

# **Harnessing the science of social marketing and behaviour change for improved water quality in the GBR: A documentary analysis of Reef Trust Tender (Burdekin) and Reef Programme**

Rachel Hay and Lynne Eagle



(c) Lynne Eagle

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## Acronyms

<b>DSITI</b> .....	Department of Science Information Technology and Innovation
<b>DEHP</b> .....	Department of Environment Heritage and Protection
<b>GBR</b> .....	Great Barrier Reef
<b>GBRMPA</b> .....	Great Barrier Reef Marine Park Authority
<b>IM</b> .....	Integrative Model of Behaviour Change and Prediction
<b>OECD</b> .....	Organisation for Economic Cooperation & Development
<b>NESP</b> .....	National Environmental Science Programme
<b>NQ</b> .....	North Queensland
<b>NRM</b> .....	Natural Resource Management
<b>PPSTRE</b> .....	Proficiency in Problem Solving in Technology-Rich Environments
<b>RAIN</b> .....	Readability Assessment Instrument
<b>TIB</b> .....	Triandis' Theory of Interpersonal Behaviour
<b>TWQ</b> .....	Tropical Water Quality
<b>SMOG</b> .....	"Simple Measure of Gobbledegook" Readability Measurement

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## EXECUTIVE SUMMARY

The intention of the documentary analysis is to assess the way that messages to land managers about water quality in the Great Barrier Reef are presented in terms of their readability, message framing and message tone. Two programmes were selected: (1) the Reef Programme; and (2) the Reef Trust Tender (Burdekin). The programmes selected for evaluation had been marketed within both the wet and the dry tropics, and they had been designed for both graziers and cane farmers.

The readability analysis has shown all three programmes to be written at a similar level well above the recommended reading level of grade / year 9. The documents associated with the Reef Programme (Burdekin), with a SMOG score of 13, were slightly more readable than documents associated with the Reef Trust Tender (Wet Tropics) (17) or the Reef Programme (Burdekin) (18).

A readability score of 18 or above requires the reader to have achieved a university degree and a score of 17 means that they must have received a level of further education beyond high school, whereas for the readability level of 13 the reader must have completed high school. Therefore, the analysis of water quality information indicates that many of the communications are written in language too complex for a substantial percentage of the Australian population.

Each of the programmes analysed rated slightly different in terms of norms, tone and message framing used. The programmes used both positive and negative framing as well as fear and guilt appeals. Some messages appeared to be collaborative and both injunctive and descriptive norms were used to demonstrate approved methods of what land managers ought to be doing and how other land managers were behaving. In addition, many of the documents were also dictatorial or patronising.

Due to the nature of message communication, there are no standard rules to apply to norms, message tone and framing. However, understanding the principles of communication can help to deliver messages appropriate to the given audience (see future report NESP Project 3.1.3 Harnessing the science of social marketing in communication materials development and behaviour change for improved water quality in the GBR: a desktop review).

Overall, the material was written above the recommended reading level of year/grade 9. Most of the documents were written using a positive tone using injunctive and descriptive norms appropriately. However, the materials were largely dictatorial and sometimes patronising. During the analysis, it became evident that there were limitations to the materials content imposed by various Government Guidelines and the unavoidable use of three syllable words such as government and management, which affected readability heavily. Therefore, it is important that the outcomes of this analysis be used in discussions to inform stakeholders beyond the regional natural resource management groups and others who supply the current programmes to land managers. Funding has been obtained to extend this type of analysis across a wider range of material. Work will commence on this in early 2017.

## 1.0 INTRODUCTION

The National Environmental Science Programme (NESP) Tropical Water Quality (TWQ) Hub *Project 2.1.3: Harnessing the science of social marketing and behaviour change for improved water quality in the Great Barrier Reef: An action research project* is working in partnership with staff from the Australian Government's Great Barrier Reef Marine Park Authority (GBRMPA), the Department of the Environment and Energy (DoEE), regional Natural Resource Management bodies, and the Queensland Government's Department of Science Information Technology and Innovation (DSITI) and the Department of Environment and Heritage Protection (EHP) to evaluate how water quality improvement programmes are 'marketed' to land managers.

The project will use data collected from land managers and elsewhere to critically evaluate the way water quality (WQ) improvement programmes are 'marketed'. It will use insights from those evaluations to inform the reconfiguration of engagement strategies associated with programmes scheduled for rollout during 2017. Demonstrating methods for monitoring and assessing the extent to which these different programmes and changed strategies improve adoption and/or alter behaviours. Project 2.1.3 is designed with the explicit intention of linking to the current and planned Programmes being rolled out by both governments under the Reef 2050 Plan.

The purpose of this report is to critically analyse the readability of materials from selected programmes. The documentary analysis is part of the critical analysis. Material from the following programmes will be analysed for its readability using the SMOG readability index (McLaughlin, 1969), message framing (Gerend & Cullen, 2008; Rothman & Salovey, 1997; Tversky & Kahneman, 1974), use of norms and message tone (Barnes, Toma, Willock, & Hall, 2013, p. 449). A discussion on the analysis tools follows in Section 3.0.

- **Reef Trust Tender - Burdekin**  
(<http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin>)
- **The Reef Programme**  
(<http://www.nrm.gov.au/national/continuing-investment/reef-programme>)

The intention of the analysis is to assess the way that messages to landholders are presented in terms of their readability, message framing, and message tone. Of these, all have been identified in past research as impacting significantly on the way that messages are processed (if at all) and whether the messages are ultimately influential in encouraging the desired behaviours (Clark, 2014). Unfortunately, much of the work in these areas, especially message tone, relates to health issues with a focus on the need for concern and empathy (van Stolk-Cooke, Hayes, Baumel, & Muench, 2015) or political campaigning (Barton, Castillo, & Petrie, 2016) and therefore is of limited use in the agri-environmental context.

Readers should also refer to Eagle, L., Hay, R., Farr, M. (2016) *Harnessing the science of social marketing and behaviour change for improved water quality in the GBR: Background review of literature*. Report to the National Environmental Science Programme. Reef and Rainforest Research Centre Limited, Cairns (98 pp.).

## 2.0 FUNCTIONAL LITERACY

The Organisation for Economic Cooperation and Development (OECD) (Nutbeam, 2008) defines functional literacy as whether a person is able to understand and employ printed information in daily life, at home, at work and in the community. Varying definitions of literacy make cross-study comparisons difficult. However, there appears to be agreement that some 20% of the population of most developed countries have severe literacy problems and a further 20% have limited literacy (Adkins & Ozanne, 2005; Office for National Statistics, 2000).

Concerns regarding the functional literacy of the Australian population as a whole have been evident for some time. For example, the 2006 Australian Bureau of Statistics (ABS) Adult Literacy and Life Skills Survey used an internationally recognised five-level assessment of literacy, for which Level 3 is regarded as: the “*minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy*” (Australian Bureau of Statistics, 2006 (reissued 2008); Australian Council for Adult Literacy, 2009), Table 1.

**Table 1:** Adult Literacy and Life Skills Survey Five Level Assessment of Literacy

LEVEL	POINTS	DESCRIPTION
1	0-225	Indicates a person with very poor literacy skills
2	226-275	Identifies individuals who, although they can read, can deal with only material that is simple, clearly laid out and in which the tasks involved are not too complex
3	276 - 325	Denotes people with the ability to integrate several sources of information and solve more complex problems. This is the level of skill regarded by many experts as a suitable minimum for coping with the demands of everyday life and work in a modern society.
4 & 5	326 -500	Describes respondents who demonstrate the capacity to use higher order thinking and information processing skills. Since the numbers performing at the highest skill level are small (under five percent in most countries), Level four and five are combined for the purposes of data analysis.

There are particular concerns evident in terms of the high proportion of people unable to problem solve.

Table 2 summarises functional literacy of Australians aged between 15 and 74 years. The high percentage of the population who fail to meet the minimum levels is a concern given the increasing amount of print-based material provided either by conventional print media or via the Internet.

**Table 2:** Summary of Functional Literacy Levels - Australians aged 15 - 74 years

<b>DOMAINS MEASURED</b>	<b>DOMAIN DEFINITION</b>	<b>% WITH SCORES FALLING IN THE LOWEST TWO QUINTILE LEVELS</b>
<b>PROSE LITERACY</b>	The ability to understand and use information from various kinds of narrative texts, including texts from newspapers, magazines and brochures.	46
<b>DOCUMENT LITERACY</b>	The knowledge and skills required to locate and use information contained in various formats including job applications, payroll forms, transportation schedules, maps, tables and charts.	47
<b>NUMERACY</b>	The knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.	53
<b>PROBLEM SOLVING</b>	Goal-directed thinking and action in situations for which no routine solution is available.	70

A further concern is that of the inability to understand technical rather than generic material. Scientific literacy is defined as having “*a basic vocabulary of scientific terms and constructs and a general understanding of the nature of scientific inquiry*”; on this basis only 17% of US adults were classified as being scientifically literate (Miller, 2004, p.273).

An additional group also exists that could be classed as 'alliterate', in that they are able to read but choose not to, and rely on television rather than print media for news. This group prefers to learn through trial and error rather than by reading instructions (Wallendorf, 2001). While the specific preferences and needs of these groups should be considered, it is essential to avoid being seen as condescending in the design and delivery of appropriate interventions (Bohnet, 2008). We also caution that much of the work in this field is American in origin and centres primarily on the health sector. Clearly, more research is needed in functional literacy as it relates to agri-environmental issues.

More recent data on the Australian population’s literacy and numeracy skills reinforces the concerns raised in relation to the 2006 data and should be considered by those charged with preparing written material is presented in

Table 3. Literacy and numeracy was again assessed across five levels, for which Level 3 is regarded as the 'minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy' (Australian Bureau of Statistics, 2006 (reissued 2008)). Some 44% of the population are at Level 2 or below for literacy and 54% are at Level 2 or below for numeracy.

**Table 3: Comparison of Australian Literacy Levels - People aged 15 - 74 years 1996 - 2011 / 2012**

(Australian Bureau of Statistics, 2013)

<b>Literacy Level Descriptors:</b>						
<b>Level 1: Read relatively short digital or print texts to locate a single piece of information</b>						
<b>Level 2: Match text and information, may require paraphrasing or low-level inferences</b>						
<b>Level 3: Read dense or lengthy text, identify, interpret or evaluate one or more pieces of information, disregard irrelevant or inappropriate content</b>						
<b>Level 4: Integrate, interpret or synthesise information from complex or lengthy texts, interpret or evaluate subtle evidence-claims or persuasive discourse</b>						
<b>Level 5: Search for and integrate information across multiple dense texts, construct synthesis of similar and contrasting ideas or evaluate evidence-based argument, make high-level inferences.</b>						
<b>Literacy</b>	<b>1996</b>		<b>2006</b>		<b>2011- 2012</b>	
<b>Total persons aged 15–74 years</b>	<b>'000</b>	<b>%</b>	<b>'000</b>	<b>%</b>	<b>'000</b>	<b>%</b>
<b>Below Level 1/ Level 1</b>	2468.7	18.7	2512.6	16.6	2361.1	14.1
<b>Level 2</b>	4035.3	30.5	4419.7	29.3	5036.0	30.1
<b>Level 3</b>	5068.1	38.3	5986.8	39.6	6339.0	37.9
<b>Level 4/5</b>	1648.7	12.5	2186.3	14.5	2611.9	15.6
<b>Missing</b>					356.3	2.1
<b>Total</b>	<b>13220.8</b>	<b>100.0</b>	<b>15105.4</b>	<b>100.0</b>	<b>16704.4</b>	<b>100.0</b>
<b>Numeracy Level descriptors:</b>						
<b>Level 1: Perform simple, one-step concrete tasks</b>						
<b>Level 2: Perform task that require identifying and acting on mathematical information in common contexts</b>						
<b>Level 3: Perform task that require an understanding of mathematical information in contexts that are not always familiar and are presented in more complex ways</b>						
<b>Level 4: Perform tasks that may be complex, abstract or embedded in unfamiliar contexts: multiple steps requiring selection of appropriate problem-solving</b>						
<b>Level 5: Understand complex representations and abstract and formal mathematical and statistical ideas, sometimes embedded in complex texts</b>						
<b>Numeracy</b>	<b>2006</b>		<b>2011- 2012</b>			
<b>Total persons aged 15–74 years</b>	<b>'000</b>	<b>%</b>	<b>'000</b>	<b>%</b>		
<b>Below Level 1/ Level 1</b>	3014.5	20.0	3631.5	21.7		
<b>Level 2</b>	4706.0	31.2	5423.2	32.5		
<b>Level 3</b>	5338.4	35.3	5231.5	31.3		
<b>Level 4/5</b>	2046.5	13.5	2061.9	12.3		
<b>Missing</b>					356.3	2.1
<b>Total</b>	<b>15105.4</b>	<b>100.0</b>	<b>16704.4</b>	<b>100.0</b>		



## 2.1 Proficiency in Problem Solving in Technology-Rich Environments (PPSTRE)

There are known socio-economic differences in digital literacy (specific skills and wider competencies), also termed 'technology fluency' (Garcia, 2014) impacting on both the time spent online and the tasks carried out (Castaño-Muñoz, 2010). A recent OECD report maps proficiency in problem solving in technology-rich environments (Table 4), defined as: "using digital technology, communications tools and networks to acquire and evaluate information, communicate with others and perform practical tasks" (Organisation for Economic Cooperation and Development, 2012, p. 5).

This impacts on people's ability to access, extract and apply information from websites or use technology-based tools with confidence and proficiency.

**Table 4:** Australian Proficiency in Problem Solving in Technology-Rich Environments  
(OECD, 2012)

<b>PPSTRE Level descriptors:</b>		
Below level 1: Perform one simple technology function only		
Level 1:	Use of widely available and familiar technology applications: simple reasoning	
Level 2:	Use of both generic and more specific technology applications. Some integration and inferential reasoning may be needed	
Level 3:	Tasks require evaluating relevance and reliability of information. Integration and inferential reasoning may be needed to a large extent	
	<b>2011- 2012</b>	
	<b>Adults %</b>	<b>16 – 24 year olds %</b>
Below Level 1	9.2	6.7
Level 1	28.9	32.2
Level 2	31.8	41.7
Level 3	6.2	8.9
No computer experience	4.0	0.4
Opted out of computer-based assessment	13.7	6.9
Failed ICT core	3.5	2.1
Missing	2.7	1.0
	<b>100.0</b>	<b>100.0</b>

### 2.1.1 Cognitive Limits: Time Dimensions

An individual's ability to visualise the future is only 15 – 20 years for most people (Tonn, Hemrick, & Conrad, 2006), and 50 years seems to be the longest conceptualisation limit (O'Neill & Hulme, 2009). Scenarios projected beyond this are seen as largely hypothetical (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007), thus talking about what will happen in a hundred years or by the end of the century is unlikely to be ineffective. A major barrier to engagement with climate change information is that information may be inaccessible to those who are not experts in the field (Moser & Dilling, 2004). The problem of understanding and engaging with BMP issues is also closely related to the functional literacy capacity of individuals. Tools for evaluating readability are now discussed in more detail.

## 3.0 READABILITY ANALYSIS

### 3.1.1 SMOG readability index

To investigate the Water Quality Programme offerings, we searched the designated websites for water quality programme related material, which was then analysed for readability using the SMOG readability index. The SMOG index has been described as “*the gold standard readability measure*” (Fitzsimmons, Michael, Hulley, & Scott, 2010, p. 294).

The originator (McLaughlin, 1969) of the SMOG formula teamed up with JAVA programming expert Alain Trottier to provide an (undated) internet-based version of the calculator at <http://www.harrymclaughlin.com/SMOG.htm>. It is also available on a number of readability websites, such as Trottier’s Words Count Website (<http://wordscount.info/index.html>) and the Readability Score website (<https://readability-score.com/text/>). In previous research, we have compared the manually calculated results with those derived from the internet version and found no difference between them (Eagle & Dahl, 2016; Kemp & Eagle, 2008). This calculation measures only the likely reading level required for comprehension of the material and no other aspects such as readability and suitability, which could be assessed using other tools such as the Readability Assessment Instrument (RAIN) (Adkins, Elkins, & Singh, 2001) or the Suitability Assessment of Materials measurement (SAM) (Doak, Doak, & Root, 1985).

This index was selected because it has been repeatedly validated, and because of its proven accuracy, correlation with other readability formulae and subsequent widespread use in the academic literature, primarily in the health field (Mumford, 1997; Wallace & Lemon, 2004). More recently, it has also been used in environmental contexts such as renewable energy (Biddinika et al., 2016), drinking water reports (Roy et al., 2015) and online crisis communication (Temnikova, Vieweg, & Castillo, 2015).

Reading is a skill like any other. The average adult reading skill level will fall by 3 – 5 grades below the level expected at the completion of formal education. Thus an adult who left school after 12 years of formal education but who does not maintain their reading skills can be expected to have a reading skill level of 7 – 9 (Kemp & Eagle, 2008). It is recommended that material be written at no more than grade / year 9 level to enable the majority of the general population to understand it (Carbone & Zoellner, 2012).

The method used for the Manual calculation of SMOG levels is well documented in the literature (see, for example, Aldridge, 2004). The manual calculation is performed by taking three groups of 10 consecutive sentences at the beginning, middle, and end of a document, giving a total of 30 sentences. Following this, all words with three or more syllables within these selected sentences are counted and the square root of the total is then calculated and rounded to the nearest integer. Finally, the number 3 is added to the integer to obtain the grade level of the document. Table 5 shows how the scores convert to grade levels. Text that has 30 sentences or less are converted using the conversion rate listed (McGraw, n.d.). Manual calculation using the associated conversion number in Table 5 was completed on material that had less than 30 sentences.

**Table 5:** SMOG Conversion Tables (Kemp & Eagle, 2008; McGraw, n.d.)

30 or more sentences			Conversion for less than 30 Sentences			
Word Count	Approximate Grade Level +/- 1.5 grades		Number of Sentences	Conversion # multiplier	Number of Sentences	Conversion # multiplier
0-2	4	Nursery, Junior/ Primary School	29	1.03	14	2.14
3-6	5		28	1.07	13	2.3
7-12	6		27	1.1	12	2.5
13-20	7		26	1.15	11	2.7
21-30	8		25	1.2	10	3.0
31-42	9		24	1.25		
43-56	10		23	1.3		
57-72	11		Secondary School	22	1.36	
73-90	12	21		1.43		
91-110	13	20		1.5		
111-132	14	19		1.58		
133-156	15	18		1.67		
157-182	16	Further Education	17	1.76		
183-210	17		16	1.87		
211-240	18+	Higher Education College/University	15	2.0		

## 3.2 Norms, Message Framing and Message Appeals (including Fear Appeals)

### 3.2.1 Norms

Norms revolve around standards of proper or acceptable behaviour. While some research treat norms as a single concept (Barnes et al., 2013, p. 449), others distinguish between injunctive norms (portrayal of what people ought to do) and descriptive norms (what people actually do) (Cialdini, 2007). Additionally, it has been recognized for more than two decades that, when there is a perceived conflict between actual or perceived norms and attempts to change behaviours in a way that would conflict with those norms, message effectiveness will be hampered (Cialdini & Goldstein, 2004). Cialdini (2004) also cautions against depicting behaviour that is problematic and thus targeted for change as being widespread as this may result in the perception of behaviour change being seen as contrary to prevailing social norms or that changing one's own behaviour will be futile. An example of this is the American 'Crying Indian' anti-littering campaign in which an indigenous American is shown paddling down an increasingly polluted river. While the campaign received numerous awards and was hailed as powerful (Searles, 2010), subsequent research revealed that it reinforced descriptive norms, i.e. the perception that it was normal to litter rather than the injunctive norm that people should not litter (Maio et al., 2007).

