



Engaging for Change

Using the principles of behavioural science to achieve behavioural change through engagement and place based initiatives

Dr Tracy Schultz

Meg Bickle

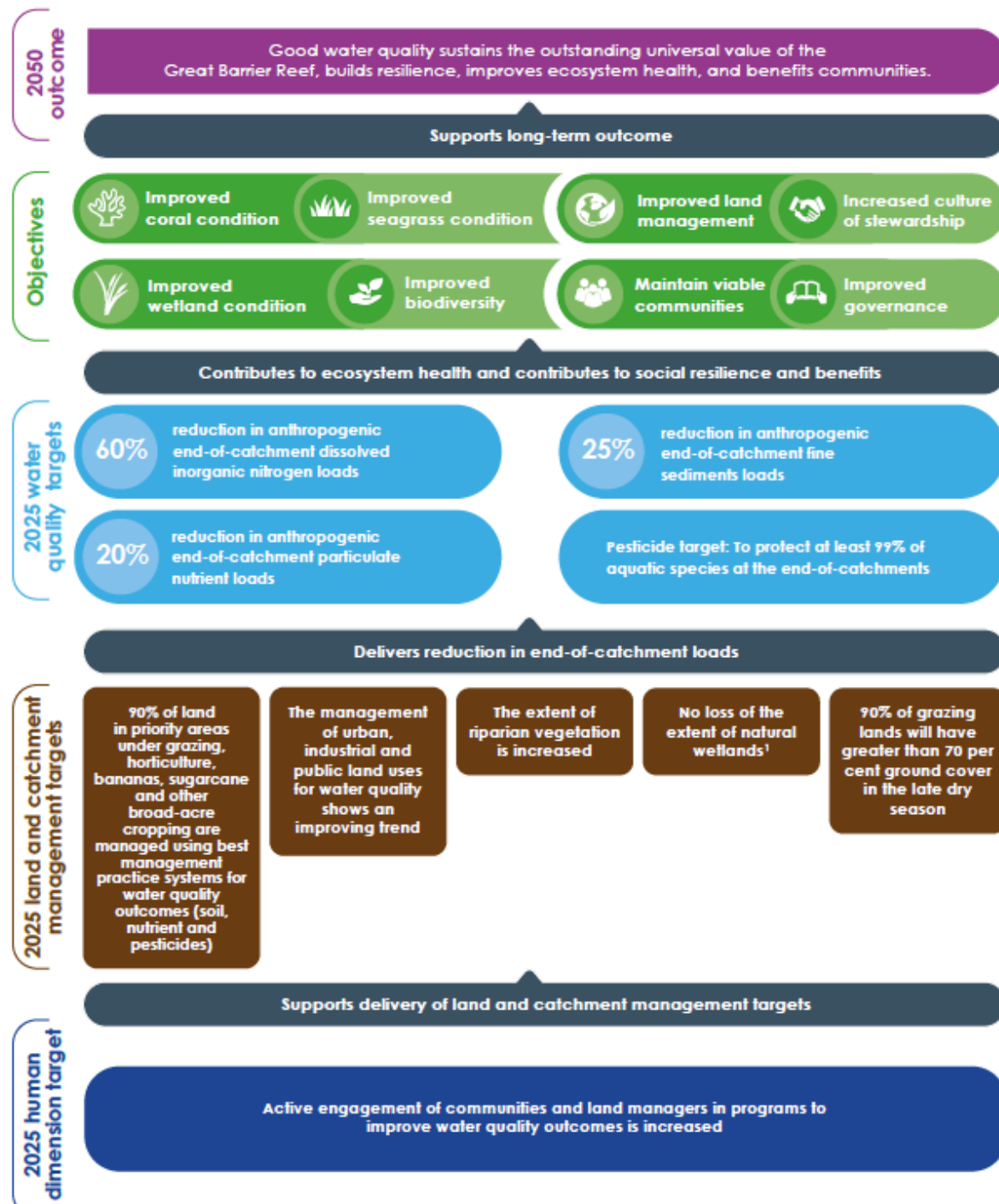
Office of the Great Barrier Reef

Office of the Great Barrier Reef

- We coordinate and implement the Queensland Government's actions and commitments across the various national and state plans and programs aimed at protecting the GBR, with a focus on improving water quality entering GBR waters.

