concern.

Partnership Chair, Di Tarte, said the new initiative would help prioritise where efforts should be directed to improve waterway health.

"Thanks to the pilot report card, the community is provided with ongoing, relevant information necessary to secure a strong future and the long-term health of the Mackay-Whitsunday waterways and the adjacent area of the Great Barrier Reef," Ms Tarte said.

The Healthy Rivers to Reef Partnership, hosted by Reef Catchments,

represents the first collaboration of diverse sectors focused specifically on waterway health in the Mackay-Whitsunday area, consisting of 28 organisations working together to share leading and transparent independent science.

Collectively, the group has access to regional data and information representing over \$4M of investment in monitoring and research programs.

"For the first time, the Partnership brings together organisations and information from a wide range of sectors for a collaborative approach to assessing the health of our waterways and identifying management priorities – from government, mining and ports, to agriculture, fisheries, tourism, traditional owners and environmental and NRM groups," Ms Tarte said.

"This approach ensures insight into whole-of-catchment waterway health, from basin to estuary and out to the marine environment and adjacent Great Barrier Reef.

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Australian Government



Queensland Government

L-R: Healthy Rivers to Reef Partnership Panel members: Matthew Fullerton (Department of Environment and Heritage Protection), Katrina Dent (Partnership deputy chair and Reef Catchments), David Wachenfeld (Great Barrier Reef Marine Park Authority), Partnership Chair Di Tarte, Kevin Kane (North Queensland Bulk Ports), Dan Staley (Whitsunday Regional Council, Kerry Latter (Canegrowers), Lance Murray (Mackay Recreational Fishers Alliance), Samarla Deshong (Koinjmal Traditional Owner), David Brewer (CSIRO), Partnership executive officer Charlie Morgan and Ellen Roberts (Mackay Conservation Group).



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The diversity in the number of organisations coming to the table, is testament to a high level of commitment to waterway health from the Mackay-Whitsunday region.

"The pilot report card is a first step towards tracking trends in waterway health and the progress of management activities to respond in areas where improvements are needed." It includes results on environmental and community values of waterways, as well as stewardship by industry.

Results demonstrate a clear need for more action and investment into the Mackay-Whitsunday region to effectively improve water quality into the future.

"While there are certainly areas in the region with encouraging results, there are also clear areas where improvement is needed, and some areas where we have no data at all," Ms Tarte said.

The condition of the region's waterways ranged from B's (Good) to D's (Poor). Of the Mackay-Whitsunday region's five major freshwater basins, just one reported a grade of B (the O'Connell), two scored C (Don and Proserpine) and two scored D (Pioneer and Plane).

Major estuaries rated more positive overall with water quality scores of B for the Gregory River, Vines Creek, and Carmila Creek; C for Rocky Dam Creek, Plane Creek and Murray and St Helens Creek; and D for Sandy Creek.

The marine results were mixed, from D for the Inshore Central region, to a C for the Northern and Whitsunday regions, to a B Offshore.

There was no data available for the southern inshore reporting zone (east of Carmila), flagging a critical need for monitoring programs to be established in this area.

Contaminants have been identified as a key issue in the Pioneer and Plane basins. Wetland extent and riparian vegetation also appear to be a key concern within the region's basins and estuaries. The condition of the Whitsunday inshore marine area (C) is also of concern given this area's importance to the tourism industry.

Ms Tarte said importantly, the pilot report also showed that the Mackay-Whitsunday community placed an exceptionally strong value (A) on waterways for the lifestyle and social benefits provided.

"From fishing, snorkelling and diving to simply enjoying a walk on a beautiful and pristine beach – these results show the region strongly values the lifestyle its waterways provide, and are committed to ensuring they remain intact for the next generation to enjoy."

Ms Tarte said responsibility for water quality improvements did not fall on any one industry or sector, but required a partnership approach.

The Partnership welcomes comment and feedback from the community on the pilot report card.

The Partnership supports the development of an annual report card based on rigorous independent science and straightforward public reporting, providing the community with the information needed to make informed decisions around waterway health and management.

Partners recognise that more can be achieved together than alone and acknowledge the value of collaboration in realising outcomes beyond those that could be attained by any single agency or organisation.