It is also important to ensure that communications work with, rather than against prevailing social norms. If threats to autonomy and identity are perceived, resistance and even defiant behaviour may occur (Mols, Haslam, Jetten, & Steffens, 2015), particularly when there are some land manager groups who are unwilling or unable to accept that they are contributing directly or indirectly to water quality problems.

### **3.2.2 Origins of Message Framing Theory**

Message framing derives from prospect theory (Gerend & Cullen, 2008; Rothman & Salovey, 1997; Tversky and Kahneman, 1974). Prospect theory itself developed from extensive research into responses to people's perceptions of the prospect of positive (gain) or negative (loss) outcomes resulting from a range of specific behaviours. This research confirmed that people tend to be loss averse, being prepared to take risks to avoid losses but avoiding risk if there is potential gain from an action (Van de Velde, Verbeke, Popp, & Van Huylenbroeck, 2010). Far more research has been conducted into message framing effects in the health sector than in environmental sectors although research in the latter sector is growing, albeit largely in terms of broad pro-environmental areas (Chang & Wu, 2015) and climate change communication (Scannell & Gifford, 2013). We believe that the general message framing principles identified in prior research are likely to be applicable to the agri-environment sector.

In terms of framing, a message can either emphasise the advantages of doing a certain action (e.g., in relation to health, losing weight as a result of regular exercise) or it can emphasise the negative consequences of not taking a certain action (e.g. having a higher likelihood of cardiovascular disease as a result of not taking regular exercise). In the agri-environment sector, the gains in terms of positive outcomes of best land management practices would be emphasised versus the potential losses in terms of negative outcomes from not taking action.

Both approaches have been used successfully in various campaigns. However, research that has explored the effects of either positive or negative message framing has led to conflicting results (Homer & Yoon, 1992; Maheswaran & Meyers-Levy, 1990). It is now usually recognised that no one single framing approach is applicable across all intervention types (Block & Keller, 1995; Alexander J. Rothman & Salovey, 1997). We now review the situations in which positive versus negative framing has been explored.

#### **3.2.2.1 Positive framing**

Positively framed messages appear to be stronger for preventative behaviour and health affirming messages (i.e. no risk in undertaking the behaviour), such as stopping smoking before the onset of ill-health related to smoking. However, reviews of previously published studies suggest that this may not apply in all situations (van Assema, Martens, Ruiters, & Brug, 2001). This may potentially be explained by the findings that positively framed messages will not be effective if the recipient is unsure about behavioural norms (Blanton, Köblitz, & McCaul, 2008). For example, if reduced fertiliser application rates are not considered a behavioural norm, then a positively framed message may be confusing, as the recipient may question why if the solution to the problem is simple it is not done so all the time by others in the industry.

A further caution identified in previous research (Cox & Cox, 2001) is that positive message framing may have a boomerang effect if the message conflicts with pre-existing knowledge, attitudes and beliefs or with behavioural norms (Stuart & Blanton, 2003). For example, some anti-smoking interventions have not only been ineffective, but also apparently hardened young smokers' determination to continue to smoke (Wolburg, 2006). Similar effects have been found in relation to anti-drug interventions, such as a 1980s American campaign featuring posters of a 'wasted' heroin addict, which had no effect other than to make the posters a collectable item

(Bird & Tapp, 2008). We have been unable to identify any studies that investigated these effects in the agri-environmental context.

Additional factors that may impact on potential intervention effectiveness include whether new behaviour is being promoted or whether ceasing current behaviour is targeted (Snyder et al., 2004). Additionally, it has been argued that positive framing fosters a greater self-efficacy, which in turn is a major factor in compliance behaviour (Jayanti & Burns, 1998) and therefore long-term behaviour change. Self-efficacy has been identified as a factor that should be stressed more strongly by health professionals during their discussions with patients (Holloway & Watson, 2002) and expectations regarding self-efficacy have long been proven to be a major factor in the outcomes of health behaviour change interventions (Strecher, De Vellis, Becker, & Rosenstock, 1986). The self-efficacy issues relating to other potential behavioural influences will be explored in the project's ongoing research activity.

The level of personal involvement in a message topic also affects the type of framing that is more effective. Evidence suggests (Donovan & Jelleh, 1999) that in low involvement conditions positive messages are more effective, whereas the reverse is true for high-involvement conditions. Again, this may support why for example positive framing appears to have been effective in the past for sunscreen use, i.e. that messages framed as:

*“If you use sunscreen with SPF or higher, you increase your chances of keeping your skin healthy and your life long”*

*“Using sunscreen decreases your risk for skin cancer and prematurely aged skin”*

were more effective than:

*“If you don't use sunscreen with SPF 15 or higher you increase your chances of damaging your skin and bringing on an early death”*

*“Not using sunscreen increases your risk for skin cancer and prematurely aged skin” (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999).*

In water conservation interventions, positive framed messages such as

*“by conserving water through installing low-flow irrigation heads, you will decrease the cost of your water bills in the future”*

have been suggested as potentially more effective (Owens, Warner, Rumble, Lamm, & Cantrell, 2015) than:

*“by wasting water through installing high power irrigation heads, you will increase the cost of your water bill in the future”*

In the agri-environment context, a positively framed message might be:

*“Farmers who manage runoff are reducing pollutants into the Great Barrier Reef protecting our reef for its future”*

Conversely, a negatively framed message might be:

*“Farmers who do not manage runoff are continuing to harm the Great Barrier Reef, risking harm to corals, sea life and water quality”.*

### **3.2.2.2 Negative framing**

Negative message framing has been found to be more effective for illness-detecting behaviour (Rothman, Martino, Bedell, Detweiler & Salovey 1999). Where there is uncertainty about the outcome of the behaviour, but awareness of the danger of not getting a problem detected early, for example for screening programmes that prevent a more serious outcome, such as regular mammography for women over 40 or cholesterol checks. However, there is also evidence of significant barriers to these types of messages among adolescents and young adults (Miller, Lane, Deatruck, Young & Potts, 2007), reactance effects, where direct, potential or perceived threats to personal freedom cause resistance (see Eagle et al., 2016, p. 22 for more discussion on the reactance effect).

There appears also to be cultural (Orth, Koenig, & Firbasova, 2007), context and situation variations. Additionally, personality types may also have an influence: the potential ‘pain’ of not undertaking a recommended behaviour may be a stronger motivator for those who are focussed on safety and security, whereas the potential pleasures from adhering to recommended behaviours may be more motivating for those seeking personal growth (Cesario, Corker, & Jelinek, 2013).

Table 6 summarises the existing state of knowledge regarding the situations in which positive or negative framed messages have been found to be most effective within the health sector. We have then added the specific agri-environmental context to the bottom of the table.

**Table 6:** Summary of Positive versus Negative Framing  
(Eagle & Dahl 2015)

<b><i>Positively framed messages (i.e. stressing benefits of undertaking behaviour) more effective</i></b>	<b><i>Negatively framed messages (i.e. stressing potential disadvantages if recommended behaviour is not undertaken) more effective</i></b>
Low motivation	High motivation
High perceived efficacy	Low or uncertain perceived efficacy
No risk in behaviours	Uncertain outcomes
Certain outcomes	
Acceptable in relation to perceived behavioural norms	
Prevention focus (maintaining good health, appearance)	Detection / early diagnosis
<b><i>In the specific agri-environment sector, we suggest the following modification to the last point above regarding prevention versus detection:</i></b>	
Prevention focus (maintaining good run off prevention practices)	Consequences of poor run off practices (Disengagement focus – need to clarify the actual reasons behind the distrust, lack of engagement)

Confounding factors include the degree of risk involved in changing behaviours (Chang & Wu, 2015). Communicating uncertainty of outcomes requires consideration, as people are reluctant to change behaviours if uncertainty is high, and if potential outcomes are seen as threatening, denial may be triggered, resulting in a refusal to make any meaningful behaviour changes (Morton, Bretschneider, Coley, & Kershaw, 2011). We therefore review the potential impact of fear appeals, a specific subset of negative message framing.

### **3.2.3 Fear Appeals**

Message appeals are the connection between the emotion or the cognition and the consumer's response to the message (Sheth, 2011). Appeals can be rational or emotional and can include fear appeals. Fear appeals should be used with caution as, while early studies suggest that fear appeals have the potential to influence attitude change and subsequent behaviour, there are numerous examples of interventions based on fear appeals not achieving the objectives (Donovan, Jalleh, Fielder & Ouschan, 2009). Other research also suggests the need for caution. Most studies that claim fear appeals to be effective have been laboratory-based, often with methodological shortcomings, and have measured only short-term effects. It is suggested that real-world effects are weaker – therefore this type of strategy may be least effective with people with low self-efficacy (Hastings, Stead & Webb, 2004).

In the health sector, fear appeals have also generated a number of unintended effects, including dissonance, discomfort and distress, boomerang effects, epidemics of apprehension and desensitisation (Witte, 1994). Additionally, strong fear appeals are more likely to be regarded as unethical if the target populations do not believe they can readily undertake the recommended behaviour or that the behaviour will be effective in minimising the perceived

threat (Snipes, LaTour & Bliss, 1999) such as ultimately improving the water quality of the Great Barrier Reef.

The Extended Parallel Process Model, shown in Figure 1, may offer an explanation for the fact that some fear appeals are effective and others not. If a threat is seen as trivial or not relevant to the individual, the risk message will be ignored. Even when susceptibility is recognised, if an individual doubts their ability to minimise the threat (self-efficacy), or is uncertain regarding the outcome of their actions (risk assessment) they will control concerns and fears by denial and rejection of the message. Factors recognised as impacting on the ability of individuals to take effective steps to minimise the risk include both social (e.g. peer pressure and social norms) and physical pressure (e.g. work environment). Again, we stress that this model has not been explicitly tested in the agri-environment context.

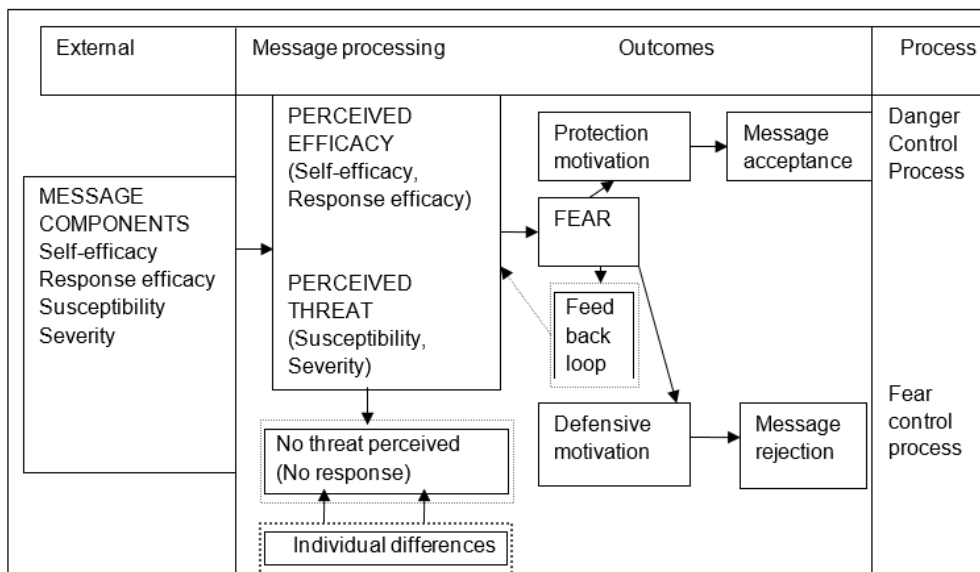


Figure 1: Extended Parallel Process Model

(Witte, 1994)

Fear appeals appear to be effective and appropriate only in situations where the solution to a fairly critical problem is relatively easy and effective solutions are available (Buller, Borland, & Burgon, 1998). An additional factor appears to be a lessening of the effectiveness of fear appeals over time. The ongoing usage of fear appeals can in fact lead to complacency as people start to no longer respond with fear, but rather with indifference to the messages, if not 'switching off' entirely (Brennan & Binney, 2010).

The discussion of message framing effects highlights the importance of ensuring that the most effective framing strategies are used, acknowledging that different frames and messages may be warranted for different segments. Further, the rationale for, and expected outcomes of behaviour change must be made explicit: a general attitude about an issue has been proven in numerous studies to *not* lead to specific behaviours (Ham, 2009). This underpins our endeavours to focus on the identification of factors influencing specific land management practices.



In addition, threats of stronger government legislation and regulation may be interpreted as a form of fear-based messaging; the use of law generally is thought of as “*coercive and punishing*” (Rothschild, 1999, p. 25). Evidence regarding actions taken to avoid compulsion is somewhat mixed. For example, in the UK, the agricultural sector is noted as having tried to avoid statutory controls on pesticide use through collective voluntary action but the environmental outcomes achieved are noted as having been mixed (Blackstock, Ingram, Burton, Brown, & Slee, 2010). Further, it is suggested that fear of penalties for non-compliance is not as effective in changing beliefs and convictions that behaviour change is necessary and desirable (Mols et al., 2015).

It is important to develop ways of communicating the need for ‘buy in’ to finding appropriate and potentially effective solutions to diffuse pollution challenges and the behaviour change that will be necessary and effective. It is also important to frame the overarching problem in a way that will not alienate target groups and that will provide evidence of the need for action on the part of landholders and focuses on salient beliefs (Greiner, 2016; Hurlbert, 2014; Maio et al., 2007). Drawing on a body of earlier research, the following recommendations are relevant here:

*“The content and quality of the message can be manipulated to make it more persuasive. For example, messages are more persuasive if they contain very specific recommendations for action rather than general recommendations and if they present questions within arguments, which encourage individuals to systematically analyse the information. Messages presenting both sides of an argument should ensure that opposing arguments are adequately refuted to be persuasive” (Blackstock et al., 2010, p. 5632).*

As part of this persuasion focus, message tone and the use of visual imagery are important in achieving effective motivational rather than prescriptive communication. These are discussed in the following sections.

### **3.3 Message Tone**

While readability and message framing have been identified in past research as impacting significantly on the way that messages are processed (if at all) and whether the messages are ultimately influential in encouraging the behaviours desired, message tone effects have received less attention (Clark, 2014). Unfortunately, much of the work in relation to these areas, especially message tone, relates to health issues with a focus on the need for concern and empathy (van Stolk-Cooke et al., 2015) or political campaigning (Barton et al., 2016) and therefore is of limited use in the agricultural-environmental context.

It is also important to ensure that communications work with rather than against prevailing social norms. If threats to autonomy and identity are perceived, resistance and even defiant behaviour may occur (Mols et al., 2015), particularly when, as we have noted earlier, there are some land manager groups who are unwilling or unable to accept that they are contributing directly or indirectly to water quality problems.

## 3.4 Design Principles

### 3.4.1 Design

Design of communication, whether it is documents, posters or websites is important to conversions of the advertised material. If the communication is poorly designed then it will have less chance of being understood, less attention will be paid to its content resulting in less uptake of its product. Good design relies on six principles: balance, proximity, alignment, repetition, contrast and space (J6 Design, 2015).

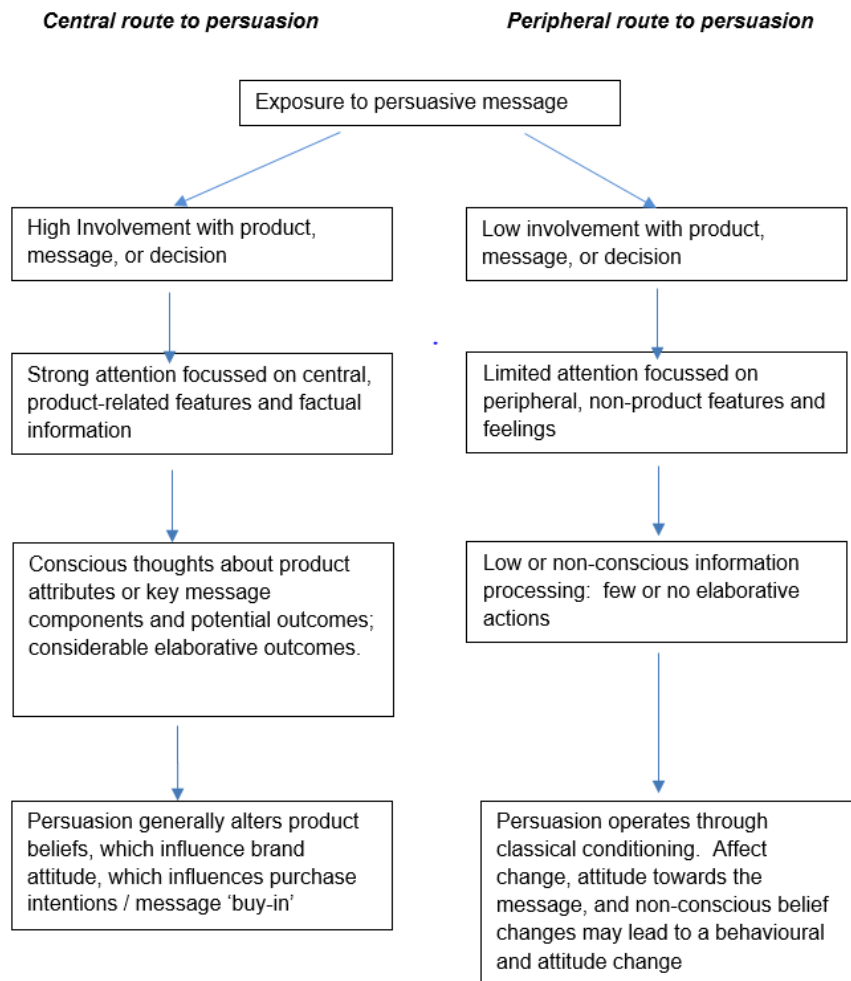
Balance provides stability and structure to the design, whereas proximity creates relationships between the included elements. This is particularly important when considering the use of visual imagery (see section 3.3.5). Aligning the material creates visual relationships between elements of the design features. Repetition amongst documents, in terms of brochures, posters and other paper based advertising and amongst websites where each page has certain elements repeated can create association and consistency (J6 Design, 2015). Contrast emphasises key elements in the design, while space refers to the area around the other elements that creates space (J6 Design, 2015)

### 3.4.2 Use of Visual Imagery

It is claimed that “knowledge, attitudes and behaviours underpinning sustainability are all mediated through communication”, with visual communication playing a key role in “synthesizing complex information” (Thomsen, 2015, p. 1). The use of visual aids should be considered for three reasons. First, they may help in gaining attention and interest in a message in order for time and effort to be allocated to the remainder of the material (Lazard & Atkinson, 2014). Secondly, the use of appropriate visuals can help those who struggle to understand text-based information (Dowse, 2004) or abstract concepts (Altinay, 2015). Finally, they can “amplify the verbal portion of a persuasive message” (Seo, Dillard & Shen, 2013, p. 565), or make specific elements within a specific communication stand out (Altinay, 2015). Further, there is evidence that they can communicate more effectively than words alone (Lazard & Atkinson, 2014).

In the context of environmental impacts (including the impact of climate change), the use of iconic images that are not personally relevant and focused on local impacts or which are based on model simulations is discouraged (Thomsen, 2015). Conversely, the use of local images in climate change communication has been shown to be effective in gaining acceptance of the need for local action, and consideration of alternative courses of action (Scannell & Gifford, 2013). A caveat is that the visuals should be pre-tested to ensure that the message intended to be conveyed is that actually received rather than having the potential for miscommunication (Dowse, 2004). Visually demonstrating the link between environmental pollution causes and impact is noted as being challenging (Hansen & Machin, 2013). However, visuals can be a powerful tool for demonstrating that positive actions are possible and achievable (Altinay, 2015).