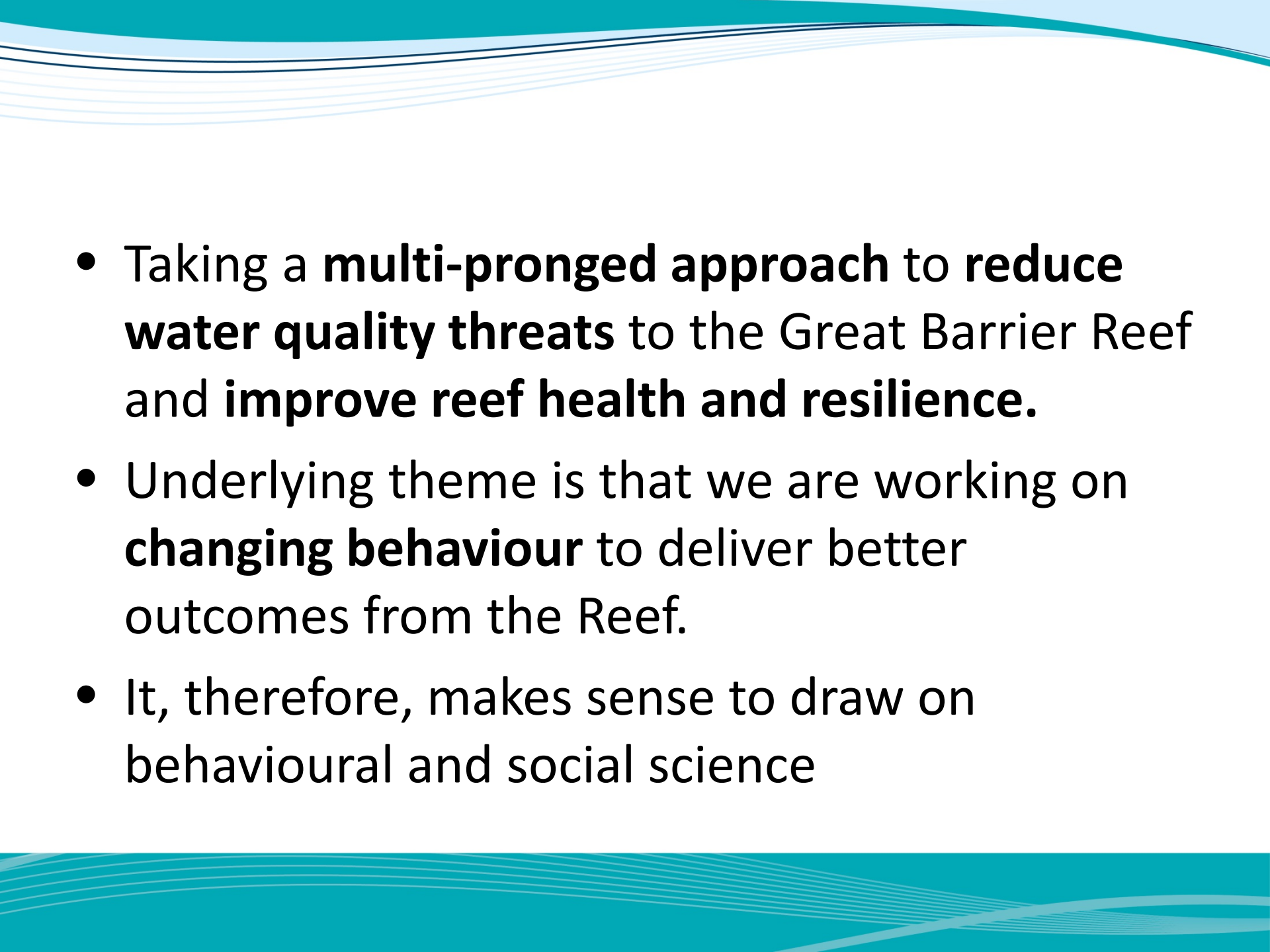
Reef 2050 WQIP

summary of outcomes, objectives and targets



Office of the Great Barrier Reef

- Manage over 100 projects, in 6 Reef catchments, across 5 key industries groups
- Work with NRM Groups, Industry Groups (e.g., Canegrowers and ABGC), Department of Agriculture, private agronomists (e.g., Farmacist).
- **Total reef water quality investment in 2016/17- 2019/20 around \$57 million per year.**

- 
- Taking a **multi-pronged approach** to **reduce water quality threats** to the Great Barrier Reef and **improve reef health and resilience**.
 - Underlying theme is that we are working on **changing behaviour** to deliver better outcomes from the Reef.
 - It, therefore, makes sense to draw on behavioural and social science

What is Behavioural Science?



What is Behavioural Science?

Behavioural science aims to understand why people think and act the way they do and to use that understanding to change behaviour.

Why do we use behavioural science for the Reef?

- Strong evidence from health and environmental contexts that it works
- A person-centred approach to solving complex problems
- Adds another tool to the toolbelt

How do we apply behavioural science principles at OGBR?

1. Give direction to the rider – *Complete NMP for Cane Farming (RP161)*
2. Appeal to the elephant – *Connecting cane farms to their local wetlands (RP167)*
3. Shape the path – *Major Integrated Projects in the Burdekin and Wet Tropics*

Case Study 1: RP161

Complete Nutrient Management Planning for Cane Farming (Burdekin)

- Builds upon a successful trial project (RP20)
- Applying above 6ES rate = no benefit
- Used community based social marketing (CBSM) methodology to design the 'RP161' project to overcome barriers to changing farming practices
- Worked with a qualified agronomist and a grower "champion" (involved in RP20)

CBSM	RP161
Step 1: Selecting behaviour with greatest impact and probability	Matching nitrogen supply to crop requirements, following industry best standards (6ES)