The report card showcases current activities being undertaken by Partners directed at improving waterway health and amenity. This includes activities across a number of themes such as gross pollutant traps, catchment rehabilitation, marine debris removal and innovation in sugar cane farming.

The Activities Spotlight document has been released coinciding with the release of the Mackay-Whitsunday 2014 Pilot Report Card.



HEALTHY RIVERS TO
REEF PARTNERSHIP
MACKAY-WHITSUNDAY

Innovative trials

A significant component of the Reef Catchments Sustainable Agriculture program includes working with farmers and graziers to develop on ground trials and demonstration sites that look to improve soil health, water quality runoff and productivity. These are focused on all industries including horticulture, grazing, forestry and cane. The horticulture trials in this program include:

- Biofertiliser application in a mango orchard
- Establishing groundcover to suppress weeds
- Soil health benefits of multi species groundcover in a banana plantation

The trials within the sugarcane component of this program include:

- Banded 2 year precision compost (chicken manure)
- Mixed plantings in cane row to improve soil health
- Deep application of mill mud and bagasse with VR mill ash to treat sodic soil and improve overall soil health
- Brazilian farming system – clean cane source, deep application of precision compost, legume crop matched to soil needs, plant cane grown on each block and planted out (i.e. two rows cane, skip four rows and plant legume, two rows cane, skip four rows and plant legume, then spray out legumes and plant cane into skipped areas)
- Improving understanding of a legume fallow – soil tests over time to understand break down and availability of legume crops
- Understanding the long term benefits of a skip row (soil improvements over time)
- Understanding the long-term benefits of controlled traffic

Three grazing demonstration sites have been promoted and developed as case studies. These include;

- Riparian fencing, off-stream watering points, pasture monitoring and rotational grazing on 86 Ha
- Gully erosion remediation, riparian fencing and the use of off stream watering points
- Management options for controlling Giant Rats Tail grass

For more information on these trials, or to get involved, please visit the Reef Catchments website or get in contact.

Holistic management in grazing systems

Brian Wehlburg of Inside Outside Management came to Proserpine to deliver a workshop to over 20 interested graziers about the principles of holistic management in October this year.

Brian has been a Holistic Management certified educator for nearly 15 years and also comes from a diverse background as a farm manager in Africa and Australia. He has worked with diverse groups in providing training about holistic management that include Landcare, Natural Resource Management groups, family businesses and sole operators in Queensland, NSW and WA.

Holistic Management is about developing a clear vision of the future you want to ensure decisions are economically, environmentally and socially sound. The information provided through this training can provide a way forward with making decisions, setting goals, land planning, environmental monitoring and grazing planning.

In the workshop Brian raised and questioned the issue of conventions, beliefs and paradigms that have been taught with land degradation and potential causes by certain grazing practices.

He emphasised that to be a sustainable grazer you need to focus on what you get for free; which includes sunlight, minerals, biology and water. To reduce costs and make better use of the 'free resources' you need to think of better ways to manage these.

A prime example with forecasts for reduced rain due to the El Niño is to focus more on how to manage the rain you do get. "It's not about how much rain that we get it's about how we manage that rain to make the most of it for us, our farming system and the environment."

Participants on the day found Brian an excellent presenter and considered the concepts interesting, informative and thought provoking. The majority of graziers that came to the day are keen to undertake further training in holistic management.

Reef Catchments, through the Regional Landcare Facilitator program, is investigating the potential to assist in delivering the full holistic management training program in the Mackay Whitsunday Isaac NRM region.

The course would cover the full principles of holistic management and is delivered over eight face-to-face sessions that include decision making,

grazing planning, financial planning, ecological monitoring, land planning and managing environments holistically.

To find out more or to register your interest in participation contact the Regional Landcare Facilitator **Robyn Bell** on 07 4945 2321 or robyn.bell@reefcatchments.com.



New soil health group formed in the Mackay Whitsunday region



The Central Queensland Soil Health Systems (CQSHS) group was formed out of the recognition that soil is much more than just somewhere to stand your crop.

The group notes that the major issues in Mackay soils are lack of soil carbon and plant available calcium as well as compaction in the field from heavy machinery resulting in poor soil microbial activity. CQSHS is currently auspiced by Pioneer Landcare Group but intends to form its own official entity.

The group recognises that soil biology needs soil carbon levels of 3% or more to become fully active.