The Elaboration Likelihood Model, originated in the 1980s (Petty & Cacioppo, 1984) in the context of commercial marketing and offers guidelines to the way visual imagery and related factors impact on engagement as shown in Figure 2: **Elaboration Likelihood Model**.



**Figure 2:** Elaboration Likelihood Model  
(adapted from Hawkins, Best, & Coney, 2001, p. 408)

It is therefore recommended that, given the importance of visual elements together with message framing and related issues discussed in the preceding sections, that a set of design principle guidelines be developed to aid those producing intervention material.

## 4.0 PROGRAMME ANALYSIS

When selecting programmes for evaluation, we sought to ensure that we covered programmes which had been marketed within both the wet and the dry tropics, and which had been designed for both graziers and cane farmers. In addition, we sought to select programmes from different time periods (early and late), and programmes that targeted a broad (Reef Programme) and narrow (Reef Tender - Burdekin) range of issues with different philosophical approaches. Table 7 summarises those key characteristics. The Dry Tropics Tender, had been preceded by a Tender in the Wet Tropics (with a closing date for submissions in February 2015), and was thus thought to have contained ‘learnings’ from its predecessor. As such, the Wet Tropics Tender was not included in the Reef Trust Tender analysis. When evaluating Reef Programme, we confined our analysis to materials used within the Burdekin and the Wet Tropics, both regions having water quality identified as being at ‘very high risk’ from nitrogen pollution, and the Burdekin also identified as being at ‘very high risk’ from sediment and pesticide pollutants (Table 8).



**Figure 3:** Burdekin Dry Tropics Region  
(Source: NQ Dry Tropics)

**Table 7:** Key Characteristics of the Reef Trust Tender (Burdekin) and the Reef Programme

	<b>Reef Programme</b>	<b>Reef Trust Tender (Burdekin)</b>
<b>Region</b>	<b>Wet &amp; Dry Tropics</b>	<b>Dry Tropics</b>
<b>Sector</b>	Cane & Grazing	Cane
<b>Period</b>	2008-2013	2015 – 2018
<b>Focus</b>	Anything that could help improve water quality	Nitrogen reduction
<b>Philosophical approach</b>	Bottom up and extremely diverse including grants, training programmes and extension activities. When applying for grants, land managers could develop their own ideas about what to do and what to ‘target’	Top down and tightly prescribed, in that all tenders needed to specifically address the issue of nitrogen

**Table 8:** Relative risk of degraded water quality to the Great Barrier Reef (Source: Brodie *et al.*, 2013 Scientific Consensus Statement, Chapter 3)

Region	Overall relative risk	Priority pollutants for management		
		Nitrogen	Pesticides	Sediment
<b>Cape York</b>	LOW			
<b>Wet Tropics</b>	VERY HIGH	VERY HIGH	HIGH	
<b>Burdekin</b>	HIGH	VERY HIGH	VERY HIGH	VERY HIGH
<b>Mackay Whitsunday</b>	MODERATE	HIGH	VERY HIGH	
<b>Fitzroy</b>	HIGH		HIGH	VERY HIGH
<b>Burnett Mary</b>	UNCERTAIN**			HIGH

## 5.0 ANALYSIS AND DISCUSSION

The following analysis and discussion will analyse readability and then norms and message framing including the type of appeal used (when relevant). Comments are also made on the overall experience of the information search including design and imagery where appropriate. Each section will end with a summary of findings, and conclusions and recommendations will follow.

### 5.1 Readability

To conduct the analysis we first address readability as if the material is written in language too complex for the intended recipients to comprehend, other factors such as message framing and tone are treated as less relevant at this point, but are addressed in Section 5.2.

#### **Process:**

A manual calculation was performed by taking three groups of 10 consecutive sentences at the beginning, middle, and end of each document, giving 30 sentences in total (adjustments were made in cases where there were less than 30 sentences, see Section 3.1.1). Following this, all words with three or more syllables within these selected sentences were counted and the square root of the total was then calculated and rounded to the nearest integer. Finally, the number 3 was added to the integer to obtain the grade level of the document. This task was performed using Trottier's Words Count Website (<http://wordscount.info/index.html>) which is based on McLaughlin's (1969) SMOG formula.

#### **Specific aim:**

The specific aim is to measure the likely reading level in terms of formal years of education by evaluating online information provided to landholders in the two associated websites in terms of basic readability required in order to comprehend the material. The two associated programmes are the Reef Trust Tender (Burdekin) and the Reef Programme (wet and dry tropics). The results of the analysis follow.

#### **5.1.1 Reef Trust Tender (Burdekin)**

The Reef Trust Tender (Burdekin) targets nitrogen discharge from the Burdekin natural resource management region. The tender offers funding to sugar cane farmers in the Burdekin NRM region to improve nitrogen and irrigation management practices on their farms. The aim of the project is to significantly lower the amount of nitrogen fertiliser applied to participating farms to meet Reef 2050 nitrogen reduction targets. For more information visit the [Reef Trust Tender \(Burdekin\)](http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin) webpage <http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin>.

Analysis of the material on the Reef Trust (Burdekin) website was completed in two parts. Firstly, material was used from the front web page at [www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin](http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin), Table 9 (a) and included the Reef Trust Gully Control Program <http://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control>, Table 10 (c). Secondly, the link for further information from NQ Dry Tropics was selected

[www.nqdrytropics.com.au/reef-trust-tender/](http://www.nqdrytropics.com.au/reef-trust-tender/), Table 9 (b) where NQ Dry Tropics materials related to the Reef Trust Tender were analysed.

The landing page of the Reef Trust Tender Burdekin website rated between grade/year 17 and 20 for its readability score, which is well above the recommended readability level of grade/year 9, see Table 9 (a). Under the further information link, some of the fact sheets were at the better readability level of grade/year 12-13. However, the remaining documents under the further information link were written at grade/year 15 and above, which is equivalent to a secondary school leaver or someone who has completed further education through to someone who has completed college or a university degree (refer Table 5).

**Table 9:** SMOG analyses for material on The Reef Trust Tender (Burdekin)

See appendices for analysed material

<b>(a) Reef Trust Tender (Burdekin)</b>	<b>SMOG Grade</b>
Reef Trust Tender – Burdekin – first page of website <a href="http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin">http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin</a> , Appendix 1	17.3
Reef Trust Tender—Burdekin Applicant Guidelines 2015–2018 Reef Trust Phase II—Competitive Tender, Appendix 2	17.6
Grant Contract - Part A Specific Project Activity Details, Appendix 3	20.5
Grant Contract - Part B – Grant Contract terms and Conditions, Appendix 4	18.0
<b>(b) Under the NQ Dry Tropics Further Information link:</b>	<b>SMOG Grade</b>
<a href="http://www.nqdrytropics.com.au/reef-trust-tender/">http://www.nqdrytropics.com.au/reef-trust-tender/</a>	
Reef Trust Tender – Burdekin Cane Industry, Appendix 5	19.1
- Tender Overview Factsheet1, Appendix 6	15.5
- Improving Nitrogen and Irrigation Management Factsheet 2, Appendix 7	19.0
- Smartcane BMP – Six Easy Steps, Factsheet 2 & 5, Appendix 7a	16.0
- Frequently asked questions Factsheet 3, Appendix 8	13.5
- Reef Plan- Paddock to Reef Overview, Appendix 8a	18.2
- Reef Plan – 2012-2013 Report Card, Appendix 8b	15.1
- Minimum Standards of Management Practice Factsheet 5 (listed online as Factsheet 4), Appendix 9	16.4
- Smartcane BMP modules, Appendix 9a <a href="http://www.nqdrytropics.com.au/reef-trust-tender/">http://www.nqdrytropics.com.au/reef-trust-tender/</a>	17.9
- Soil Health Module, Appendix 9b	17.8
- Irrigation and Drainage Module, Appendix 9c	18.5
- Weed, Pest & Disease Management Module, Appendix 9d	18.7
- Crop Production & Harvesting Module, Appendix 9e	16.2
- Farm Business Management Module, Appendix 9f	16.4
- Natural Systems Management Module, Appendix 9g	18.5
- WHS Module, Appendix 9h	23.7
- Smartcane Best Management Practice Program Factsheet 6 (shows on webpage listing as Factsheet 5), Appendix 10	12.3
- Draft Template Grant Contract – Part A – Grant Contract Specific Project Activity Details. Note: Link takes you to a Google Drive sign up page.	Duplicate of PDF Docs on Reef Trust Tender – Burdekin Website, see Appendix 1, 3 and 4
- Draft Template Grant Contract – Part B – Grant Contract Terms and Conditions. Note: Part B takes you to an electronic PDF, which cannot be printed (reduces trust).	
- Reef Trust Tender Burdekin – Tender Form, Appendix 11	14.7



### **5.1.2 Reef Trust - Gully Erosion Control Program (Burdekin)**

The aim of the Reef Trust Gully Erosion Control Program is to reduce or manage fine sediment erosion from gullies into the reef catchments. The program aims to fund landholders and others to remediate high-risk gullied areas, for more information visit the [Reef Trust Gully Erosion Control Program](#) webpage. However, one point of difference is that the program targets community groups or organisations, who would work with land managers to implement the programs, rather than directly targeting land managers.

While the Reef Trust Gully Erosion Control Program is targeted at an intermediary market, for example, community groups or organisations who then work with land managers, the level of readability is still well above the recommended level of grade/year 9, see Table 10. All of the documents, with the exception of the Gully Tool Box would require someone who was an immediate school leaver up to someone who had completed university to fully comprehend the information contained in the documents. The Gully Tool Box, which was designed with community groups in mind, has a readability level of grade/year 11. If you consider the measurement is the approximate grade +/- 1.5 grades/years, then the readability of the Gully Tool Box sits high within the range of grade/year 9.5 to 12.5. At the lower level, this is much more acceptable for readability.

**Table 10:** SMOG analysis for material on the Reef Trust Gully Erosion Control Programme (Burdekin)

See appendices for analysed material

Title	SMOG Grade
(c) Reef Trust Gully Erosion Control Programme – front web page <a href="https://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control">https://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control</a> , See Appendix 12	20.4
Reef Trust Gully Erosion Control Programme – Approved Gully Erosion Control Projects <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/reef-trust-gully-erosion-control-programme-successful-projects.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/reef-trust-gully-erosion-control-programme-successful-projects.pdf</a> , see Appendix 13	15.3
- Project 1 – 50% reduction in gully erosion from high priority sub catchments in the Normanby, project website	N/A
- Project 2 – Gully management in highly erodible sub-catchments of the Mary River Catchment	N/A
- Project 3 – Don River Catchment Sediment Reduction Project – Improving GBR water quality	N/A
- Project 4 – Point Source Sediment Management in the Burdekin Dry Tropics NRM Region	N/A
- Project 5 – Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management Application for funding	N/A
Gully Tool Box – A technical guide for the Reef Trust Gully Erosion Control Programme 2015-2016, <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/grant-gully-toolbox.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/grant-gully-toolbox.pdf</a> , see Appendix 14 <b>Note: This document is designed for funded groups... funded groups include community groups and organisations who would then work with land managers to implement programs</b>	11.4
Mapping Tool Instructions – for an explanation on how to draw polygon areas for a project, <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/smartform-application-mapper-guide.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/smartform-application-mapper-guide.pdf</a> , Appendix 15	22.4
Sample Funding Agreement – Part A DRAFT <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-parta.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-parta.pdf</a> , Appendix 16a	22.4
Programme Specific Terms and Conditions – Part B DRAFT <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partb.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partb.pdf</a> , Appendix 16b	20.9
Programme Specific Terms and Conditions – Part C DRAFT <a href="https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partc.pdf">https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partc.pdf</a> , Appendix 16c	16.3

### 5.1.3 The Reef Programme

The Australian Government's Reef Programme addresses the threats of declining water quality and climate change to the GBR World Heritage Area. The program has delivered funds to more than 3,200 land managers to be used for on farm water quality projects. The program has six components, which include WQ Grants and Partnerships; Systems Repair and Urban Grants; WQ Monitoring and Reporting Research and Development; Crown of Thorns Starfish; Land and Sea Country Partnerships; and the GBR Marine Park Authority. For more information, visit <http://www.nrm.gov.au/national/continuing-investment/reef-programme>.

The Reef Programme document analysis was completed in three parts. Firstly, the front page of the Australian Government Reef Programme web page was analysed (Table 11). Secondly,

material from the dry tropics was analysed using information from the NQ Dry Tropics Reef Programme at <http://www.nqdrytropics.com.au/projects/sustainable-agriculture/>, (Table 12), and thirdly, material from the Wet Tropics using information from Terrain <http://www.terrain.org.au/Projects/Wet-Tropics-Agriculture/Reef-Programme/> (Table 13).

The SMOG analysis for Reef Programme material on the Australian Government website reveals that the material is written for a person with an education level of grade/year 17 i.e., for someone who has completed further education.

**Table 11:** SMOG analysis for material on the Australian Government Reef Programme

See appendices for analysed material

<b>Title</b>	<b>SMOG Grade</b>
(a) The Australian Government Reef Programme webpage <a href="http://www.nrm.gov.au/national/continuing-investment/reef-programme">http://www.nrm.gov.au/national/continuing-investment/reef-programme</a> , see appendix 17	17.4

### 5.1.3.1 The Reef Programme (Dry Tropics)

Table 12 displays material from the NQ Dry Tropics link on the Australian Government webpage for the Reef Trust Tender (Burdekin), with an average SMOG grade of 12.8, it is slightly better than the government page, but was still above the recommended writing age of year/grade 9.

**Table 12:** SMOG analysis for material on the Australian Government Reef Programme – Burdekin Region

See appendices for analysed material

Title	SMOG Grade
(b) NQ Dry Tropics – Projects - Sustainable Agriculture, see Appendix 18 <a href="http://www.nqdrytropics.com.au/projects/sustainable-agriculture/">http://www.nqdrytropics.com.au/projects/sustainable-agriculture/</a> <i>Note: the case studies below give examples of successful implementation of water quality programs</i>	19.4
- Case Study – Brad Rosten, see Appendix 19	16.0
- Case Study – Terry Creek, see Appendix 20	16.0
- Case Study – Joseph Magatelli, see Appendix 21	17.2
NQ Dry Tropics – Projects & Programmes – Sustainable Agriculture – Reef Programme webpage, see Appendix 22 <a href="http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/">http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/</a>	15.5
Reef Programme – Sugar Cane Activities, See Appendix 23 <a href="http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/">http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/</a>	19.4
- Sugarcane innovation program: Automated irrigation field day, see Appendix 23a	13.5
- Sugarcane water quality grants, see Appendix 23b	15.7
Reef Programme – Grazing Activities <a href="http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/">http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/</a>	12.0
- Erosion control field walk, see Appendix 24a	14.7
- Erosion control grader workshop, see Appendix 24b	
NQ Dry Tropics – Projects & Programmes – Sustainable Agriculture – Grazing BMP webpage, see Appendix 25 <a href="http://www.nqdrytropics.com.au/projects/sustainable-agriculture/grazing-bmp-project/">http://www.nqdrytropics.com.au/projects/sustainable-agriculture/grazing-bmp-project/</a>	16.6
Grazing BMP webpage, see Appendix 26 <a href="https://www.bmpgrazing.com.au/audit/public/default.aspx">https://www.bmpgrazing.com.au/audit/public/default.aspx</a>	18.6
- Grazing BMP Accreditation Information – Certification and Audit Assurance Strategy, see Appendix 26a	13.8
- Grazing BMP Self-Assessment – Grazing Land Management, see Appendix 26b	17.9
- Grazing BMP Self-Assessment – Soil Health, see Appendix 26c	16.2

### 5.1.3.2 The Reef Programme (Wet Tropics)

Table 13 displays material from the Terrain link on the Australian Government webpage for the Reef Programme (Wet Tropics), with an average SMOG grade of 13.2, it is slightly better than the Government page, but was still above the recommended writing age of year/grade 9.

**Table 13:** SMOG analysis for material on the Australian Government Reef Programme – Wet Tropics Region

See appendices for analysed material

Title	SMOG Grade
(c) Reef Programme – Wet Tropics – Reef Programme Page <a href="http://www.terrain.org.au/Projects/Wet-Tropics-Agriculture/Reef-Programme">http://www.terrain.org.au/Projects/Wet-Tropics-Agriculture/Reef-Programme</a> , Appendix 27	17.6
Click MORE on the above page: Example text taken from Terrain Website – Paddock to reef program - Reef Water Quality Protection Plan, landing page <a href="http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/">http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/</a> , Appendix 28	16.8
Example text taken from the more info – Paddock to Reef Overview <a href="http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/assets/paddock-to-reef-overview.pdf">http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/assets/paddock-to-reef-overview.pdf</a> , see Appendix 29	17.3
Example text taken from the link - Sugarcane – Case Studies <ul style="list-style-type: none"> <li>- Comparing runoff loss of knockdown and residual herbicides in the Herbert catchment, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/comparing-runoff-loss/">http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/comparing-runoff-loss/</a>, Appendix 30</li> <li>- Sub-surface fertiliser application reduces nutrient runoff in the Herbert catchment, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/sub-surface-fertiliser/">http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/sub-surface-fertiliser/</a>, Appendix 31</li> <li>- Modelling pesticide runoff from improved land management scenarios, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-modelling-pesticide-runoff.pdf">http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-modelling-pesticide-runoff.pdf</a>, Appendix 32</li> </ul>	15.5  16.3  18.0
Example text taken from the link - Grazing – Case Studies <ul style="list-style-type: none"> <li>- Tracking gully activity in the Burdekin range lands, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-tracking-gully-activity.pdf">http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-tracking-gully-activity.pdf</a>, Appendix 33</li> <li>- Grazing in the Burdekin region – achieving better returns and saving soils, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-burdekin.pdf">http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-burdekin.pdf</a>, Appendix 34</li> </ul>	15.5  15.6

## **Summary of search experience**

Overall, the usability of the NQ Dry Tropics website (<http://www.nqdrytropics.com.au>) and the Terrain website (<http://www.terrain.org.au/>) to access information about water quality programmes was above average. Both websites use many of the six graphic design principles required to enhance readability. The use of background colour to change the contrast of the text uses correct colour combinations to maximise readability for those with eyesight challenges such as colour blindness. Appropriate use of 1.5 spaced lines in most cases, appropriate imagery, balance and colour to break up white space. The alignments of design between different documents make the branding more recognisable and in turn more trusted.