Step 2: Uncover barriers and benefits	Conduct surveys with landholders
Step 3: Develop strategy	<ul style="list-style-type: none"> - Provide one-on-one support to develop Nutrient Management Plans with a trusted local agronomy provider - Supported by the project ‘champion’ - Fee to participate (enough to value the service)
Step 4: Pilot strategy	In 2016, ~50 Burdekin cane farms worked with Farmacist
Step 5: Evaluate	In year 1, the project saved 82 tonnes of Nitrogen in the Burdekin.
Step 6: Implement more broadly	By 2019, engaged ~210 farms in the Burdekin.

RP161
Calibrated
FARMACIST

UNI
BAR FERTILIZER



Case Study 2: RP169

Connecting Burdekin Cane Farmers To Their Local Wetlands

- Used community based social marketing (CBSM)
- Strategies to change on-farm practices that have an impact on the water quality of the wetlands through farm run-off
- Delivered by extension officers from NQ Dry Tropics & BBIFMAC (on-farm practice trials)

CANE FARMER PRACTICE CHANGE ENGAGEMENT MODEL FOR WETLAND HEALTH

PROJECT MODEL

STEP 1

Landholder selection

- Targeted landholder selection
- Secure interest
- Start project

STEP 2

Baseline information

- Research and literature review
- Social survey
- Paddock to Reef Program survey
- Commence farm monitoring

STEP 3

Identifying barriers

- Farm monitoring (feedback-engagement-reinforcement)
- Identify barriers and benefits through Community-Based Social Marketing

STEP 4

Addressing barriers

- Continue farm monitoring
- Develop and implement a communication, engagement and extension strategy
- Project evaluation and adaptation

STEP 5

Grower engagement for wetlands health

- Final surveys
- Evaluate change
- Share project learning

PROJECT EXPERIENCE



1: Targeting cane properties



2: Must be proximate to wetland



3: Must be willing to participate



4: Motivated by wetland health*

*Desirable but not necessary

BASELINE SURVEY (using KASA)