It also needs the calcium/magnesium ratio to be correct so that soil PH will also be at the desirable level. Compaction also needs to be addressed in order to gain good water and air infiltration. When these variables are addressed then healthy soils result which in turn achieves a healthier environment, better use of applied inputs and higher productivity.

The CQSHS group believes that addressing soil health must take a systemic approach. Addressing one issue at a time is a lengthy procedure with resultant improvements from each trial often being too miniscule for farmers to warrant adoption of changed farming practices. Farmer driven research and trials can address multiple issues at any one time with multiple science disciplines working on the same project. Currently, trials and practices to improve soil biology being conducted include the multi-species planting of alternate crops, annual applications of calcium

and the incorporation of other soil ameliorants, the inclusion of micro-nutrients in fertilising programs, the use of composting and other forms of organic farming.

The desired objectives of these trials is to increase microbial activity and improved soil biology in order to achieve healthier soils, reduced inorganic inputs and increased yields, thus a benefit to farmers and the environment.

The Central Queensland Soil Health Systems group will be open to membership from all sectors of agriculture, farming and grazing, and the wider community. It is believed that practical and science based research trials driven and owned by membership, will be able to achieve the CQSHS stated objective of restoring and building soil health through combining practical knowledge and science.

For more information please contact Reef Catchments.

Grazing land management field day and pub lunch

Local graziers attended the Reef Catchments Grazing Land Management Field Day and pub lunch on Thursday 3 September. The free event was attended by 43 people, representing 30 grazing enterprises from the Mackay, Whitsunday and Isaac region.

Land management expert and consultant Bill Thompson was guest presenter for the event and drew on his depth of experience to provide practical advice to participants. The field component of the day included a morning site visit to a Palmyra grazing property.

Throughout the day, graziers were able to focus on management tools to improve the resilience and productivity of their grazing blocks. They also had a chance to learn more about addressing key challenges, including:

- **Managing erosion**
- **Soil fertility**
- **Lowering sediment and nutrient runoff**
- **Dispersing grazing pressures**
Considering supplement and water point dispersal to help ensure cattle are not over-using or degrading one area
- **Identifying priority and risk areas for physical intervention**
Intervention activities may include riparian and land type fencing, off-stream watering points, bank stabilisation, and revegetation
- **Understanding the difference between breeding and grow out/ fattening herds**
Adopt strategies appropriate to your herd and understand the constraints different land-types place on each system

The field notes on the above topics can be found on the Reef Catchments website.

Following the field visit, graziers were invited to lunch at the Duke of Edinburgh Hotel in Walkerston. In these relaxing surrounds, graziers had an opportunity to network with other landholders facing similar challenges and to take away some practical tips for more effective grazing land management. Bill Thompson and RCL Staff were also available to consult with graziers. Participant feedback from the day was very positive.

Reef Catchments wishes to extend its gratitude to Michael Shanks for hosting the field day on his property.

Hardwood Farm Forestry trial at Bloomsbury



The Regional Working Group for Forestry visiting Max's trial.

A small trial is being established at Max McFarlane's property at Bloomsbury on the O'Connell River as part of Reef Catchments Sustainable Agriculture program.

The site where the trial is being established is too stoney for growing cane but provides an area to grow alternative crops, in particular fence posts and poles. These can be grown in those small areas on many farms in the district that are marginal for cane.

Farm forestry in the region has had a rough time, firstly with the Managed Investment Schemes that saw cane land taken out of production and ultimately failing, partly due to inappropriate species.

Farm forestry has also been a bitter pill for many tree growers with Cyclone Ului damaging many trees throughout the region.

There has however been lessons learnt with some of the species that have been planted; one being that the trees may look good for the first couple of years; but two years to make judgement is too short; particularly with the variability in

climate that can happen within the region.

Over at least the last 20 years there has been a number of schemes that have encouraged small-scale farm forestry.

To date, there has been insufficient monitoring of the performance of these trials; however a report produced in 2009 by the Queensland government details some of the better performing taxa. This and other reports have been utilised in determining the potential best performers for the site.

The trial has been designed as a fully replicated experimental trial and includes six hardwood species. These are: Black ironbox (*Eucalyptus raveretiana*), two provenances of Gympie messmate (*E. cloeziana*), grey gum (*E. longistrata*) and two species of spotted gum (*Corymbia citriodora* ssp. *citriodora* and *C. citriodora* ssp. *variegata*). It is intended to monitor survival initially with the trial and with time to monitor growth (height and diameter). Other parameters that will need to be monitored include form and susceptibilities (insect damage and pathogen attack).