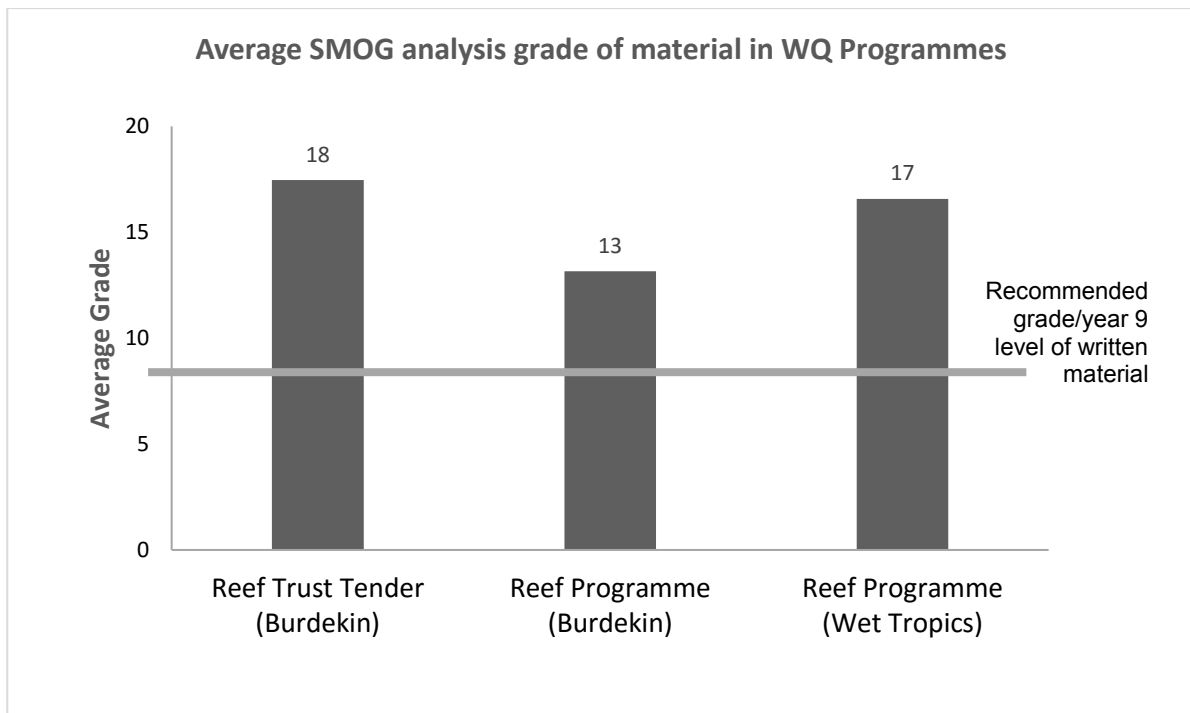
Both websites includes case study examples of water quality improvement - success stories, which follow the readability design rules. At this point, it became a little confusing as the Terrain site used examples from the NQ Dry Tropics, which has a vastly different environment requiring different management than the wet tropics.

All of the analysed case studies scored between 12 and 17 on the SMOG scale, which is still well above the recommended readability level. This may be due to the unavoidable use of three syllable words such as management, government, nitrogen, and Burdekin, which also have a high-density rate of usage. Access to sugar cane and grazing activities was restricted because funding was fully committed. Therefore, analysis of related documents was not completed. There was a link to the Grazing BMP site, which gave access to some user content. The content consisted of certification and audit assurance strategy information and self-assessment. The SMOG score for the associated documents was between 13 and 19, which are grade/year levels from late stage secondary school to beyond university education. The visual imagery was within the context of most topics. The imagery did to a degree support the topic of the document, which could assist reader's with low literacy levels.

### **5.1.4 Summary of Readability Analysis**

The intention of the analysis was to assess the way that messages to land holders about water quality in the Great Barrier Reef are presented in terms of their readability, design, message framing, and message tone. Two programmes were selected (1) the Reef Programme and (2) the Reef Trust Tender (Burdekin).

The initial SMOG analysis has shown all three programmes to be written at a similar level, with the Reef Programme (Burdekin) being slightly more readable than the Reef Trust Tender (Burdekin) or the Reef Programme (Wet Tropics). However, all three programmes have a readability level well above the recommended reading level of grade/year 9 (see Figure 4).



**Figure 4:** Average SMOG Scores for Water Quality Programmes Analysed

The readability score of 18 requires the reader to have achieved a university degree and for score of 17 they must have received a level of further education beyond high school, for the readability level of 13 the reader must have completed high school. All of the reviewed produced readability score over the recommended reading level of grade/year 9. When examining this in the light of wider Australian literacy data, the ABS note that just over 80% of Australians aged between 15-74 have a literacy level of less than Level 3 (the reading level required to meet complex demands of everyday life and work), (see

Table 3, pg.5). While people at Level 3 can read, identify, interpret or analyse dense, lengthy text (37.9%), at Level 2 people can only perform simpler tasks such as matching text and information (30.1%), the remaining 14.1% are at or below Level 1, where they can read relatively short and simple text material to locate single pieces of information (i.e. they cannot analyse or synthesise information). The analysis of water quality information indicates that many communications may be written in language too complex for a substantial percentage of the Australian population. It should be noted that the nature of the text used in the agri-industry uses large amounts of three syllable words for example: management and government, which has an effect on the overall readability score. To test for bias, three syllable words imposed by managing guidelines were removed from the document to compare the scores. In all cases the document score reduced only by one to two grades.



## 5.2 Norms, Message Framing and Message Appeals (including Fear Appeals)

The next step was to investigate the message framing, use of norms and message tone. The tone of a message affects the way messages are processed and how influential they are or are not and norms revolve around standards of proper behaviour. Norms use examples of what people do (descriptive norms) and the portrayal of what people ought to do (injunctive norms) to influence behaviour, whereas the tone can be dictatorial, collaborative, patronising or adversarial. Messages can work with or against prevailing norms and they can be subject to resistance or defiance. Whether a message is framed positively or negatively and what appeal is used will also have an effect on how the message is received. Message appeals are the connection between the emotion or the cognition and the consumer's response to the message (Sheth, 2011). Appeals are either rational or emotional and can include fear appeals.

Each of the documents were rated independently by two researchers who coded the general character of the message, for example if it was positive the code Po was used, likewise if it was descriptive the code D was used. Each analysis was cross checked to increase inter-rater reliability and gain consensus to ensure the analysis was rigorous (Lombard, Snyder-Duch, & Bracken, 2002). The results of the analysis follow the tables for each programme.

The accepted benchmark measures for inter-coder reliability of .90 being acceptable in all situations and .80 being acceptable in most situations have been used (Lombard et al., 2002). Each of the documents analysed in the readability section was examined and the following coding schedule was used to code the message:

**Key:**

**Framing:** Po Positive, N Negative / R Rational E Emotional G Guilt F fear

**Norms:** D Descriptive, I Injunctive

**Tone:** DT Dictatorial, C Collaborative, Pa Patronising, A Adversarial

**Format:** S Scientific / technical evidence

T Testimonial / endorsement from landholders

The analysis begins at Table 14.

### 5.2.1 Reef Trust Tender (Burdekin)

**Table 14:** The Reef Trust Tender (Burdekin) - Message Framing, Use of Norms and Message Tone

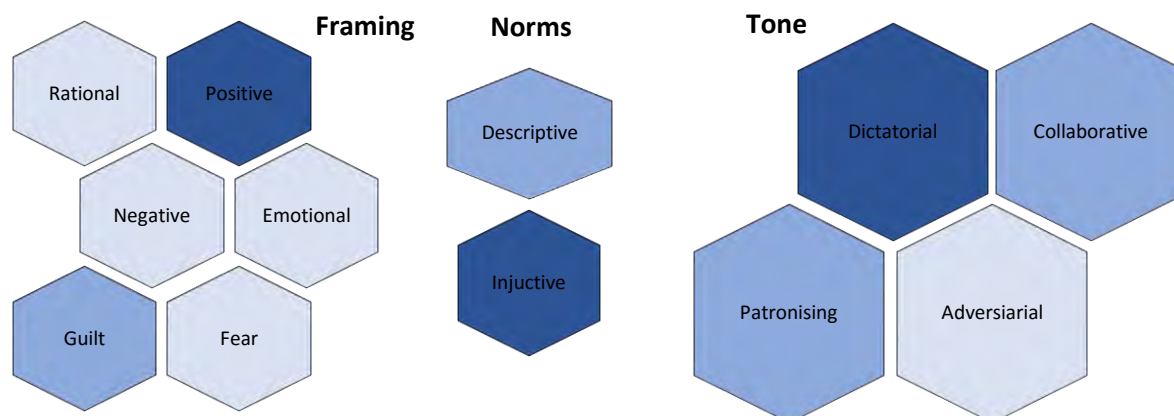
<b>Reef Trust Tender (Burdekin)</b>	<b>Framing</b>	<b>Norms</b>	<b>Tone</b>
Reef Trust Tender – Burdekin – first page of website, Appendix 1			DT
Reef Trust Tender—Burdekin Applicant Guidelines 2015–2018 Reef Trust Phase II—Competitive Tender, Appendix 2	Po		DT
Grant Contract - Part A Specific Project Activity Details, Appendix 3	Insufficient wording to analyse		
<b>Reef Trust Tender (Burdekin)</b>	<b>Framing</b>	<b>Norms</b>	<b>Tone</b>
Grant Contract - Part B – Grant Contract terms and Conditions, Appendix 4			DT
Reef Trust Tender – Burdekin Cane Industry, Appendix 5		D	C
Tender Overview Factsheet 1, Appendix 6	Po		
Improving Nitrogen and Irrigation Management Factsheet 2, Appendix 7			C
Smartcane BMP – Six Easy Steps, Factsheet 2 & 5, Appendix 7a	FG	I	DT
Frequently asked questions Factsheet 3, Appendix 8			DT
Reef Plan- Paddock to Reef Overview, Appendix 8a	NEG	I	DT
Reef Plan – 2012-2013 Report Card, Appendix 8b	R	I	CPa
Minimum Standards of Management Practice Factsheet 5 (listed online as Factsheet 4), Appendix 9			Pa DT
Smartcane BMP modules, Appendix 9a <a href="http://www.ngdrytropics.com.au/reef-trust-tender/">http://www.ngdrytropics.com.au/reef-trust-tender/</a>	Po	D	
Soil Health Module, Appendix 9b		I	DT
Irrigation and Drainage Module, Appendix 9c		I	DT
Weed, Pest & Disease Management Module, Appendix 9d		I	DT
Crop Production & Harvesting Module, Appendix 9e		I	DT
Farm Business Management Module, Appendix 9f		I	DT
Natural Systems Management Module, Appendix 9g		I	DT
WHS Module, Appendix 9h		I	DT
Smartcane Best Management Practice Program Factsheet 6 (shows on webpage listing as Factsheet 5), Appendix 10			DT
Draft Template Grant Contract – Part A – Grant Contract Specific Project Activity Details. Note: Link takes you to a Google Drive sign up page.	Duplicate of PDF Docs on Reef Trust Tender – Burdekin Website, see Appendix 1, 3 and 4 Cannot access material		
Draft Template Grant Contract – Part B – Grant Contract Terms and Conditions. Note: Part B takes you to an electronic PDF, which cannot be printed (reduces trust).			
Reef Trust Tender Burdekin – Tender Form, Appendix 11			DT

### 5.2.2 Reef Trust Gully Erosion Control Programme

**Table 15:** Reef Trust Gully Erosion Control Programme - Message Framing, Use of Norms and Message Tone

Title	Framing	Norms	Tone
Reef Trust Gully Erosion Control Programme – front web page <a href="https://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control">https://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control</a> , Appendix 12	R	D I	DT Pa
Reef Trust Gully Erosion Control Programme – Approved Gully Erosion Control Projects, see Appendix 14	Po	D	A
Gully Tool Box – A technical guide for the Reef Trust Gully Erosion Control Programme 2015-2016, see Appendix 15 <i>Note: This document is designed for funded groups... funded groups include community groups and organisations who would then work with land managers to implement programs</i>			DT
Mapping Tool Instructions – for an explanation on how to draw polygon areas for a project, Appendix 16			DT
Sample Funding Agreement – Part A DRAFT, Appendix 16a			DT
Sample Funding Agreement – Part B DRAFT, Appendix 16b		D	DT
Programme Specific Terms and Conditions – Part C DRAFT, Appendix 16b		D	DT

The Reef Trust Tender (Burdekin) messages were framed both using positive reinforcement and to a lesser extent guilt as a communication tool (Figure 5). The messages used injunctive norms to inform that others approved of the subject for example in the fact sheets, learning modules and the Reef Plan. However, nearly all of the messages analysed were dictatorial, with some of the messages having a collaborative nature, while others were mildly patronising. Examples include improving nitrogen and irrigation management and the Reef Plan. Figure 5 uses colour tone to illustrate the level at which each element was rated. Darker colours indicate high-level elements.



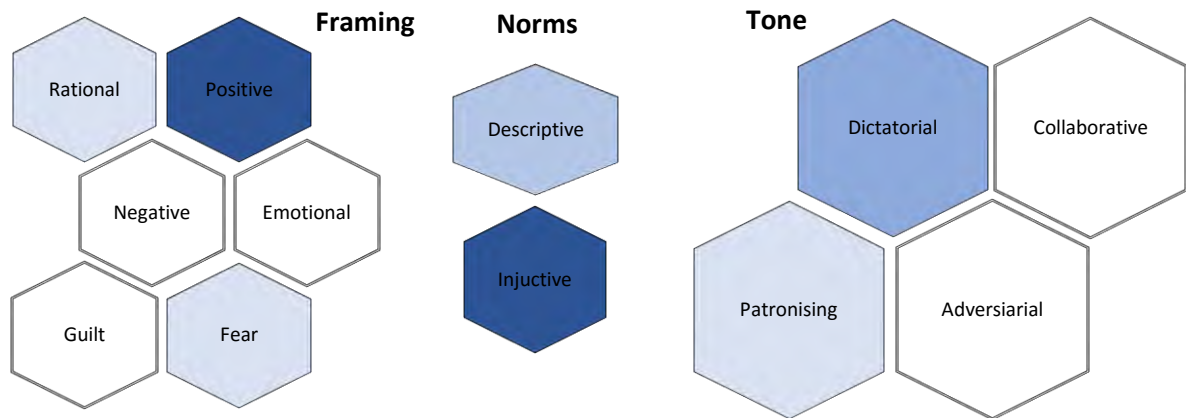
**Figure 5:** Illustration of results of message framing, norms and message tone analysis - Reef Trust Tender (Burdekin)

### 5.2.3 Reef Programme (Dry Tropics)

**Table 16:** Australian Government Reef Programme and Reef Program – Burdekin Region  
- Message Framing, Use of Norms and Message Tone

Title	Framing	Norms	Tone
(a) The Australian Government Reef Programme webpage, see appendix 17	R	I	Pa
(b) NQ Dry Tropics – Projects - Sustainable Agriculture, see Appendix 18 <i>Note: the case studies below give examples of successful implementation of water quality programs</i>	Po	I	
- Case Study – Brad Rosten, see Appendix 19	Po	D	
- Case Study – Terry Creek, see Appendix 20	Po	D	
- Case Study – Joseph Magatelli, see Appendix 21	Po	D	
NQ Dry Tropics – Projects & Programmes – Sustainable Agriculture – Reef Programme webpage, see Appendix 22	Po		DT
Reef Programme – Sugar Cane Activities, See Appendix 23			
- Sugarcane innovation program: Automated irrigation field day, see Appendix 23a	Po	I	
- Sugarcane water quality grants, see Appendix 23b			
Reef Programme – Grazing Activities, See Appendix 24			
- Erosion control field walk, see Appendix 24a	Po	I	
- Erosion control grader workshop, see Appendix 24b	Po	I	
NQ Dry Tropics – Projects & Programmes – Sustainable Agriculture – Grazing BMP webpage, see Appendix 25	Po		DT
Grazing BMP webpage, see Appendix 26	F		
- Grazing BMP Accreditation Information – Certification and Audit Assurance Strategy, see Appendix 26a	Po	I	
- Grazing BMP Self-Assessment – Grazing Land Management, see Appendix 26b			DT
- Grazing BMP Self-Assessment – Soil Health, see Appendix 26c			DT

Messages in the Reef Programme (Dry Tropics) were positively framed (Figure 6). However, some of the messages were based on rational and fear appeals for example the Gully Erosion Control Program and the Grazing BMP webpage. The documents analysed contained both injunctive norms, where land managers were told what needed to be done (Australian Government webpage, NQ Dry Tropics projects webpage, the sugarcane innovation program, sugarcane water quality grants and the grazing BMP accreditation information) and descriptive norms, which contained rich descriptions of approved methods used and the results found (case studies, grazing bmp and assessments). The messages were mildly dictatorial and sometimes patronising. Figure 6 demonstrates using colour the level of which each element was rated. Darker colours indicate high levels of elements.



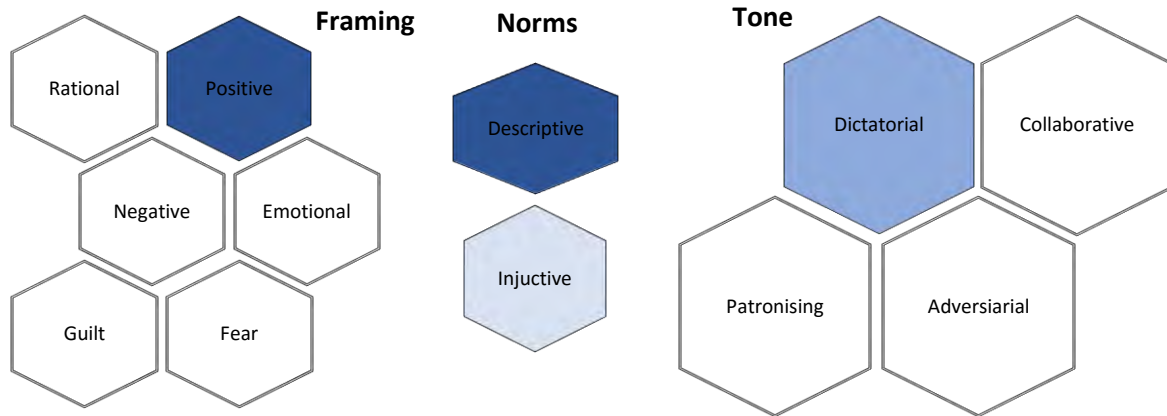
**Figure 6:** Illustration of results of message framing, norms and message tone analysis - Reef Programme (Dry Tropics)

### 5.2.4 Reef Programme – Wet Tropics

**Table 17:** Australian Government Reef Programme – Wet Tropics Region  
Message Framing, Use of Norms and Message Tone

Title	Framing	Norms	Tone
Reef Programme – Wet Tropics – Reef Programme Page, Appendix 27		I	DT
Click MORE on the above page: Example text taken from Terrain Website – Paddock to Reef program - Reef Water Quality Protection Plan, landing page, Appendix 28	Po	D	
Example text taken from the more info – Paddock to Reef Overview, see Appendix 29		I	DT
Example text taken from the link - Sugarcane – Case Studies <ul style="list-style-type: none"> <li>- Comparing runoff loss of knockdown and residual herbicides in the Herbert catchment, Appendix 30</li> <li>- Sub-surface fertiliser application reduces nutrient runoff in the Herbert catchment, Appendix 31</li> <li>- Modelling pesticide runoff from improved land management scenarios, Appendix 32</li> </ul>	Po	D  D  D	
Example text taken from the link - Grazing – Case Studies <ul style="list-style-type: none"> <li>- Tracking gully activity in the Burdekin range lands, Appendix 33</li> <li>- Grazing in the Burdekin region – achieving better returns and saving soils, <a href="http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-burdekin.pdf">http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-burdekin.pdf</a> Appendix 34</li> </ul>	Po	D	

Figure 7 illustrates that most of the messages in the Reef Programme (Wet Tropics) were positively framed and descriptive, sharing messages of what had been done and the results of the trials (Paddock to Reef WQ Protection plan landing page and the case studies). There was a limited number of messages using injunctive norms. Some of the messages were dictatorial, where the land manager is being told what to do (Reef Programme WT landing page, Paddock to Reef overview).



**Figure 7:** Illustration of results of message framing, norms and message tone analysis - Reef Programme (Wet Tropics)

Unlike the readability index, there is no recommended level for norms, message framing and message appeal as each message is written given the subject that is the object of the message and its appeal at the time of writing, given the objective of the message.