FINANCIAL

- Sugar price
- Trial cost
- Retirement

TRUST

- Project staff
- Government
- Science and modelling

EXTERNAL CIRCUMSTANCES

- Media
- Weather
- Reef protection regulations

AVAILABLE TIME

- Off-farm employment
- Farming schedules
- Competing priorities

KNOWLEDGE AND UNDERSTANDING

- Connection between farm, wetland and Great Barrier Reef
- Farm water and nutrient loss
- Wetland health

SOCIAL/CULTURAL NORMS

- Family support
- Community support
- Perception others 'not doing their bit'



Extension support 1:1 visits

On-farm water monitoring and data

Targeted communication products

Wetland water quality evaluation and data

Positive reinforcement

Connectivity events: AIMS field trip

Wetland events: electrofishing demos

Peer-to-peer learning and farm demos

EFFECTIVENESS



PROJECT OUTCOME:

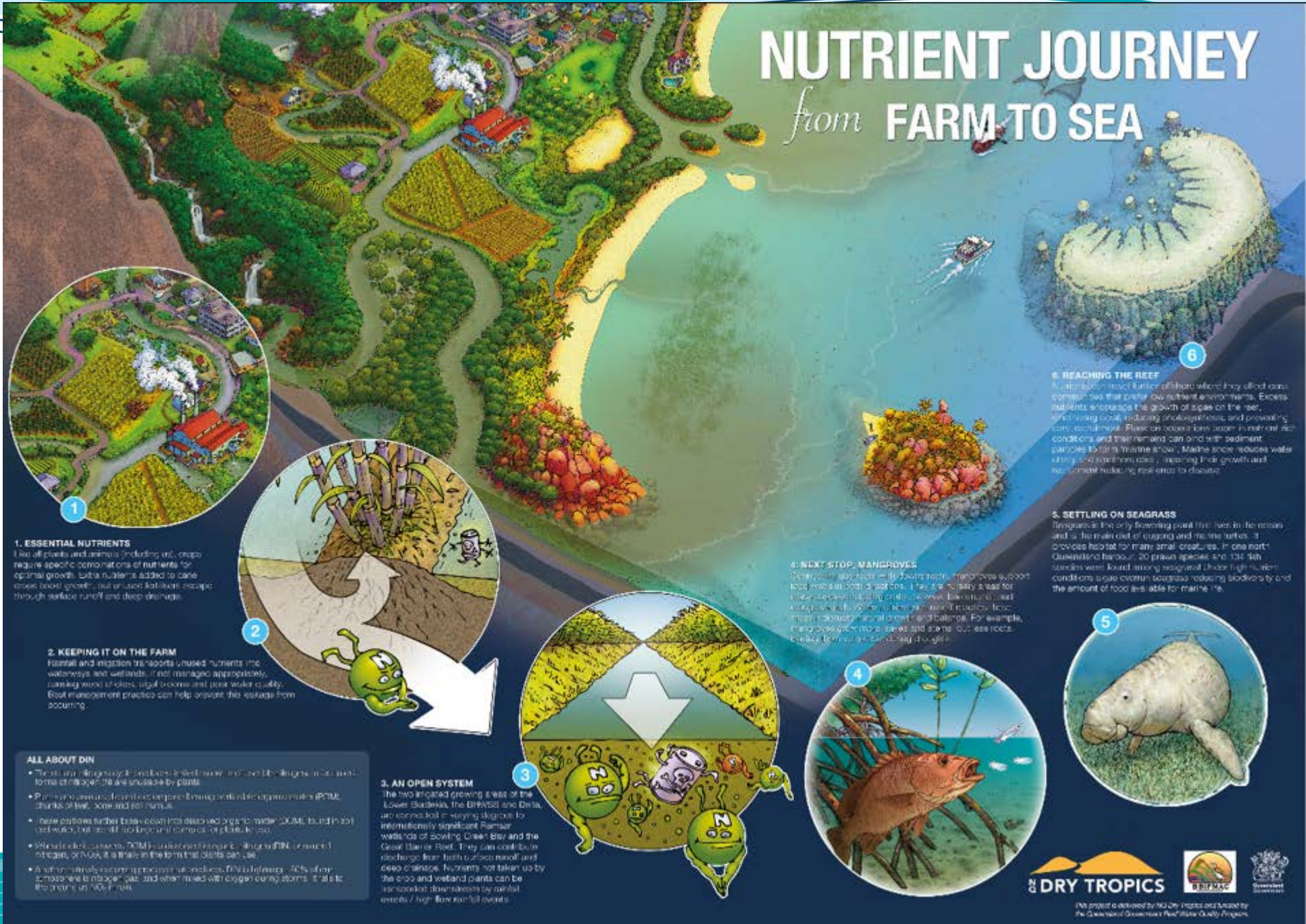
increased stewardship of wetlands

This model was created from the NQ Dry Tropics Connecting Burdekin Cane Farmers To Their Local Wetlands project which engaged with 14 farmers at two wetland sites over two years



NUTRIENT JOURNEY

from FARM TO SEA



1

1. ESSENTIAL NUTRIENTS

Like all plants and animals (including us), crops require specific combinations of nutrients for optimal growth. Extra nutrients added to cause crops to grow faster, but without full access through surface runoff and deep drainage.

2

2. KEEPING IT ON THE FARM

Rainfall and irrigation transports unused nutrients into waterways and wetlands. If not managed appropriately, causing weed infestations, algal blooms and poor water quality. Best management practices can help prevent this leakage from occurring.

ALL ABOUT DIN

- There are three major nutrients: Nitrogen, Phosphorus and Silicon. These form the backbone of life for plants.
- Phosphorus and Silicon are important for plant growth and are essential for the production of DNA, RNA and proteins.
- Nitrogen is the most abundant element in the atmosphere and is essential for plant growth. It is also the most abundant element in the soil.
- Phosphorus is essential for plant growth and is also the most abundant element in the soil.
- Silicon is essential for plant growth and is also the most abundant element in the soil.