Reef Catchments' ABCD frameworks

Reef Catchments has recently been developing and updating ABCD frameworks in collaboration with the regional working groups for the horticulture, sugarcane, grazing, forestry and fisheries industries in the region. These documents are developed to assist landholders, farmers, graziers and fishers in improving their practices relative to their industry to promote a sustainable future in the Mackay Whitsunday region. The Forestry ABCD framework has been finalised with recent changes including the separation of the framework into plantation and native forestry. This provides a clearer and easier to understand format for the community to understand.

The Fisheries ABCD framework is also looking to adopt a similar approach by separating recreational and commercial fisheries. Horticulture, is into its final draft stage and will be approved by the regional working group by the end of 2015.

If you would like to obtain the most recent version of the ABCD frameworks, please check the Reef Catchments website, or contact Reef Catchments.

Central Queensland graziers convene in Mackay for 4th annual Grazing Forum

Graziers and industry members from across the Queensland Coast gathered in Mackay in June this year for the annual Sustainable Grazing Forum 2015. This annual forum is the only local event that focuses specifically on graziers in the Mackay Whitsunday Isaac region.

More than 120 attendees travelled from up to 200km to find out more about the big issues for beef production: from breeding and biosecurity, to soil health and new pasture varieties for the region.

“Significantly, the graziers in the room represented the collective management of nearly 50,000 ha of land. The day was a chance for us to provide our graziers with the information they need to improve land and pasture management, to focus on challenges and opportunities, and to highlight where efficiencies can be gained.” said Michael Boland, Reef Catchments’ grazing officer.

Attendees enjoyed the variety of presentations on the day, as well as the chance to network with industry professionals and other graziers.

Issues covered included: policy updates; achievements being made by local graziers through the Australian Government Reef Programme; genetics and breeding; pasture nutrition; control of Giant Rat’s Tail Grass (GRT); and soil health.

Geoff Niethe, Research Coordinator from Meat & Livestock Australia (MLA) spoke to the group on how to win the ‘world cup’ of cattle by building the best foundation for a breeder herd.

“If you want to win the world cup, you need to have a good junior sports development team coming up through the ranks.” Mr Niethe said. “It’s about considering how to select and prepare the right heifers from a young age for maximum lifelong productivity in the herd. For example, we know from data that cows targeted at certain times of the year are more likely to calf again in a 12-month cycle. Information like that can be critical in adding value to the herd.

“With more pressure on graziers and producers to build efficiencies, there’s certainly areas for improvement in fertility – no one has it quite right yet.”

Ross Dodt, Senior Industry Development Officer for DAF spoke on the challenges facing the local Mackay, Whitsunday and Isaac beef industry.

“A problem for many regional beef properties is insufficient scale. For example properties in Area III of the Brigalow ballot scheme were originally sub-divided on the basis they would run 800 head of cattle. Technology has enabled producers to stock at higher rates than this but the temptation for some has been to stock at unsustainable rates, hastening problems such as pasture rundown, unwanted pasture specie encroachment and deteriorated land condition,” Mr Dodt said.

“Producers are also feeling the ‘terms of trade’ pinch in a commodity-based market of – how do we juggle the challenge of trying to decrease the cost of production while also raising quality animals that are worth more per head?”

Mr Dodt said there was no “one hat fits all” solution, but that beef producers needed the right information to make an educated decision on how to move forward.

The Queensland Coast Sustainable Grazing Forum is an annual event for the benefit of industry and is free for landholders.

The forum is delivered by Reef Catchments, through the Regional Landcare Facilitator program with funding provided by the Australian Government’s National Landcare Programme.

Other presenters on the day included: Megan Star (DAF), Michelle Smith (DAF), Geoff Neith (MLA), Lauren Hewitt (AgForce), Jim Fletcher (DAF), Neil Cliffe (DAF), Ross Dodt (DAF), Dr Pam Pittaway (University Southern Queensland), Paul Tippet (Heritage Seeds), Amanda Bland (Reef Catchments) and Misko Ivezich (Alluvium); as well as the forum’s wonderful MC, Kim Kleidon.