## **6.0 RECOMMENDATIONS AND CONCLUSION**

The documentary analysis has critically evaluated the readability of documents relating to water quality programmes delivered in the wet and dry tropical regions of Queensland in recent years. The analysis considered the design of current water quality improvement programmes with a view to improve communications to better match the motivations and values of land managers in future communications.

The preceding discussion has highlighted the complexities of functional literacy, readability and message framing and it revealed that current marketing materials are written in a reading level that is well above the recommended reading level of grade/year 9.

The analysis has provided relevant material that should be considered when writing marketing material for water quality programs and it has improved the understanding of the communication components. However it is limited in its scope to provide users with guidelines to produce quality communication material at the recommended reading level.

It is recommended that further research be completed to produce guidelines, templates and readability assessment tools and message framing guidelines to support the fine tuning of existing materials and the rollout of future communication material.

During the analysis, it became evident that there were limitations to the materials content imposed by various government guidelines, which impacts heavily on readability. Therefore, it is important that the outcomes of this analysis be used in discussions to inform stakeholders beyond the regional natural resource management groups and others who supply the current programmes to land managers.

As a result of initial discussions regarding the implications of the findings documented via the earlier draft of this document (distributed June 2016), a supplementary bid was submitted to extend the documentary analysis across a wider range of material. Confirmation has been received that the bid has been successful and it is intended that work will commence in early 2017.

In the supplementary bid, it was noted that achieving consistency in approach and message clarity across the gamut of communication materials produced for projects that support the Reef 2050 Plan would address a number of issues. Firstly, the GBR Water Science Taskforce indicated that 'poor communication and engagement' represents one of the barriers to effective program delivery. Secondly, beyond clarity of message, improving the way projects communicate and get buy in from producers will ensure greater project uptake, associated results and lasting behaviour change. Thirdly, there is a need to further strengthen the understanding and impact that visuals play in the agricultural-environmental context. It is intended that a draft of the findings from this phase of research will be circulated for comment in mid-2017.



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**APPENDIX 1: EXAMPLE TEXT TAKEN FROM AUSTRALIAN GOVERNMENT, DEPARTMENT OF ENVIRONMENT, REEF TRUST TENDER – BURDEKIN WEBPAGE**  
<http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.29**

Sentences: 34

Big Words (>= 3 syllables): 209

**17.29 = 3.1291 + 1.043 \* square root of (((209.0) / 34.0) \* 30)**

Reef Trust Tender - Burdekin | Department of the Environment

<http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-...>



**Australian Government**  
Department of the Environment

## Reef Trust Tender - Burdekin

*Reef Trust Tender – Burdekin* is a phase two investment that targets nitrogen discharge from the Burdekin natural resource management (NRM) region.

*Reef Trust Tender – Burdekin* offers funding to sugar cane farmers in the Burdekin NRM region to improve nitrogen and irrigation management practices on their farms. This project aims to significantly lower the amount of nitrogen fertiliser applied to participating farms which will help contribute to targets in the [Reef 2050 Plan](#) for reducing nitrogen runoff into the reef.

Using a competitive tender approach, funding of up to \$2.5 million will be available to sugar cane farmers over three years from 2016 to improve on-farm nitrogen and irrigation management practices.



Map of Burdekin Natural Resource Management region

### How does it work?

This project provides flexibility for sugar cane farmers to determine their own nitrogen reduction targets and cost-effective means of achieving those targets. A market-based Reverse Auction will be used to allocate funding to maximise value for money and outcomes for the reef.

The *Reef Trust Tender – Burdekin Applicant Guidelines 2015-18* provide information to help interested sugar cane farmers prepare an application. It is recommended that interested sugar cane farmers carefully read and consider the Guidelines before beginning an application.

[Reef Trust Tender – Burdekin Applicant Guidelines 2015-18 \(PDF - 4.03 MB\)](#) | [\(DOCX - 6.47 MB\)](#)



**APPENDIX 2: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER —BURDEKIN  
APPLICANT GUIDELINES 2015–2018 REEF TRUST PHASE II —COMPETITIVE TENDER**

<http://www.environment.gov.au/system/files/pages/2610ae34-c8e7-4424-acc9-fe022d4b18fb/files/burdekin-reef-trust-tender-applicant-guidelines.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.56**

Sentences: 29 \* 1.03

Big Words (>= 3 syllables): 185      Conversion: 185 \* 1.03 = 190.5

**17.56** = 3.1291 + 1.043 \* square root of (((190.5) / 29.87) \* 30)

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## Reef Trust Tender—Burdekin

Applicant Guidelines 2015–2018  
Reef Trust Phase II—Competitive Tender



Register interest by: 7 December 2015

Submit Tender applications by: 18 February 2016

**APPENDIX 3: EXAMPLE TEXT TAKEN FROM GRANT CONTRACT - PART A SPECIFIC PROJECT ACTIVITY DETAILS**

<http://www.environment.gov.au/system/files/pages/2610ae34-c8e7-4424-acc9-fe022d4b18fb/files/reeftrust-grant-contract-parta.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 20.46**

Sentences: 25 \* 1.2

Big Words (>= 3 syllables): 230      Conversion: 230 \* 1.2 = 276.0

**20.46** = 3.1291 + 1.043 \* square root of (((**276.0**) / **30.0**) \* 30)

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**Grant Contract - Part A  
Specific Project Activity Details**



BETWEEN

NQ Dry Tropics Ltd  
ACN: 101 770 601  
(NQ DRY TROPICS)

AND

Entity Name  
ABN: XXXXXX  
(PROPONENT)

AGREEMENT NUMBER RTS15-XXXX  
Nitrogen Management Practice



## APPENDIX 4: EXAMPLE TEXT TAKEN FROM PART B – GRANT CONTRACT TERMS AND CONDITIONS

<http://www.environment.gov.au/system/files/pages/2610ae34-c8e7-4424-acc9-fe022d4b18fb/files/reeftrust-grant-contract-partb.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 18.01**

Sentences: 33

Big Words (>= 3 syllables): 224

**18.01** =  $3.1291 + 1.043 * \text{square root of } (((224.0) / 33.0) * 30)$



### PART B - GRANT CONTRACT TERMS AND CONDITIONS

#### 1. PURPOSE OF AGREEMENT

- 1.1. This Agreement is read in conjunction with Part A - Specific Project Activity Details and establishes the terms and conditions upon which NQ Dry Tropics will pay the Proponent the Grant Funds and the Proponent will perform the Deliverables.

#### 2. PRIORITY OF DOCUMENTS

- 2.1. The following documents together comprise the Agreement:
- 2.1.1. Part A - Project Specific Details, including Schedules 1 to 4, the execution page and any special conditions specified in Schedule 2.
  - 2.1.2. Part B - Grant Contract Terms and Conditions
- 2.2. If there is any ambiguity, inconsistency or conflict between the provisions of any of the documents forming part of this Agreement, then unless otherwise stated, the documents take precedence in the following order:
- 2.2.1. Any special conditions specified in Part A - Schedule1;
  - 2.2.2. Part B - Grant Contract Terms and Conditions;
  - 2.2.3. Part A - Project Specific Details;
  - 2.2.4. Any other documents attached or referred to in this Agreement, or which NQ Dry Tropics or the Department provides to the Proponent for the purposes of carrying out the Works, including the Reef Trust Tender Burdekin Applicant Guidelines 2015-2018;
  - 2.2.5. Budgets, application and other communication between the Parties.

#### 3. DEFINITIONS

- 3.1. In this Agreement the following definitions apply:

**ABN** has the same meaning as it has in section 41 of the *A New Tax System (Australian Business Number) Act 1999* (Cth).

**Agreement** means this Grant Contract and all Schedules to it;

**Agreement Material** means any Material

- a) created for the purposes of this Agreement ;

## APPENDIX 5: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – BURDEKIN CANE INDUSTRY

<http://www.nqdrytropics.com.au/reef-trust-tender/>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 19.08**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 78      Conversion: 78 \* 3.0 = 234

**19.08** = 3.1291 + 1.043 \* square root of (((234.0) / 30.0) \* 30)

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Reef Trust Tender – Burdekin Cane Industry | NQ Dry Tropics

<http://www.nqdrytropics.com.au/reef-trust-tender/>

### NQ Dry Tropics

## REEF TRUST TENDER – BURDEKIN CANE INDUSTRY



The Reef Trust Tender – Burdekin Cane Industry is an Australian Government initiative to improve the quality of water entering the Great Barrier Reef and support the sustainability of the sugarcane industry in the Burdekin. The project aims to protect and conserve the Great Barrier Reef by addressing the issue of nitrogen discharge from the Burdekin region.

It is funded by the Australian Government as a component of the \$140 million Reef Trust and is delivered in partnership with NQ Dry Tropics and trusted partner organisations Burdekin Productivity Services (BPS), Farmacist, Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC) and Agritech Solutions.

NQ Dry Tropics and its project partners see the project as a great opportunity to build on the significant improvements that the Burdekin sugarcane industry has already made to the quality of water flowing to the Great Barrier Reef.

Funding of up to \$2.5 million will be provided to contracted Burdekin sugarcane farmers over three years to improve on-farm nitrogen and irrigation management practices. The project aims to significantly reduce nitrogen fertiliser application and will help contribute to ambitious targets for reducing nitrogen runoff into the reef.



## APPENDIX 6: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – BURDEKIN CANE INDUSTRY TENDER OVERVIEW FACTSHEET1

[https://drive.google.com/file/d/0B2eYGb5\\_I-adZ3BsY3JmcThTRzJoaHZXbEdSeTAyVmxTR3Fn/view?pref=2&pli=1](https://drive.google.com/file/d/0B2eYGb5_I-adZ3BsY3JmcThTRzJoaHZXbEdSeTAyVmxTR3Fn/view?pref=2&pli=1)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 15.51**

Sentences: 36

Big Words (>= 3 syllables): 169

**15.51** =  $3.1291 + 1.043 * \text{square root of } (((169.0) / 36.0) * 30)$



### Introducing the Burdekin Tender

The Reef Trust Tender - Burdekin (the Project) is a great opportunity for sugarcane farmer to access funding of up to \$500,000 to assist with changes to nitrogen and irrigation management practices to make their farming operations more sustainable and reduce nitrogen run-off to the Great Barrier Reef.

NQ Dry Tropics and its project partners see this as a great opportunity to continue the good work that the Burdekin cane industry has already achieved in improving water quality flowing to the Great Barrier Reef.

The Project is intended to run from 2015 - 2018. This Project is voluntary and up to \$2.5 million is available for grants awarded through one competitive tender round. Importantly, sugar cane farmers have the flexibility to choose which farming practice changes to make to improve nitrogen and irrigation management, and how much they need to be paid to carry out these changes.

The Burdekin Tender is delivered in partnership with the Australian Government, NQ Dry Tropics and trusted partner organisations, Burdekin Productivity Services (BPS), Farmacist, Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC) and Agritech Solutions.

### How the Project works

There are two stages to this Project:

1. an expression of interest stage for sugar cane farmers to register their interest; and
2. a reverse auction where sugar cane farmers submit tenders seeking funding to improve their nitrogen and irrigation management practices.

NQ Dry Tropics and its partner organisations will be on hand to assist sugarcane farmers throughout both the expression of interest and reverse auction stages of the Project. Tenders will be evaluated based on value for money in improving nitrogen fertiliser management and improving irrigation management practices.

To be eligible for the Project, sugarcane farmers *must* register their interest through the expression of interest stage before 2pm (AEST) on 7 December 2015.

To be considered for funding, tenders *must* be submitted before 2pm (AEST) on 18 February 2016.

For more information go to:

NQ Dry Tropics webpage: [www.nqdrytropics.com.au/reef-trust-tender/](http://www.nqdrytropics.com.au/reef-trust-tender/).

Australian Government webpage: [www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin](http://www.environment.gov.au/marine/gbr/reef-trust/reef-trust-tender-burdekin).

The Burdekin Tender is supported by NQ Dry Tropics through funding by the Australian Government's National Reef Trust Programme.



## APPENDIX 7: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – IMPROVING NITROGEN AND IRRIGATION MANAGEMENT FACTSHEET 2

[https://drive.google.com/file/d/0B2eYGb5\\_I-adMmJUeUJXUEFUNEpLRExfjdRNFhX2xrSTVn/view?pref=2&pli=1](https://drive.google.com/file/d/0B2eYGb5_I-adMmJUeUJXUEFUNEpLRExfjdRNFhX2xrSTVn/view?pref=2&pli=1)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 19.01**

Sentences: 37

Big Words (>= 3 syllables): 286

**19.01** =  $3.1291 + 1.043 * \text{square root of } (((286.0) / 37.0) * 30)$



### Reef Trust Tender Burdekin Improving Nitrogen and Irrigation Management Factsheet 2

#### Improving Nitrogen and Irrigation Management

Reef Trust Tender – Burdekin (the Project) offers you the choice and flexibility to choose which farming practice changes you are prepared to make to improve your nitrogen and irrigation management practices, and how much you need to be paid in order to carry out these changes. Up to \$500,000 is available for each successful applicant.

It is important to read all of the available information. NQ Dry Tropics strongly advises you seek any professional advice you need from industry experts and extension groups before submitting your tender. This fact sheet and other Project information provide general guidance only.

NQ Dry Tropics and BBIFMAC can assist sugarcane farmers with the process throughout both the expression of interest and reverse auction stages, but is unable to provide technical advice around practice changes that may be suitable to your farming operation.

Neither NQ Dry Tropics nor the other project partners are able to offer specific advice on the details of your own tender, particularly advice on costing your tender.

**Please consider** - NQ Dry Tropics strongly advises you to seek assistance from industry experts. When thinking about how to improve your nitrogen and irrigation management practices and how to develop your tender, there are a range of things you should consider.

#### For example:

- Work out what types of changes you need to make to improve your nitrogen and irrigation management and what steps would be needed to implement them. For example, do you need new equipment, professional advice or training?
- Work out how much it will cost to implement these changes as well as the costs of implementing the minimum standards of management practice defined in the Guidelines. Remember to include the initial costs of changing practices, plus any ongoing benefits or costs, such as more or less labour and specialist advice.
- Work out the change to your nitrogen fertiliser requirements from implementing these changes. Some hypothetical examples are provided below.
- Estimate the change to your nitrogen fertiliser costs as a result of making these changes. For example, will there be savings through applying a lower quantity?
- Estimate the installation and running costs of moving to drip or overhead irrigation systems.
- Decide on a tender price. Remember that the price you ask for should be enough to carry out the activities as a whole. This will be the amount you are paid if you are successful in the reverse auction.

*The Burdekin Tender is supported by NQ Dry Tropics through funding by the Australian Government's National Reef Trust Programme.*

## APPENDIX 7A: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - BURDEKIN CANE INDUSTRY (FACT SHEETS 2 & 5) – SIX EASY STEPS

[http://www.sugarresearch.com.au/icms\\_docs/164355\\_Best-practice\\_nutrient\\_management\\_Six\\_Easy\\_Steps\\_IS13016.pdf](http://www.sugarresearch.com.au/icms_docs/164355_Best-practice_nutrient_management_Six_Easy_Steps_IS13016.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.01**

Sentences: 24 \* 1.25

Big Words (>= 3 syllables): 122      Conversion: 122 \* 1.25 = 152.5

**16.01** = 3.1291 + 1.043 \* square root of (((152.5) / 30.0) \* 30)



**sha** Sugar Research Australia

Information Sheet  
IS13016

## Best-practice nutrient management

The SIX EASY STEPS Approach

### Introduction

Modification of the traditional nutrient-management guidelines for sugarcane production in Australia has been in progress for the past 10 years. The need for change occurred with a realisation that nutrient management should no longer only target sugarcane yields, but should be aimed at sustainability.

Increased study and research has led to a better understanding of soil types and appropriate nutrient application rates.

This research has also resulted in the nutrient management guidelines being more soil-specific by taking into account basic soil attributes such as colour, texture, position in the landscape, and chemical properties.

These modified guidelines have been incorporated into a grower-friendly nutrient management program branded the 'SIX EASY STEPS' approach to improved nutrient management.

### What does sustainable and best-practice nutrient management mean?

Nutrient management in the sugar industry should be aimed at sustainability. This means that profitable cane production needs to be achieved in combination with the maintenance of soil fertility on-farm and minimal off-site effects.

In simple terms we should continue to consider our 'back pockets' when planning nutrient inputs, but we should also be maintaining our farm resources for future generations, and caring for the larger environment by not applying excessive amounts of nutrients.

Best-practice nutrient management means having the best chance of success in minimising the risk of losses in productivity (loss of yield), profitability (loss of income), nutrients (leaching, run-off and/or gaseous losses) and soil resources (erosion and fertility losses).

Farm-specific nutrient-management plans based on the SIX EASY STEPS will enable adoption of best-practice nutrient management in sugarcane production.

### What is the SIX EASY STEPS program?

The SIX EASY STEPS program is an integrated nutrient management tool that enables the adoption of best practice nutrient management on-farm. It consists of:

1. Knowing and understanding your soils.
2. Understanding and managing nutrient process and losses.
3. Regular soil testing.
4. Adopting soil-specific nutrient management guidelines.
5. Checking on the adequacy of nutrient inputs (eg leaf analyses).
6. Keeping good records to modify nutrient inputs when and where necessary.

The SIX EASY STEPS program is being delivered to industry through a grower-orientated short-course entitled 'Accelerating the adoption of best-practice nutrient management.'

The overall objective of the program is to provide guidelines on how to implement balanced nutrition on-farm with the ultimate aim of optimising productivity and profitability, without adversely influencing soil fertility or causing off-farm effects. It is also aimed at giving growers the required skills to develop nutrient management plans for their farms.

For further information on the SIX EASY STEPS program please contact your local adviser.

sugarresearch.com.au



## APPENDIX 8: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – FREQUENTLY ASKED QUESTIONS FACTSHEET 3

[https://drive.google.com/file/d/0B2eYGb5\\_I-  
adcDdxSzVZczVqUHVhVWZBQ2djZUJCNIIdjVnBF/view?pref=2&pli=1](https://drive.google.com/file/d/0B2eYGb5_I-<br/>adcDdxSzVZczVqUHVhVWZBQ2djZUJCNIIdjVnBF/view?pref=2&pli=1)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 13.45**

Sentences: 30

Big Words (>= 3 syllables): 98

**13.45** =  $3.1291 + 1.043 * \text{square root of } (((98.0) / 30.0) * 30)$



**If I submit an EOI do I have to submit a Tender application?**

No. Applicants can withdraw from the process at any time before signing a Grant Contract. However, only sugarcane farmers that register their interest by 2pm (AEST) on 7 December 2015 will be eligible to submit a Tender.

**What if my farm is partially in the Burdekin NRM Region?**

If your property boundaries extend beyond the Burdekin Natural Resource Management region, the whole property will be eligible for the Project.

**Can I submit a Tender application with multiple farms?**

Yes. A Tender application can include more than one sugar cane farm owned or operated by a single legal entity. In this circumstance, Applicants may be required to provide three years of historical data and current documentation that clearly distinguishes activities related to the individual sugar cane farms covered by their Tender application.

The online Application form can accept data for up to 10 farms. You will need to submit an appropriate number of application forms to accommodate the number of farms. For example: 10 or less farms = 1 Application form; 11-20 farms= 2 Application forms; 21-30 farms=3 Application forms. It is important that you use the same ABN for each Tender application form.

The generic information requested in the Tender application form (i.e. Applicant details, not farm level information) will need to be repeated each time and it is important that this generic information is consistent across all Tender application forms. Once your Tender application forms are submitted, please email the receipt reference numbers to the Reef Trust email address ([burdekintender@nqdrytropics.com.au](mailto:burdekintender@nqdrytropics.com.au)). These numbers will be provided to the Australian Government to help ensure the applications are matched during the assessment phase.