3. AN OPEN SYSTEM

The two largest growing areas of the Lower Burdekin, the BRWSD and Delta, are considered a 'leaky' system. It is an important Ramsar wetland of Bowling Green Bay and the Great Barrier Reef. They can contribute to the Great Barrier Reef. They can contribute to the Great Barrier Reef. They can contribute to the Great Barrier Reef.

4. NEXT STOP, MANGROVES

Many of the nutrients that are not absorbed by the mangroves support food webs in coastal ecosystems. They are a nursery area for many species of fish and shellfish. Mangroves also provide habitat for many species of birds and mammals. Mangroves also provide habitat for many species of birds and mammals.

4

6

6. REACHING THE REEF

As nutrients reach further offshore, they affect coral reefs that prefer low nutrient environments. Excess nutrients encourage the growth of algae on the reef, and reduce coral, including staghorn corals, and preventing coral recruitment. Excess nutrients also cause coral bleaching and their remains can bind with sediment particles to form 'marine snow'. Marine snow reduces water clarity and smothers coral, impacting their growth and recruitment making reef areas less diverse.

5. SETTLING ON SEAGRASS

Seagrass is the only flowering plant that lives in the ocean and is a habitat for many small creatures. It provides habitat for many small creatures. In one north Queensland harbour, 20 prawn species and 130 fish species were found among seagrass. Under high nutrient conditions, seagrass coverages reduce biodiversity and the amount of food available for marine life.

5



CONNECTING BURDEKIN CANE FARMERS TO THEIR LOCAL WETLANDS PROJECT

14 Participants | **8** From Lilliesmere Lagoon | **6** From Horseshoe Lagoon



EIGHT indicated that they will continue with the practice change.

Out of those **EIGHT** respondents:

- 50% indicated that they would not have made the change without being a part of the project.
- 75% have or will recommend the change to other landholders.
- 100% scored above the mid-point in response to the question:

"Please rate your level of knowledge now (after participating in the trial) about the effects of nutrients and irrigation runoff on the wetlands?"