Tilapia



Tilapia have been branded as the cane toad of Australian waterways, a pest fish which threatens native species through their prolific breeding and ability to out compete our natives.

Tilapia have the ability to tolerate poor water quality and continue to proliferate when native fish are just trying to survive until conditions improve.

Reef Catchments has been delivering a program to prevent the spread of tilapia in the Southern GBR catchments. Currently the project is working to establish the extent of current tilapia populations in the region, trial control measures and raise community awareness to reduce the chance of people moving fish between waterways.

Education is a key component of the project. Recently, Reef Catchments held a community fishing and waterway health field day at the Gooseponds in Mackay.

As part of the day 150 kids and their families helped release 1000 barramundi fingerlings and took part in tagging and habitat improvement demonstrations.

The day helped raise awareness of tilapia and the barramundi release was part of an ongoing predator control trial in the Gooseponds.

The final aspect of the project is to improve the health of affected waterways. Increasing habitat complexity and improving water quality will help build the resilience of native fish, giving them the best chance of competing against these unwanted intruders.

System Repair

System Repair programs are funded by the Australian Government with four major projects, based in the O'Connell basin, the Pioneer basin, the Plane Creek basin (Rocky Dam Creek) and urban areas across the region.

A fifth System Repair project is working to stop the spread of the fish species Tilapia in waterways throughout Mackay Whitsunday Isaac region and also the Fitzroy Basin.

Over the past two years, the O'Connell River and Plane Creek Basin Systems Repair projects have delivered a range of activities which will provide water quality and ecosystem health outcomes for years to come, minimising future loss of sediment and nutrients to the Great Barrier Reef Lagoon.

A number of erosion mitigation projects have been undertaken including three major engineered bank stabilisation works.

The major engineered works include embedding a 2m rock toe within the bed to prevent further scour and re-profiling the bank which will dissipate the energy of future flows. The banks have then been revegetated which will provide long term stability.



Before works



After works



Before works



After works

If you have an eroding bank that you would like assistance with and are within the O'Connell and Plane Creek Catchments, please contact Reef Catchments.

After the last wet season a wide scale revegetation program was carried out. This resulted in over 30,000 native trees being planted across the region. These trees will provide connectivity throughout the region and provide greater stability to eroding banks.



Pioneer systems repair - a treatment train approach

The Pioneer Basin Systems Repair project has a different focus than the O'Connell and Plane Creek projects.

The main driver of the project is to improve the water quality of one of the most intensively cropped basins in the GBR. By working with landholders to implement a treatment train approach the outcomes not only provide water quality outcomes but also provide landholders with an additional source of water for their crop.

Over the past two years a number of sediment detention basins have been constructed. These basins allow for sediment to drop out before reaching the rivers.

Also under this project a number of multiple chambered treat trains have been constructed.

These provide multiple benefits including dropping out sediment, increasing detention time for breaking down of herbicides and soaking up additional nutrients through aquatic plants.

Reef Catchments has also established a water quality monitoring site to be able to quantify the benefits and outcomes of these treatment trains. While only a newly established basin the monitored water quality outcomes have been promising.

Now into the third and final year due to the success of this project the funding has been completely allocated, however Reef Catchments is currently preparing a proposal for continued funding due to the number of positive outcomes of this project both for water quality and for landholders.

Water Quality Improvement Plan



Reef Catchments has recently updated the region's Water Quality Improvement Plan (WQIP) for the period 2014 – 2021. The plan provides water quality targets and objectives for a range of key pollutants and details the activities and the investment required to achieve the outcomes.

The Plan is an update of the WQIP (2008) and reports on water quality and ecosystem improvements over the past seven years as a result of investment from programs such as the Australian Government's Reef Programme. During this time, significant progress has been made towards the water quality targets initially set.

The new plan builds on past work and incorporates new and existing knowledge to establish new targets for the region's water quality. Management practice adoption within agricultural industries continues to be a key priority for the improvement of water quality.

With increased understanding a greater focus has been directed towards urban areas to improve their water quality through planning tools such as the Urban ABCD framework and the Constructed Wetland ABCD Framework.

Another key area for improving water quality is Systems Repair, which focuses on management interventions to improve ecosystem health. This work identifies improvements in riparian management, fish community health, flow, sea grass and coral as priority activities.