If you are proposing to include more than 10 farms, please contact NQ Dry Tropics on 1800 504 699 or at [burdekintender@nqdrytropics.com.au](mailto:burdekintender@nqdrytropics.com.au)

**I want to submit a multiple farm Tender application form. Do I need to provide a map for every farm?**

The mapping tool must be completed for each farm in a multiple farm Tender application (i.e. under each farm tab). Ensure you map the farm's cane cropping area for 2015 and not the property boundary. The mapped area of cane should also reflect the area entered into the nitrogen management calculator.

**Can sugarcane farmers submit a group Tender application?**

No. Group Tender applications will not be accepted. However, family owned farms are considered as one management unit, so a Tender can be submitted for one or multiple farms managed by the one family unit.

**What constitutes a farm? Is it the same ABN or same farming entity irrespective of different ABNs?**

For the purposes of this Project, a farm constitutes the same farming entity.

*The Burdekin Tender is supported by NQ Dry Tropics through funding by the Australian Government's National Reef Trust Programme.*

**APPENDIX 8A: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – PADDOCK TO REEF INTEGRATED MONITORING, MODELLING AND REPORTING PROGRAM, REEF WATER QUALITY PROTECTION PLAN 2013-2018**

<http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/assets/paddock-to-reef-overview.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

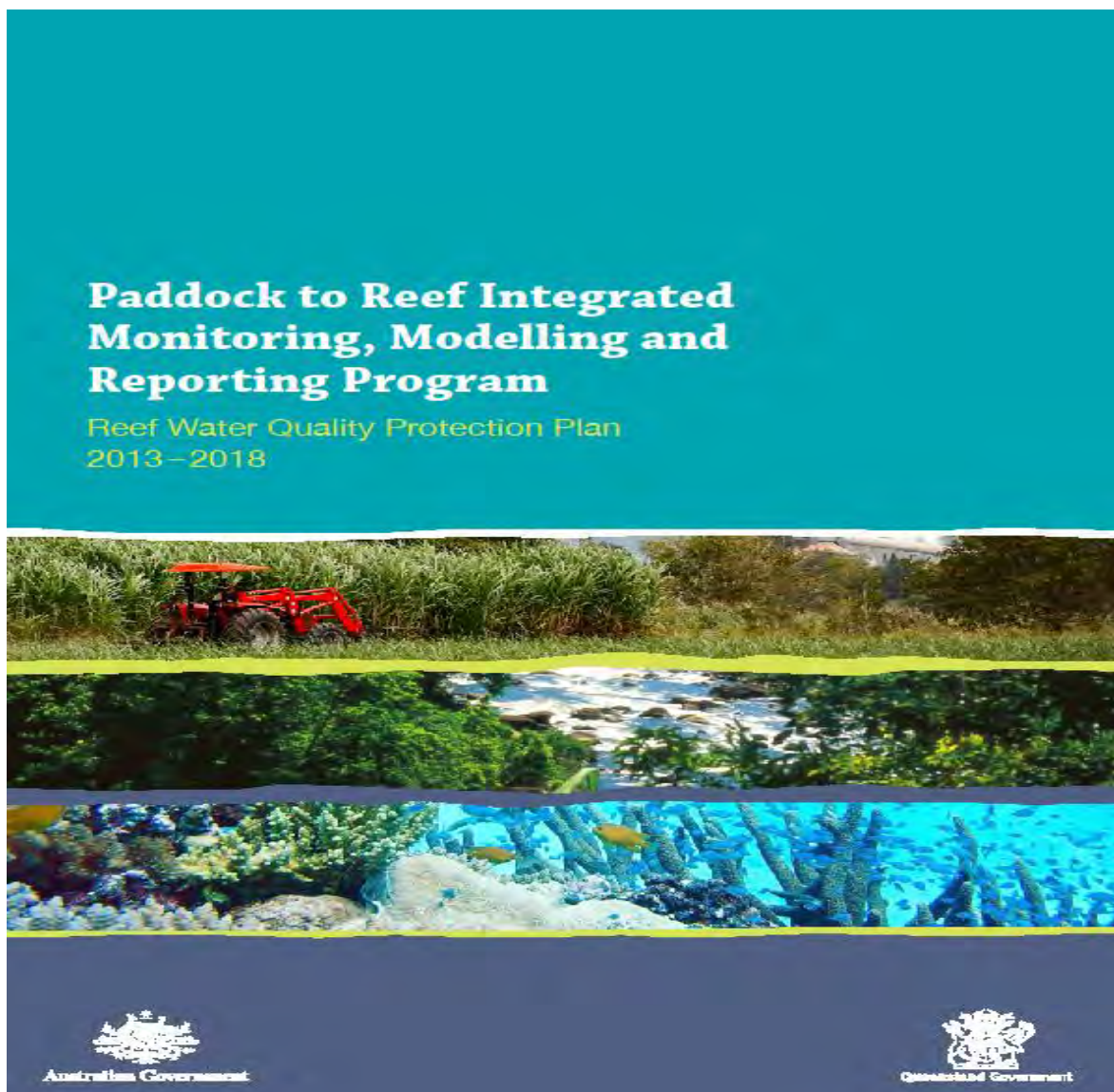
**Smog Grade: 18.18**

Sentences: 18 \* 1.67

Big Words (>= 3 syllables): 125

Conversion = 125 \* 1.67 = 208.75

**18.18** = 3.1291 + 1.043 \* square root of (((**208.75**) / **30.06**) \* 30)





**APPENDIX 8B: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – GREAT BARRIER REEF REPORT CARD 2012 AND 2013 REEF WATER QUALITY PROTECTION PLAN**

<http://www.reefplan.qld.gov.au/measuring-success/report-cards/assets/report-card-2012-2013.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

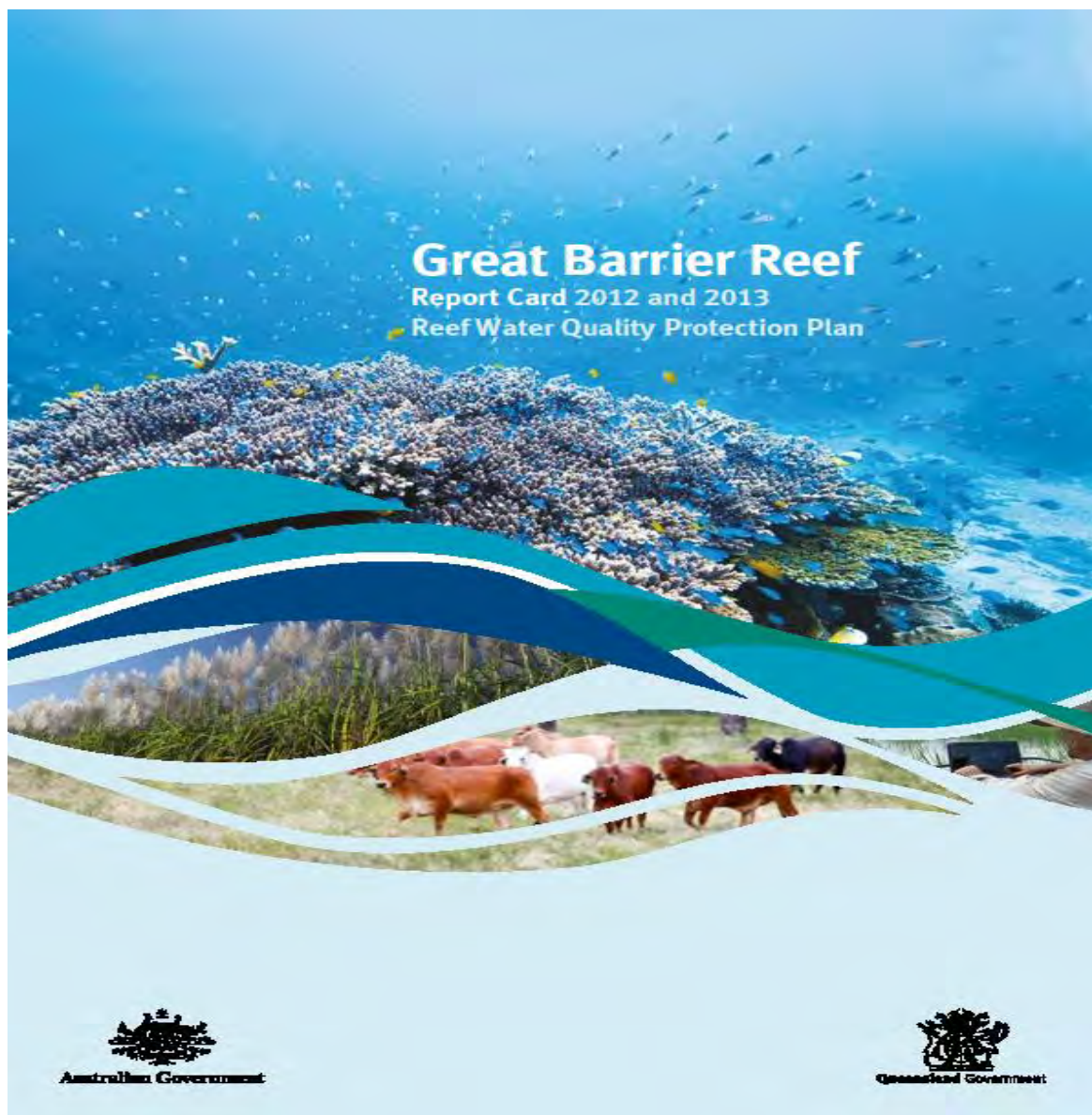
**Smog Grade: 15.11**

Sentences: 30

Big Words (>= 3 syllables): 132

**15.11** =  $3.1291 + 1.043 * \text{square root of } (((132.0) / 30.0) * 30)$

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## APPENDIX 9: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER – MINIMUM STANDARDS OF MANAGEMENT PRACTICE FACTSHEET 5 (LISTED AS 4 ONLINE)

[https://drive.google.com/file/d/0B2eYGb5\\_I-adM2tLZnlaVE1jOHVCQ29IR3B6VDBPNkpiZUFv/view?pref=2&pli=1](https://drive.google.com/file/d/0B2eYGb5_I-adM2tLZnlaVE1jOHVCQ29IR3B6VDBPNkpiZUFv/view?pref=2&pli=1)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.36**

Sentences: 30

Big Words (>= 3 syllables): 161

**16.36** =  $3.1291 + 1.043 * \text{square root of } (((161.0) / 30.0) * 30)$



### Reef Trust Tender Burdekin

#### Minimum Standards of Management Practice Factsheet 5

Minimum standards of management practice are not an eligibility requirement for the Reef Trust Tender – Burdekin. However, successful applicants who enter into grant contracts must have the following practices in place on their cane farms within the first 12 months of their grant contract. These standards are designed to assist successful applicants to sustainably manage the use of fertiliser and irrigation on their farms.

##### Application and placement of fertiliser

Sub-surface application of fertiliser reduces surface runoff and volatilisation, and enables a reduction in fertiliser inputs.

For the purposes of this Project, by the end of the first year of the grant contract fertilisers must be applied subsurface in or beside the row (i.e. stool split or side banded) by the end of the first year of the Grant Contract.

- Granular or solid fertilisers are applied subsurface in or beside the row (i.e. stool split or side banded).
- Surface applied liquid nutrients on the hill.

If fertilisers are not applied subsurface, successful applicants will need to provide a rationale as to why.

##### Mill by-products

Some sugar cane farmers use mill by-products (for example mill mud) which may increase the risk of nitrogen runoff to the Reef if not managed well. In order to help mitigate this risk, the following minimum standards will apply.

If mill by-products have been used in the previous three years, they can continue to be used at the previous rate and frequency during the grant contract period provided the following conditions are met:

- the rate does not exceed 200 wet tonnes/hectare.
- consideration is given to applying mill by-products on the row.

Successful applicants with no history of mill by-product application are not to apply mill by-products for the duration of the grant contract.

##### Calibration

Regular calibration of fertiliser application equipment is important as large variations in application rates can occur between batches of product, between different products, in changed weather conditions or at different times of the day.

Application equipment must therefore be calibrated prior to the season and at each product and batch change.

Further information on calibration is available from the Sugar Research Australia website.

*The Burdekin Tender is supported by NQ Dry Tropics through funding by the Australian Government's National Reef Trust Programme.*

## APPENDIX 9A: EXAMPLE TAKEN FROM REEF TRUST TENDER – FURTHER INFORMATION - BURDEKIN CANE INDUSTRY

<http://www.nqdrytropics.com.au/reef-trust-tender/>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.92**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 67      Conversion: 67 \* 3.0 = 201

**17.92 = 3.1291 + 1.043 \* square root of (((201.0) / 30.0) \* 30)**

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Reef Trust Tender – Burdekin Cane Industry | NQ Dry Tropics

<http://www.nqdrytropics.com.au/reef-trust-tender/>

### NQ Dry Tropics

## REEF TRUST TENDER – BURDEKIN CANE INDUSTRY



The Reef Trust Tender – Burdekin Cane Industry is an Australian Government initiative to improve the quality of water entering the Great Barrier Reef and support the sustainability of the sugarcane industry in the Burdekin. The project aims to protect and conserve the Great Barrier Reef by addressing the issue of nitrogen discharge from the Burdekin region.

It is funded by the Australian Government as a component of the \$140 million Reef Trust and is delivered in partnership with NQ Dry Tropics and trusted partner organisations Burdekin Productivity Services (BPS), Farmacist, Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC) and Agritech Solutions.

NQ Dry Tropics and its project partners see the project as a great opportunity to build on the significant improvements that the Burdekin sugarcane industry has already made to the quality of water flowing to the Great Barrier Reef.

Tenders have been assessed and funding of \$2.84 million will be provided to contracted Burdekin sugarcane farmers over three years to improve on-farm nitrogen and irrigation management practices. The project aims to significantly reduce nitrogen fertiliser application and will help contribute to ambitious targets for reducing nitrogen runoff into the reef.

# APPENDIX 9B: EXAMPLE TAKEN FROM REEF TRUST TENDER – MINIMUM STANDARDS OF MANAGEMENT PRACTICE - SMARTCANE BMP MODULES – SOIL HEALTH MODULE (NOTE SCORE TAKEN FROM ASSOCIATE PDF).

[http://www.canegrowers.com.au/icms\\_docs/211102\\_BMP\\_-\\_Soils\\_module\\_Clean\\_form\\_FEB\\_2015.pdf](http://www.canegrowers.com.au/icms_docs/211102_BMP_-_Soils_module_Clean_form_FEB_2015.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 17.80

Sentences: 22 \* 1.36

Big Words (>= 3 syllables): 145 Conversion: 145 \* 1.36 = 197.2

17.80 = 3.1291 + 1.043 \* square root of (((197.2) / 29.92) \* 30)

Smartcane BMP

<https://www.smartcane.com.au/user/modules.aspx?id=3573deaa-1ef3-...>

## Soil Health

These BMP modules contain suggested resources and suggested acceptable 'proof of practice'. Other information can also constitute 'proof of practice' and this should be discussed with the facilitator. For example – an Implemented Land and Water Management Plan would be acceptable proof for many sections. Click the following link for an offline PDF version of this module: [Soil Health module](#).

If a grower believes that their practice is BMP but it doesn't match the BMP guidelines they should be able to provide sound reasoning for their practice and why it is BMP.

Note - you will need copies of items such as these ready so that you may insert them as proof of your practices:

- Dairy records of practice including trash blanketing, minimum tillage, rotational cropping and controlled traffic.
- Photos of wheel, row and implement spacing measurements
- Cultivation records
- Rainfall records
- GPS records and photo
- Photos of trash blanket, trash related from stool or written qualifier from industry expert as to why no trash blanket
- Follow with trash &/or cover crop photo
- Photo of zero tillage planting equipment
- Photo of pre-formed beds
- Soil and water tests
- Soil amendment application records

You can scan documents to insert them. Note – photographic evidence will require verification from an industry technical officer.

Background to this module:

- The Sugarcane Yield Decline Joint Venture (SYDJV), a major program of investigating perceived decline in sugarcane yield, and subsequent industry research has highlighted the importance of improving soil health. The SYDJV recommendations identified three major aspects of sugarcane production that contribute to long-term yield constraints:
  - Compaction – primarily caused by a mis-match of machinery wheel or track spacing's with row spacing's with row spacing's with row spacing's, leads to a range of problems including reduced porosity, reduced soil water holding capacity and increased soil erosion strength (related to constriction of root growth), and physical stool damage.
  - Tillage – excessive tillage leads to a reduction in soil structure, resulting in a suite of problems including a loss of beneficial soil micro and macro organisms mainly through a loss of soil carbon and physical destruction, reduced soil water holding capacity, reduced water infiltration, surface crusting and erosion.
  - Microclimate – Successive plough-out replant leads to a continuous sugarcane system. This contributes to a build-up of pests and diseases that are favoured by sugarcane. Introduction of break crops, particularly nitrogen fixing broadleaf crops, creates an opportunity to re-balance soil-borne pathogen/beneficial, and add nitrogen and carbon into the system.
- Permanent beds with wider row spacing using controlled traffic systems result in lower compaction and increased profit while reducing environmental impacts.
- Trash blanketing & follow cropping have many benefits including increasing the supply of soil carbon and the soils ability to hold and supply water to the crop.

## Nutrient Management

Note - you will need copies of items such as these ready so that you may insert them as proof of your practices:

- Soil test results
- Nutrient recommendations
- Soil type maps
- Nutrient Management Plan
- Irrigation application records
- Rainfall records
- Paddock management records
- Photographs or records of placement of fertilizer
- Photo of fertilizer applicator
- Electronic rate controller photo
- Records of harvest time
- Six Easy Steps certificate
- Records of fertilizer application including soil tests, application rates, products, placement, calibration of equipment and person applying
- Weather forecasts associated with timing of fertilizer applications.

You can scan documents to insert them. Note – photographic evidence will require verification from an industry technical officer.

The BMP module contains supporting documentation and proof of practice items. Other information can also constitute proof of practice and this should be discussed with the facilitator. For example – an Environmental Risk Management Plan would be acceptable proof for many sections.

If a grower believes that their practice is BMP but it doesn't match the BMP guidelines, they should be able to provide sound reasoning for their practice and why it is BMP.

## Basics of Nutrient Best Management Practice

Management of inputs of nutrients in sugarcane production is aimed at sustainability. Farm profitability is a prime consideration along with the management of inputs to minimise off-farm losses of nutrients and soil resources and associated environmental risk. Nutrient management recognises environmental and managerial differences between and within regions.

### Key Area: Managing Compaction

#### 1.1.1 Managing compaction

##### Practices:

Below Industry Standard -	Row spacing is not matched to wheel spacing. Machinery is operated in wet field conditions.
Industry Standard -	Row spacing and most machinery wheel spacings are matched, initial row establishment formed GPS guidelines. Where possible machinery operations are delayed to avoid operating in wet field conditions.
Above Industry Standard -	Row spacing and all machinery wheel spacings are matched, GPS guidance is used for all field operation: bed forming, planting, spraying and harvesting. Machinery is not operated in wet field conditions.