"The project increased my interest in trying new things. Data is the key, and every little bit counts."

PAT CREMIN, Lilliesmere Lagoon



The two highest ranked resources that cane farmers felt helped them achieve a high degree of knowledge or achieving a practice change, were:

BBIFMAC & INDUSTRY GROUPS.

This was followed by 'over the fence' learning from **FELLOW CANE FARMERS**



CANE FARM ↔ WETLANDS ↔ GREAT BARRIER REEF

"The project gave me more confidence in my practices. Make use of organisations like NQ Dry Tropics and BBIFMAC, they're here to help and are excellent at what they do!"

FRANK HUGICA, Lilliesmere Lagoon

"Joining projects and doing trials, there is nothing to lose and plenty to gain."

ANDREW CROSS, Horseshoe Lagoon



On average, cane farmers feel that **WETLANDS ARE IMPORTANT TO THE HEALTH OF THE GREAT BARRIER REEF**, with 100% answering above the mid-point of the scale.

Cane farmers were more willing to agree that they play a role. At the end of the project, 100% of the cane farmers involved agreed that they play a role in the health and function of local wetlands and downstream areas.

Over the life of the project, cane farmers felt that they had increased their level of contribution to improving the health of local wetlands.

Cane farmers increased their understanding of the water quality in the lagoons over the life of the project.



"Just give it a go and trust the extension staff."

GERARD TUFFIN, Lilliesmere Lagoon

100% OF RESPONDENTS answered "YES" that they had the appropriate tools and resources required to implement practice change trials.

100% OF RESPONDENTS felt the project had increased their interest or excitement to try new things.

"Taking data and proof that what we are doing isn't having a detrimental downstream effect is a good feeling."

SERGE SARTORI, Lilliesmere Lagoon



This project was delivered by NQ Dry Tropics and BBIFMAC and was funded by the Queensland Government Reef Water Quality Division.

- 13 farmers trialled 11 different practice changes.
- Reduction in the average NO3-N mg/l level in the runoff samples in the 2019 harvest season when compared to the 2018.
- P2R Projector Tool estimated of total of 2,582kgs of Dissolved Inorganic Nitrogen, 158 tonnes of soil and 1,907 grams of pesticide saved.
- Eight will implement the changes to new parts of the farm.
- All increased knowledge, understanding and awareness of the connections between cane farming and wetlands.

“Participating in projects and trials is how you learn and improve. Be willing to have a try.”



PAUL WILLIS, Lilliesmere Lagoon

What trial did you monitor?

Legume fallow, reduced N rate resulting from dunder and mill mud.

Will you continue the practice?

Yes, we will on the whole farm as the monitoring proved the water quality outcomes.

“The project gave me more confidence in my practices. Make use of organisations like NQ Dry Tropics and BBIFMAC, they’re excellent at what they do.”



FRANK MUGICA, Lilliesmere Lagoon

What trial did you monitor?

Buried banded mill mud, also split timing fertiliser application.

Will you continue the practice?

Yes, on the whole farm, now that I know the water quality outcomes are good.

“Having data and proof that what we are doing isn’t having a detrimental downstream effect is a good feeling.”



SERGE SARTORI, Lilliesmere Lagoon

What trial did you monitor?

Split timing N application combined with new products such as granulated urea.

Will you continue the practice?

Yes, we will be using the split application method all the time now.

“Just give it a go and trust the extension staff.”



GERARD TUFFIN, Lilliesmere Lagoon

What trial did you monitor?

Conventional till vs Green Cane Trash Blanket.

Will you continue the practice?

I will consider using it on other parts of the farm, but it depends on the upcoming harvest results.

“I’d recommend to other farmers to join projects and try new stuff. Having another set of eyes helps to find gains.”



STEVE PILLA, Horseshoe Lagoon

What trial did you monitor?

Reduced N dunder rate.

Will you continue the practice?

No, unfortunately the dunder didn’t produce the results we wanted so we won’t be implementing it further. It was good to find out though.