The region's subcatchments have been prioritised for the desired outcome, since each of the 32 subcatchments have unique water quality issues and require a targeted approach to achieve the desired outcomes.

For more information on the WQIP and how it will be used to direct investment into the future please contact Reef Catchments.

Paddock to Reef: Integrated Monitoring modelling and Reporting Program

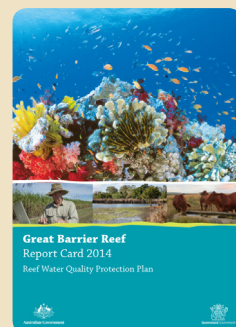
Paddock to Reef: Integrated Monitoring Modelling and Reporting Program (Paddock to Reef) is a collaboration involving governments, industry bodies, NRM groups, landholders and research groups. Paddock to Reef is jointly funded by the Australian and Queensland governments to measure progress towards the Reef Water Quality Protection Plan 2013 (Reef Plan) targets through annual report cards.

Recently the Paddock to Reef Report Card was released which highlighted that while progress has been made to improve water quality there is still more work that needs to be done.

Through the Australian Government funded Reef Programme, Reef Catchments has been working with both the sugar and grazing industries to accelerate the adoption of best management practices. These practices have been shown to improve water quality while maintaining or even improving profitability and productivity.

With Reef Programme funding due to finish at the end of this financial year continued investment from all is needed to be able to continue to progress towards the Reef Plan targets.

The report card differs from the Healthy Rivers to Reef report card in that Paddock to Reef is the reporting mechanism for Reef Plan which is designed to ensure that runoff from agricultural land has no detrimental impact on the health and resilience of the Great Barrier Reef. Healthy Rivers to Reef; while still reporting on water quality outcomes, looks at all land uses including urban areas and ports and also includes social satisfaction values. The Paddock to Reef program includes all catchments that drain into the GBR Lagoon while Healthy Rivers to Reef program is confined to this region plus also includes the Don River Catchment in the North.



Land and Water

Planning for climate change

Changes to the 'average climate' occur every 10-12,000 years, with cycles between warm periods and Ice Ages.

We have been in a warm period for over 11,000 years, in the geological epoch called the 'Holocene'. The global climate change issue is a result of the planet 'warming' rather than cooling which may have been expected from historical climate change patterns.

The CSIRO and Bureau of Meteorology released new climate projections for Australia earlier this year as a part of the national NRM Planning for Climate Change program funded by the Australian Government.

These new projections include regionally specific information about potential changes for the Mackay Whitsunday Isaac NRM region.

Levels of certainty varies dependent on the climate variability being examined. The certainty around future projections include:

- Substantial increases in average, maximum and minimum **temperatures** *Very high confidence*
- Substantial increases in the temperature of **hot days**, as well as in the frequency and duration of **extreme temperatures** *Very high confidence*
- **Average sea level** and height of **extreme sea level events** will continue to rise *High confidence*
- Increases in **evapotranspiration** in all seasons *High confidence*

- Increased intensity of **extreme rainfall** events *High confidence*
- Less frequent but more intense **tropical cyclones** *Medium confidence*
- Changes to **rainfall** are possible but unclear due to disagreement between model simulations *Low Confidence*

Future projections about the climate are dependent on greenhouse gas emissions into the future with the IPCC and international research community establishing Representative Concentration Pathways (RCP's).

These RCP's focus on concentrations of greenhouse gases, emissions trajectories and radiative forcing (energy absorbed and retained in the lower atmosphere). The current trajectory for greenhouse emissions is RCP8.5, which is the worst case or Business as usual scenario.

The latest report indicates that Australia could have an average temperature increase of up to 5.1°C by 2090, as the worst case scenario. Implications for the local region are discussed in the 'Wet Tropics Cluster report' that can be found on the Climate Change in Australia website www.climatechangeinaustralia.gov.au/en/.

Temperature increases by the end of the century may be of little consequence to some; however the implications of other changes within the climate system are having and will continue to have effects on the natural environment and society into the future.

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This newsletter is produced by Reef Catchments – the Natural Resource Management organisation for the Mackay Whitsunday Isaac (MWI) region. For more information on any of the articles in this newsletter, or to submit a story idea for the next issue, please contact Reef Catchments on (07) 4968 4200.

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