### Key Area: Trash Management

#### 1.2.1 Trash management

##### Practices:

Below Industry Standard -	Cane is burnt prior to harvest and trash is rolled and burnt after harvest or Cane is burnt prior to harvest or Green cane trash blanket is burnt after harvest or Green cane
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## APPENDIX 9C: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - BURDEKIN CANE INDUSTRY (FACT SHEETS 4 OPENS AS 5) – SMARTCANE BMP MODULES – IRRIGATION AND DRAINAGE MANAGEMENT MODULE

[http://www.canegrowers.com.au/icms\\_docs/203543\\_BMP\\_-\\_Irrigation\\_Module\\_Clean\\_Form\\_Oct\\_2014.pdf](http://www.canegrowers.com.au/icms_docs/203543_BMP_-_Irrigation_Module_Clean_Form_Oct_2014.pdf)

WordsCount SMOG Results - [http://wordcount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordcount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 18.46

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 72

Conversion: 72 \* 3.0 = 216

18.46 = 3.1291 + 1.043 \* square root of (((216.0) / 30.0) \* 30)

Smartcane BMP

<https://www.smartcane.com.au/user/modules.aspx?id=45fd4107-b095...>

### Irrigation and Drainage Management

These BMP modules contain suggested measures and suggested practices (level of practice). Other information may also be provided for level of practice and this should be discussed with the facilitator. Purpose of this information is to provide a guide for the user to develop a plan for the system. This information is for an office copy and not for use in the field. [Smartcane BMP Module](#)

The user should be aware that the user should be aware that the BMP guidelines may need to be able to provide a plan for the system and what is best.

Note - you will need copies of items such as these ready so that you may present them as proof of your practices:

- Subsoil or soil texture or bearing water holding capacity of the soil on the farm
- Drainage or irrigation system design
- Proposed irrigation system design
- Proposed drainage system design
- Proposed water management plan
- Proposed fertiliser management plan
- Proposed P/N - nutrients - soil type, if it is known, depth of groundwater, area of collection, planting, etc. (if known)
- Local water quality records
- Irrigation management plan
- Farm plan showing irrigation system design
- Irrigation records
- Irrigation or groundwater monitoring records
- Local water management plan
- Local soil water management plan
- Record of irrigation

The user should be aware that the user should be aware that the BMP guidelines may need to be able to provide a plan for the system and what is best.

Irrigation is vital for crop production in many areas. For the Burdekin and Mackay areas crop production is dependent on irrigation and the state of the other blocks (including the River Tropics). Irrigation is used to maintain and increase yields.

For production management should aim to apply sufficient water for crop growth without applying excess water. Excess water can lead to other issues such as deep drainage.

Irrigation systems are the result of the interaction of physical, technical and economic factors. A well designed and managed system that reduces runoff and salinisation is the most sustainable option for the Burdekin area.

Irrigation requirements and practices will vary by region depending on local climate, and a possibility to use application method used. It is the following areas all to be applicable to all irrigated farmers.

#### Key Area: Irrigation Scheduling

##### 2.1.1 Calculating the amount of water to apply

Practices:

Recommended Standard: The water holding capacity of farm soils is not known. The volume of water being applied is not matched to the water holding capacity.

Industry Standard: Water holding capacity of farm soils has been determined and water usage is calculated based on irrigation application records and recorded soil moisture.

House Industry Standard: Water holding capacity of farm soils has been determined and irrigation application records are maintained accordingly.

##### 2.1.2 Calculating how often to apply water

Practices:

Recommended Standard: Water is applied on a set cycle without regard to the amount of water used by the crop.

Industry Standard: Water is applied based on crop demand based on plant growth monitoring or direct measurement figures and crop factors. Water is applied based on plant growth monitoring or direct measurement figures.

House Industry Standard: Water is applied based on crop demand based on direct measurement of soil moisture monitoring equipment. Water is applied based on plant growth monitoring or direct measurement figures.

##### 2.1.3 Managing seasonal allocation management

Practices:

Recommended Standard: Irrigation water use is calculated at intervals to best suit crop needs.

Industry Standard: Water is used only and crop factors are used to determine the best time to use irrigation water. The application time is based on crop growth stage.

House Industry Standard: Crop water requirements are known and seasonal allocation is calculated so that a volume of seasonal irrigation allocation is determined. Water is used only when crop growth stage is determined. Water is used only when crop growth stage is determined. Water is used only when crop growth stage is determined.

#### Key Area: Managing runoff and deep drainage

##### 2.2.1 Managing run-off and deep drainage

Practices:

Recommended Standard: No management of irrigation runoff or deep drainage is possible.

Industry Standard: Irrigation is managed to minimise run-off and deep drainage by controlling application volume and timing of application.

House Industry Standard: Irrigation is managed to minimise run-off and deep drainage. Run-off is captured in off-water systems and recycled on farm.

##### 2.2.2 Recycle gully

Practices:

Recommended Standard: The capacity to run runoff and control irrigation runoff is not known. Capacity is not known. The capacity to run runoff is not known. The capacity to run runoff is not known.

Industry Standard: Runoff has been determined and irrigation runoff and control runoff and drainage capacity is sufficient to run the water gully. The gully is well maintained and not blocked or overgrown.

#### Key Area: Irrigation Water Quality and Using Recycled Effluent Water

##### 2.3.1 Testing quality of irrigation water

Practices:

Recommended Standard: Irrigation water quality has not been tested for suitability as an irrigation water.

Industry Standard: Irrigation water quality has been tested. The results have been used to make decisions on the best management of that water (e.g. application of nutrients, timing water quality).

##### 2.3.2 Using Effluent Water For Irrigation

Practices:

Recommended Standard: The user should be aware that the user should be aware that the BMP guidelines may need to be able to provide a plan for the system and what is best.



## APPENDIX 9E: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - BURDEKIN CANE INDUSTRY (FACT SHEETS 4 OPENS AS 5) – SMARTCANE BMP MODULES – CROP PRODUCTION AND HARVESTING MODULE

[http://www.canegrowers.com.au/icms\\_docs/187691\\_Crop\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/187691_Crop_Module_Form.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.16**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 52      Conversion: 52 \* 3.0 = 156.0

**16.16 = 3.1291 + 1.043 \* square root of (((156.0) / 30) \* 30)**

Smartcane BMP

<https://www.smartcane.com.au/user/modules.aspx?id=f313d292-408b-...>

### Crop Production and Harvesting Management

Click the following link for an online PDF version of this module: [http://www.canegrowers.com.au/icms\\_docs/187691\\_Crop\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/187691_Crop_Module_Form.pdf)

#### Key Area: Farm map

##### 4.1.1 Farm map

###### Practices:

**Smartcane Standard:** Only a limited amount of mapping information is accessed; information is not used for farm planning.

**Industry Standard:** A farm map which identifies soil types, topography, drainage lines, variable areas (fences, environmental etc), management units and crop lines is used for all farm management.

**Smartcane Industry Standard:** Multiple mapping layers are used to create strategic management decisions. Maps have a high level of resolution and allow within block decisions to be made.

#### Key Area: Farm design

##### 4.1.1 Farm design

###### Practices:

**Smartcane Standard:** Farm design frequently causes problems with irrigation, drainage and/or machinery management.

**Industry Standard:** Farm design allows for efficient business operation including irrigation, drainage, machinery management and harvesting.

**Smartcane Industry Standard:** Farm design allows for efficient and effective farm management. Practices management system based on multiple mapping layers and incorporated into the farm design and management.

#### Key Area: Variety management

##### 4.1.1 Variety management

###### Practices:

**Smartcane Standard:** Varieties chosen only on availability of planting material.

**Industry Standard:** Variety mix is determined with regard to production, CCS, time of harvest, soil type, disease and nutrient tolerance.

**Smartcane Industry Standard:** A formal variety management plan for the whole crop cycle taking into account genetic diversity has been developed and implemented.

#### Key Area: Clean planting material

##### 4.1.1 Clean planting material

###### Practices:

**Smartcane Standard:** Planting material is sourced from commercial sources and not seed treated or inspected by Plant Health Service.

**Industry Standard:** Clean seed is sourced through approved seed sources (not on those outlined) and is distributed within seed lot to individual on farm.

#### Key Area: Seed quality for planting

##### 4.1.1 Seed quality for planting

###### Practices:

**Smartcane Standard:** Commercial breeder is used to seed to seed planting material often resulting in a high proportion of damaged seeds.

**Industry Standard:** Commercial breeder is used to seed to seed planting material with good quality management plans.

**Smartcane Industry Standard:** Dedicated plant grow houses with controlled water and nutrient flow and air, where storage boxes and grower tables is used to harvest planting material. Results of planting material used and quality are kept and compared to established performance of subsequent crops.

#### Key Area: Time of planting

##### 4.1.1 Time of planting

###### Practices:

**Smartcane Standard:** Planting occurs when convenient.

**Industry Standard:** There is as little as possible delay for soil sensor when there is adequate soil moisture and soil temperature at planting depth is above 10 degrees for more than 10 days. Consider variable planting to allow variable soil moisture and temperature.

#### Key Area: Planting

##### 4.1.1 Planting

###### Practices:

**Smartcane Standard:** Fertiliser is not applied to the different soil types or row profiles (flat or hill) before and/or possible application are rarely utilised.

**Industry Standard:** Fertiliser is not used to improve row or block soil fertility and soil. Fertiliser is normally not used for best seed and soil contact. Fertiliser and possible application are regularly utilised.

**Smartcane Industry Standard:** Variable rate fertiliser or planter to maintain an even planting rate. Fertiliser and planter are targeted to meet site requirements.

#### Key Area: Harvesting – loss minimisation

##### 4.1.1 Harvesting – loss minimisation





# APPENDIX 9G: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - BURDEKIN CANE INDUSTRY (FACT SHEETS 4 OPENS AS 5) – SMARTCANE BMP MODULES – NATURAL SYSTEMS MANAGEMENT MODULE

[http://www.canegrowers.com.au/icms\\_docs/188394\\_Natural\\_Systems\\_Management\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/188394_Natural_Systems_Management_Module_Form.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 18.47

Sentences: 28 \* 1.07

Big Words (>= 3 syllables): 202 Conversion: 202 \* 1.07 = 216.14

18.47 = 3.1291 + 1.043 \* square root of (((216.14) / 29.96) \* 30)

Smartcane BMP

<https://www.smartcane.com.au/user/modules.aspx?id=bad9dbb3-0c9a...>

### Natural Systems Management

Natural systems are parts of the landscape which are not under active production but perform very important functions in whole-system management. This module covers two broad types of natural systems which are described in more detail below: 1. wetlands and waterways; 2. riparian zones; and 3. other vegetated patches and features.

In combination with other Best Management Practices (BMP) activities, well-managed natural systems assist in overall farm productivity and sustainability by regulating surface water flow and groundwater levels, trapping and filtering runoff, maintaining soil health, reducing pests, and increasing stream and riparian habitat for fish. They can also be important sites for wildlife and contribute to overall farm resilience by providing a natural buffer against extreme weather events.

This module focuses on identifying the benefits of natural systems and how to work together with other farm practices, especially drainage management, to help improve farm productivity and resilience. It also covers the Queensland Code of Practice (QCoP) for wetlands, waterways and riparian zones. Click the following link for an online QCoP version of this module: [http://www.canegrowers.com.au/icms\\_docs/188394\\_Natural\\_Systems\\_Management\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/188394_Natural_Systems_Management_Module_Form.pdf)

Figure 1. A conceptual model which shows the benefits a natural system can provide.



Figure 1. A conceptual model which shows the benefits a natural system can provide. Adapted from Smith, 2006[1].



Wetlands are specifically defined under legislation and are listed in the Queensland Wetlands List for further information: [http://www.dnr.qld.gov.au/protected\\_areas/wetlands/wetlands.html](http://www.dnr.qld.gov.au/protected_areas/wetlands/wetlands.html). However, the presence of wetlands within a part of the landscape which results naturally and serendipitously, are the best ones to retain after rainfall, and in fact natural water grass meadows, sedges or other water loving plants. Typical features of wetlands in some fields can be seen in Figure 2.

Wetlands in some growing areas typically include swamps, marshes, lagoons, lakes and floodplains. Water levels can change significantly, and many are dry for long periods and only become waterlogged when there are more or more frequent rain events. A low (high) part of a wetland landscape may have regularly or infrequently flooded areas and higher or drier areas between the low and high sections. The ground may vary from clay to sand and is often very fertile.

Wetlands in general are naturally managed as significant natural systems and landowners are encouraged to manage them as such. Wetlands benefit the landscape in the following ways:

- store water by holding water in place, reducing runoff and erosion, as well as reducing groundwater in dry periods
- slow down, absorb and filter pollutants from runoff, which results in cleaner water
- provide important habitat areas for many fish species, including barramundi
- are habitats for a wide range of wildlife, including migratory birds and many other rare or threatened species which may provide an export point.



Figure 3. Conceptual model containing typical wetland features. Adapted from Smith, 2006.

Waterways in this module refer to rivers and streams, such as water courses, creeks, drains, dams and canals, and waterholes. Waterways are important for providing water for agricultural production and for drinking and irrigation water.

Riparian zones are land that abuts waterways, or is influenced by, or is a feature of, a waterway. In other words, it is typically the banks and land adjoining a body or channel of water. Well-managed riparian zones that incorporate grass trees, shrubs and other vegetation:

- reduce the speed of water down banks, therefore reduce erosion during floods, especially in combination with other farm practices such as grass cover bank stabilisation
- increase soil and root cover that anchors banks to prevent erosion, decrease bank slumping and sediment entering as well as trapping sediment and making erosion and slumping of material
- trap sediment naturally occurring due to the increased retention of water by riparian zone vegetation
- are suitable for natural habitat for wildlife and riparian species
- provide habitat and corridors for fish, water frogs, birds, kangaroos, wallabies, and many other animals.

Other vegetated patches and features are landward parts of the landscape that have either been cleared or have gradually been cleared and are not currently managed as part of a natural system. They can be grassed, planted, or otherwise managed. A number of these vegetated patches are important for the overall health of the landscape and can provide an export point for water, sediment, and other pollutants. They can be grassed, planted, or otherwise managed. They can be grassed, planted, or otherwise managed. They can be grassed, planted, or otherwise managed.

Everyone is encouraged to consider these conditions. All land users that wish to improve the health of the landscape will benefit from the correct application of public law designed for the water BMP program. Natural systems are not managed to help improve the health of the landscape and waterways. Figure 3 shows how many farms in a part of the Burdekin catchment have been able to do this.



**APPENDIX 9H: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - BURDEKIN CANE INDUSTRY (FACT SHEETS 4 OPENS AS 5) – SMARTCANE BMP MODULES – WHS MODULE**

[http://www.canegrowers.com.au/icms\\_docs/188393\\_WHS\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/188393_WHS_Module_Form.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 23.73**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 130 Conversion: 130 \* 3.0 = 390

**23.73 = 3.1291 + 1.043 \* square root of (((390.0) / 30.0) \* 30)**

Smartcane BMP

<https://www.smartcane.com.au/user/modules.aspx?id=a95c6e6e-c47d-...>

**Work, Health and Safety Process Management**

Providing a safe working environment at the family farm is a paramount business activity that is just as important as managing any other farm business aspect. It makes good business practice to provide a safe working environment for our family workers, their families and others. We are committed to the highest standards of work, health and safety to ensure that our family workers are able to work safely and healthily. The Work Health and Safety module of the SmartCane BMP program aims to benchmark the level of our safety compliance ability and then provide us with a framework to continuously improve our working processes. The Work Health and Safety module will provide information and guidance with a practical, action-oriented approach to understanding the importance of Work, Health and Safety practices, obligations and legislative requirements as part of the broader SmartCane BMP program. Click the following link for an online PDF version of this module: [http://www.smartcane.com.au/Docs/188393\\_WHS\\_Module\\_Form.pdf](http://www.smartcane.com.au/Docs/188393_WHS_Module_Form.pdf)

- The Work Health and Safety (WHS) module contains a comprehensive range of WHS topics covering the full range of applicable activities associated with primary agriculture. The design of the SmartCane BMP module will guide growers through a process that determines whether they are BSLONG, BSLONG or ABOVE industry standards for ensuring that their business is secure about WHS compliance.
- The module covers basic categories such as:
1. Management Safety Commitment
  2. Management Responsibilities
  3. Assessment, Training and Skills
  4. Planning
  5. Hazardous Operations and Processes
  6. Workers Compensation and Rehabilitation
  7. Training

**Key Area: Management**

**T.1.1 Policies**

<b>Practical:</b>	
<b>SmartCane Standard:</b>	Management has an documented policy and risk assessment system approach to manage incidents when necessary.
<b>Industry Standard:</b>	Management has an general Safety Policy that is consistent to the legal requirements for establishing or maintaining standards and risk prevention.
<b>SmartCane Standard:</b>	Management assesses and maintains a safety management system including: - Policy documents for health and safety - Incident and injury reporting - Risk assessment and hazard identification - Design and checks - Assessment, testing and identification - Approval - Control measures - Working plans - Updates - Competency matrix - Worker flow conditions - Plans for work - Management procedures for: - Compliance with requirements - Clear safety compliance agreement

**Key Area: WHS awareness**

**T.1 WHS awareness**

<b>Practical:</b>	
<b>SmartCane Standard:</b>	Property owner/manager has a limited understanding of legal responsibilities for the health and safety of workers, contractors and others on site to avoid them.
<b>Industry Standard:</b>	Property owner/manager understands that legal responsibilities for the health and safety of workers, contractors and others and takes appropriate actions to meet that obligation.

**Key Area: Responsibilities**

**T.2.1 Obligations**

<b>Practical:</b>	
<b>SmartCane Standard:</b>	Management is not aware of obligations for safe work environment.
<b>Industry Standard:</b>	Obligations management are understood. Management is aware of safety obligations for self (as a worker) and others.
<b>SmartCane Standard:</b>	Management responsibility and responsibilities are clearly documented and included in job descriptions.

**Key Area: Risk Management**

**T.2 Risk management**

<b>Practical:</b>	
<b>SmartCane Standard:</b>	No processes of risk management has been undertaken for the workplace. No Risk Management Procedures have been developed.
<b>Industry Standard:</b>	A risk management process to understand (in consultation with workers) for all activities in the workplace that pose a risk. Risk Management Procedures are developed and implemented. Risk management processes and safe work procedures are documented.

**Key Area: Training and supervision**

**T.3 Training and supervision**

<b>Practical:</b>	
<b>SmartCane Standard:</b>	Safety training is not provided and/or workers are not made aware of safety issues. Limited supervision of safe work practices.
<b>Industry Standard:</b>	Workers are trained in safe work practices before commencing work. The workplace is supervised in safety procedures are being followed. Training meets requirements of WHS legislation and relevant codes of practice. There are no gaps in training. Training and Safe Work Procedures are consistent with relevant codes of practice.

**Key Area: Consultation**

**T.4 Consultation**

**APPENDIX 10: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER - FURTHER INFORMATION - SMARTCANE BEST MANAGEMENT PRACTICE PROGRAM FACTSHEET 6 (SHOWS ON WEBPAGE LISTING AS FACTSHEET 5)**

[http://www.canegrowers.com.au/icms\\_docs/188393\\_WHS\\_Module\\_Form.pdf](http://www.canegrowers.com.au/icms_docs/188393_WHS_Module_Form.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 12.27**

Sentences: 25 \* 1.2

Big Words (>= 3 syllables): 64      Conversion: 64 \* 1.2 = 76.8

**12.27 = 3.1291 + 1.043 \* square root of (((76.8) / 30) \* 30)**



The Smartcane Best Management Practice (Smartcane BMP) Program is an industry led, government supported best practice system for cane growing across Queensland, aiming to support business productivity, profitability and stewardship.

Smartcane BMP includes seven 'modules' covering all aspects of farm activities. Under the Reef Trust Tender – Burdekin, successful applicants are required to complete the following three self-assessed modules within the first year of their grant contract. It is expected that the process of registering and completing the following three modules will take no more than three hours:

- soil health and nutrient management
- irrigation and drainage management
- weed, pest and disease management.