“Joining projects and doing trials, there is nothing to lose and plenty to gain.”



ANDREW CROSS, Horseshoe Lagoon

What trial did you monitor?

Monitoring runoff on part of the farm and a gypsum trial.

Will you continue the practice?

Yes, we will most likely apply gypsum to the whole farm where required. And we installed a recycle pit to capture and reuse the runoff from that part of the farm.

“The data was very helpful and the results from the trials were better than anticipated.”



RUSSELL LAIDLAW, Lilliesmere Lagoon

What trial did you monitor?

Slow release fertiliser on first ratoon, and zero till on second ratoon.

Will you continue the practice?

Yes, we will implement these practices on the whole farm, where suitable.

“The project increased my interest to try new things. Data is the key, and every little bit counts.”



PAT CREMIN, Lilliesmere Lagoon

What trial did you monitor?

Split timing N application.

Will you continue the practice?

No, I will not implement on farm as it didn’t suit the characteristics of my farm.

“It’s good to know more about your practices, and having the data to back your practices up is important.”



JASON RES, Lilliesmere Lagoon

What trial did you monitor?

Stool split behind the harvester, minimum till, and added pulverised lime to improve soil condition.

Will you continue the practice?

Yes, I will use the method where it suits, depending on soil, seasons and crop cycle.

“If you can’t measure it, you can’t manage it.”



DAVID RUSSELL, Lilliesmere Lagoon

What trial did you monitor?

Split timing N application, legume fallow, GPS bed forming and zero till.

Will you continue the practice?

Yes, I will continue these new practices.

“You have to be willing to participate. Everyone’s got to do their bit.”



GAVIN WRIGHT, Horseshoe Lagoon

What trial did you monitor?

An agronomist-recommended N rate.

Will you continue the practice?

Yes, I will continue to work on improving my efficiency and reduce my N rates.

“I wouldn’t have known about my N losses without the project. Monitoring allows you to see your results and then you can improve them.”



GARY STOCKHAM, Horseshoe Lagoon

What trial did you monitor?

I had the runoff from my standard practices monitored to find out if there were any areas I could make efficiencies.

Will you continue the practice?

I plan on trialling a different fertiliser and am keen to get the water quality results monitored.

Case Study 3: Major Integrated Projects (MIPs)

- GBR Water Science Taskforce recommendation
- MIPs are about co-design within a place-based approach. Substantial funding available.
- By concentrating effort in priority catchments and involving landholders in the design and implementation and monitoring of this project, a steeper trajectory in water quality improvement will be achieved than would otherwise occur.

Case Study 3: Major Integrated Projects (MIPs)

- Wet Tropics MIP – ‘WTMIP’
 - Terrain NRM
 - Tully & Johnstone
 - Cane, bananas – mainly nutrients
- Burdekin MIP – ‘Landholders Driving Change’
 - NQ Dry Tropics NRM
 - Triple B – Bowen, Broken & Bogie
 - Grazing – mainly sediment
- Design phase from Dec 16 - July 17
- Implementation from mid 2017 to Dec 2020

Burdekin MIP

- 75 local events, more than 650 participants
- 50% of grazing properties signed up
- One large scale gully treated, two more in design stage
- Collaborating with other land managers
- Two linear infrastructure demonstration sites being established

Wet Tropics MIP

- Forty landholders intensively engaged and 200 farmers broadly engaged
- Nine demonstration sites
- Five catchment repair and treatment systems established
- Thirty water quality monitoring sites
- 14 'Walking the Landscape' workshops

How do we 'engage for change' ...

1. RP161 – *give direction to the rider*

Identify the behaviour, find the barriers and design a strategy to remove the barriers with clear guidelines for change

2. RP169 – *appeal to the elephant*

Identify what motivates the target audience and design communication strategies to match those motivations

3. MIPs – *shape the path*

Work with local people, on the ground, with a bottom-up focus on driving change

Thank you!



Tracy Schultz – tracy.schultz@des.qld.gov.au

Meg Bickle – megan.bickle@des.qld.gov.au