Applicants are also encouraged to complete the other modules offered under Smartcane BMP which are not mandatory:

- crop production and harvesting management
- farm business management
- natural systems management
- workplace health and safety.

Smartcane BMP is available on-line\* and as successful applicants answer each question, the system will tell them if they are 'below', 'at', or 'above' the industry standard for each practice. If any practice is below the industry standard, the successful applicant will be shown what they could do to reach industry standard. There is a team of local facilitators throughout Queensland that will help sugar cane farmers to go through the modules step-by-step. Hard copies of the Smartcane BMP modules are available upon request. For more information contact your local facilitator.

The local Burdekin Smartcane BMP facilitator is Terry Granshaw from Burdekin Productivity Services. He can be contacted on (07) 4783 1101 or 0437 553 149 or by email at [tgranshaw@bps.net.au](mailto:tgranshaw@bps.net.au).

**Meeting the required standard for Smartcane BMP**

If a successful applicant does not meet the industry standard within any of the three required modules, they may work with a Smartcane BMP facilitator to develop an action plan to help them meet that standard. This action plan may include a structured workshop with other sugar cane farmers, a one-on-one consultation or referral to an industry expert, a modification to a work procedure or a change to work systems. Each action plan will be tailored to suit each individual and their business situation and support will be provided to help implement the actions if requested.

*The Burdekin Tender is supported by NQ Dry Tropics through funding by the Australian Government's National Reef Trust Programme.*

## APPENDIX 11: EXAMPLE TEXT TAKEN FROM REEF TRUST TENDER FORM – TRACKING CODE 9XTXLQ

Via email by Sarah Rodriguez - [Sarah.Rodriguez@environment.gov.au](mailto:Sarah.Rodriguez@environment.gov.au)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 14.70**

Sentences: 29 \* 1.03

Big Words (>= 3 syllables): 119      Conversion: 119 \* 1.03 = 122.57

**14.70 = 3.1291 + 1.043 \* square root of (((122.6) / 29.87) \* 30)**



The image shows a document titled "Reef Trust Tender form - Burdekin". At the top left is the Australian Government logo. In the center is the Reef Trust logo featuring a fish. To the right is the logo for "DRY TROPICS" with a stylized landscape. Below the logos, the text "Tracking Code: 9XTXLQ" is visible. The main heading is "Introduction". Below this, there is a warning: "THIS FORM CAN ONLY BE SUBMITTED ONCE. IT CANNOT BE SHARED. A NEW FORM MUST BE DOWNLOADED FOR EACH TENDER APPLICATION FORM." The "Introduction" section contains several paragraphs of text, including a note about amendments and a list of definitions. The "Form Definitions" section lists terms like "Alternative Contact Person", "Applicant", "Reverse Auction", "Department", "Guidelines", and "Project". The "Eligibility & Information" section begins with an "Eligibility" heading and a question: "Has the Applicant previously registered an expression of interest in the Project?". The page number "Page 1 of 8" is at the bottom right.

**Reef Trust Tender form - Burdekin**

Tracking Code: 9XTXLQ

### Introduction

THIS FORM CAN ONLY BE SUBMITTED ONCE. IT CANNOT BE SHARED.  
A NEW FORM MUST BE DOWNLOADED FOR EACH TENDER APPLICATION FORM.

#### Introduction

This Tender Application Form is for the Reef Trust Tender - Burdekin (the Project). The Guidelines referred to throughout this Tender Application Form are the Reef Trust Tender - Burdekin Applicant Guidelines (the Guidelines).

Ensuring you have read the Guidelines prior to completing this Tender Application Form, as they contain important information on eligibility requirements and details on how to complete and submit your Tender Application Form.

**Note:** The Guidelines and this Tender Application Form may be amended by the Department of the Environment (the Department) in accordance with changing Project requirements. Any amendments made to these documents will be published on the Reef Trust Tender - Burdekin website.

The Department requires all Tender Application Forms to be submitted electronically (unless there are particular circumstances meaning an Applicant is unable to do so). Do not print this document and complete by hand. Essential questions may not be visible in the printed format. For assistance email or contact: NC Dry Tropics on 1800 604 635.

To ensure web links to retrieve information automatically we recommend that you are connected to the internet, using Internet Explorer web browser, and that you work from a secured session when completing the Tender Application Form.

You must complete all questions marked with an asterisk (\*) for your Tender Application Form to be assessed. Any mandatory numerical fields should contain a zero (0) rather than being left blank.

#### Form Definitions

The following definitions apply throughout this Tender Application Form:

- The **Alternative Contact Person** is the person who can be contacted about this Tender Application Form if the Applicant is not available.
- The **Applicant** is the person or entity who is applying under the Project and who may enter into a formal Grant Contract with NC Dry Tropics if their Tender Application is successful, as per the requirements set out in the Guidelines.
- The **Reverse Auction** is the market based mechanism whereby Applicants who registered their expression of interest are invited to apply for funding.
- The **Department** is the Australian Government - Department of the Environment.
- The **Guidelines** refer to the Reef Trust Tender - Burdekin Applicant Guidelines.
- The **Project** is the Reef Trust Tender - Burdekin.

### Eligibility & Information

#### Eligibility

Has the Applicant previously registered an expression of interest in the Project?

Page 1 of 8

## APPENDIX 12: EXAMPLE TEXT TAKEN FROM THE REEF TRUST GULLY EROSION CONTROL PROGRAM – APPROVED PROJECTS

<http://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-control>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 20.39**

Sentences: 16 \* 1.87

Big Words (>= 3 syllables): 146      Conversion: 146 \* 1.87 = 273.02

**20.39** = 3.1291 + 1.043 \* square root of (((273.02) / 29.92) \* 30)

Reef Trust Gully Erosion Control Programme | Department of the Env... <https://www.environment.gov.au/marine/gbr/reef-trust/gully-erosion-co...>



Australian Government  
Department of the Environment

### Reef Trust Gully Erosion Control Programme

#### Successful projects

The Minister for the Environment has announced the successful projects to be funded under the Reef Trust Gully Erosion Control Programme. Under the programme, the Government is providing \$4.9 million across five projects aimed at tackling the issue of gully erosion in the Great Barrier Reef catchments.

[Approved Gully Erosion Control projects \(PDF - 18.81 KB\)](#) | [\(DOCX - 15.37 KB\)](#)

[Media release](#) - 3 March 2016

The Reef Trust Gully Erosion Control Programme aims to reduce or manage fine sediment erosion from gullies in the reef catchments—one of the highest water quality risks to the Great Barrier Reef. The Government is allocating \$4.9 million for five projects across the four targeted natural resource management regions in Queensland to fund community groups and organisations to work with private landholders to remediate high risk gullied areas.

The five successful projects will be delivered across six of the 10 eligible Management Units on private land in regional areas of Cape York, Burdekin, Fitzroy and Burnett-Mary natural resource management regions.

The application process was open to eligible community groups, non-government organisations and not for profit organisations. The Government sought projects that aligned with the recommended activities in the Reef Trust Gully Erosion Control Programme Guidelines and Gully Toolbox and demonstrated consideration of the key issues in the targeted high-risk gullied areas. Strong community support, effective partnerships and high likelihood of success and ongoing management of the activities were prioritised.

The application period was open from 29 October 2015 and closed on 26 November 2015.

[Show all](#) [Hide all](#)

#### Application process

#### Contact us

For further information about the Reef Trust Gully Erosion Control Programme, please contact the Department:

Email: [reef2050@environment.gov.au](mailto:reef2050@environment.gov.au)

(Please include 'Reef Trust Gully Erosion Control Programme' in the subject line of all emails for a timely response.)



## APPENDIX 13: EXAMPLE TEXT TAKEN FROM THE REEF TRUST GULLY EROSION CONTROL PROGRAMME – APPROVED GULLY EROSION CONTROL PROJECTS

<http://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/reef-trust-gully-erosion-control-programme-successful-projects.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 15.33**

Sentences: 39

Big Words (>= 3 syllables): 178

**15.33 = 3.1291 + 1.043 \* square root of (((178.0) / 39.0) \* 30)**

### REEF TRUST GULLY EROSION CONTROL PROGRAMME

#	Project Title	Project Description	Grant Funding Location	Recipient	Value (GST excl)
1	50% reduction in gully erosion from high priority sub-catchments in the Normanby	This project utilises the most advanced spatial gully prioritisation method within the Great Barrier Reef catchment to target implementation of cost effective on ground action to achieve a 50% reduction in sediment load from gully erosion in highest priority sub-catchments in the Normanby Basin. Exclusion fencing of the gully sub-catchment, direct seeding of native grasses and trees and strategic gully stabilisation works will be targeted at the most actively eroding gullies on high priority properties. Training of technical extension officers and grazing land managers will ensure that the benefits of the Reef Trust Gully Erosion Control Programme are communicated to the wider grazing community.	Normanby, Cape York NRM region	Cape York Natural Resource Management Ltd	\$780,248
2	Gully management in highly erodible sub-catchments of the Mary River Catchment	The Mary River Catchment Coordination Association and the Gympie District Beef Liaison Group will cost effectively address gully erosion predominantly in the Western Mary Catchments. Gully erosion extension and on-ground activities will focus on key landscape units where gully erosion occurs on fragile duplex soils that export fine sediment to the Great Barrier Reef. This project will build on six years of successful delivery of Reef Water Quality Grants to the local grazing industry where gully erosion projects were a key focus. The Mary River Catchment Coordination Association will also offer professional grazing land management extension services and a suite of extension tools in these key landscape units customised to the local industry utilising experienced practitioners in erosion control, GLM, forage and pasture management.	Mary, Burnett Mary NRM region	Mary River Catchment Coordination Assoc Inc	\$808,760
3	Don River Catchment Sediment Reduction Project: Improving GBR water quality.	This project will undertake cost effective erosion gully restoration in conjunction with the Don River Improvement Trust, a Queensland statutory authority as well as Bowen and Collinsville Landcare Inc. Two sites have been selected as representative of the gully systems in the upper Don River catchment and will be used as ongoing demonstration & monitoring sites. A range of stakeholders within the Bowen region will participate including local property owners involved in agricultural enterprises.	Don, Burdekin NRM region	Greening Australia (Qld)	\$982,550
4	Point Source Sediment Management in the Burdekin Dry Tropics NRM region.	This project will implement a range of cost-effective gully remediation techniques on monitored demonstration sites in the Bowen-Bogie management unit of the Burdekin Dry Tropics NRM region by integrating best available science, extensive land rehabilitation experience and strong monitoring and evaluation framework.	Bowen Bogie, Burdekin NRM region	NQ Dry Tropics Ltd	\$808,000
5	Gully Remediation in the Fitzroy by Revegetation and Grazing Land Management	Over three years, Fitzroy Basin Association will work with landholders to undertake on-ground works at 10 sites in each of the high sediment source catchments of the Theresa Creek and Isaac management units to reduce sediment delivered to the Great Barrier Reef Lagoon through gully erosion processes. Targeted work with graziers in these areas will be achieved through the use of best available evidence to identify the highest sediment source sub-catchments in these management units as well as targeting grazing businesses that have the potential to achieve practical and meaningful outcomes to address gully erosion processes.	Theresa Creek and Isaac, Fitzroy NRM region	Fitzroy Basin Association Inc	\$1,405,767

**APPENDIX 14: EXAMPLE TEXT TAKEN FROM THE GULLY TOOLBOX – A TECHNICAL GUIDE FOR THE REEF TRUST GULLY EROSION CONTROL PROGRAM**

<http://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/grant-gully-toolbox.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 11.40**

Sentences: 82

Big Words (>= 3 syllables): 172

**11.40** =  $3.1291 + 1.043 * \text{square root of } (((172) / 14.0) * 30)$

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## Gully Toolbox

A technical guide for the Reef Trust Gully Erosion Control Programme 2015–16



Scott Wilkinson<sup>1</sup>, Aaron Hawdon<sup>1</sup>, Peter Hairsine<sup>2</sup>, Jenet Austin<sup>1</sup>

<sup>1</sup> CSIRO Land and Water

<sup>2</sup> The Fenner School, Australian National University

## APPENDIX 15: EXAMPLE TEXT TAKEN FROM THE MAPPING TOOL INSTRUCTIONS FOR REEF TRUST GULLY EROSION APPLICATION

<https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/smartform-application-mapper-guide.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 22.38**

Sentences: 14 \* 2.14

Big Words (>= 3 syllables): 159      Conversion: 159 \* 2.14 = 340.26

**22.38** = 3.1291 + 1.043 \* square root of (((340.26) / 29.96) \* 30)

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Version 2.2



Australian Government  
Department of the Environment

### Mapping tool instructions

The following instructions will allow you to draw polygon areas (enclosed shapes) for your project using Google Maps and determine the latitude and longitude of your general project location. If you have existing polygons you can also load an existing Google Earth (KML) file. Take care to draw your polygons carefully. If you have a number of sites draw a polygon for each one, rather than a single large area around them all.

#### Browser Compatibility:

Google Maps will work best using the Mozilla Firefox web browser. There are known issues if you attempt to use Internet Explorer below version 8. Mozilla Firefox can be downloaded from here <http://www.mozilla.org/en-US/firefox/new/>

This mapping tool will work on some tablet browsers, however there may be some limitations.

All example areas and locations in this guide are for guidance purposes only and have no relevance to any particular project.

#### Contents

1. Launching the Mapping Tool .....	2
2. Navigate to the general area of interest using search or the zoom and pan functions.....	2
3. Drawing a polygon area or multiple areas.....	4
4. Modifying site areas and clearing the map.....	5
5. Derive general latitude and longitude of project area .....	7
6. Saving mapping.....	8
7. Advanced Features .....	9
8. More information .....	10

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

**APPENDIX 16A: EXAMPLE TEXT TAKEN FROM THE REEF TRUST GULLY EROSION DRAFT FUNDING AGREEMENT (PART A)**

<https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-parta.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 22.42**

Sentences: 10 \* 3

Big Words (>= 3 syllables): 114      Conversion: 114 \* 3 = 342

**22.42** = 3.1291 + 1.043 \* square root of (((342.0) / 30.0) \* 30)



**Australian Government**  
**Department of the Environment**

**FUNDING AGREEMENT**

Reef Trust: **[Insert Project Name]**

Project ID:

Commonwealth of Australia as represented by the  
Department of the Environment  
ABN 34 190 894 983 (Department)

**[Insert name of Recipient]**

**[Insert ABN of Recipient]** (Recipient)





**APPENDIX 16B: EXAMPLE TEXT TAKEN FROM THE REEF TRUST GULLY EROSION PROGRAMME STANDARD TERMS AND CONDITIONS (PART B)**

<https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partb.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 20.9**

Sentences: 30

Big Words (>= 3 syllables): 291

**20.92** = 3.1291 + 1.043 \* square root of (((291.0) / 30.0) \* 30)

**PART B – Standard terms and conditions**

**1. Definitions**

In this Agreement, except where the contrary intention is expressed, the following definitions are used:

<b>ABN</b>	has the same meaning as it has in section 41 of the <i>A New Tax System (Australian Business Number) Act 1999</i> (Cth).
<b>Aboriginal Tradition</b>	has the same meaning as it has in section 3 of the <i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i> (Cth).
<b>Accounting Standards</b>	the standards of that name maintained by the Australian Accounting Standards Board (referred to in section 227 of the <i>Australian Securities and Investments Commission Act 2001</i> (Cth)) or other accounting standards which are generally accepted and consistently applied in Australia.
<b>Agreement</b>	this agreement between the Department and the Recipient comprising Parts A, B and C, as amended from time to time in accordance with clause 21.2, and includes any annexures.
<b>Agreement Period</b>	the period specified in clause 3.
<b>Audit</b>	an audit carried out by a Qualified Accountant in accordance with the Auditing Standards.
<b>Auditing Standards</b>	has the same meaning as it has in sections 9 and 336 of the <i>Corporations Act 2001</i> (Cth), and refers to the auditing standards made by the Australian Auditing and Assurance Standards Board.
<b>Auditor-General</b>	the office established under the <i>Auditor-General Act 1997</i> (Cth) and includes any other person that may, from time to time, perform the functions of that office.
<b>Auditor's Report</b>	has the same meaning it has in the Auditing Standards.
<b>Business Day</b>	in relation to the doing of any action in a place, any day other than a Saturday, Sunday or public holiday in that place.
<b>Commencement Date</b>	the date this Agreement is executed by the parties or, if executed on separate days, the date on which this Agreement is executed by the last party to do so.
<b>Commonwealth</b>	the Commonwealth of Australia.
<b>Completion Date</b>	the day after the Recipient has done all that it is required to do under clauses 5 (Conduct of the Project), 6 (Funds) and 8 (Records, reports and acquittals) of this Agreement to the satisfaction of the Department.
<b>Confidential Information</b>	information that is by its nature confidential; and (a) is designated by a party as confidential; (b) a party knows or ought to know is confidential; or (c) is Secret and Sacred Material,  but does not include: (d) information which is or becomes public knowledge other than by breach of this Agreement or any other confidentiality obligation.
<b>Conflict of Interest</b>	any circumstance in which the Recipient or any of the Recipient's Personnel has an interest (whether financial or non-financial) or an affiliation that is affecting, will affect, or could be perceived to affect, the Recipient's ability to perform the Project, or its obligations under this Agreement, fairly and independently.
<b>Department</b>	the Commonwealth Department of the Environment or any other agency that administers this Agreement from time to time.
<b>Department Material</b>	any Material provided to the Recipient by the Department.
<b>Electronic Communication</b>	has the same meaning as in the <i>Electronic Transactions Act 1999</i> (Cth).
<b>Financial Information</b>	information relating to the Recipient's receipt, retention and expenditure of the Funds, Recipient Contributions and Other Contributions including, at a minimum: (a) a balance sheet, an income statement and a cash flow statement in relation to the Funds, Recipient Contributions and Other

**APPENDIX 16C: EXAMPLE TEXT TAKEN FROM THE REEF TRUST GULLY EROSION PROGRAMME SPECIFIC TERMS AND CONDITIONS (PART C)**

<https://www.environment.gov.au/system/files/pages/d597f340-04b3-4dfa-86eb-5672003d4a5b/files/draft-funding-deed-partc.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.3**

Sentences: 30

Big Words (>= 3 syllables): 159

**16.3** = 3.1291 + 1.043 \* square root of (((159) / 30) \* 30)

**PART C – Programme specific terms and conditions**

**Programme: Reef Trust**

**23. Definitions**

In this Agreement, except where the contrary intention is expressed, the following definitions are used:

<b>Application Form</b>	the form the Recipient submitted to the Department to apply for funding for the Project, under the Programme.
<b>Asset</b>	any item of tangible property, including software, purchased or leased either wholly or in part with the use of the Funds with a value at the time of acquisition of \$5,000 or more, excluding GST.
<b>Reef Trust Branding Guidelines</b>	acknowledgement of the provision of the funds and activities undertaken in relation to the Project must be in accordance with the Reef Trust Branding Guidelines, which will be provided the Recipient upon entering the Funding Agreement.
<b>Business As Usual Activities</b>	acts or undertakings which the Recipient would undertake or would be required to undertake regardless of the Project.
<b>Depreciation</b>	has the same meaning as it has in Australian Accounting Standard AASB 116 <i>Property, Plant and Equipment</i> .
<b>Dispose</b>	to sell, mortgage or encumber, lease or sublease, license or sublicense, assign or otherwise transfer or give up ownership or the right to occupy or use, or to enter into an agreement to do any of the preceding acts.
<b>MERI / MERIT</b>	Monitoring, Evaluation, Reporting and Improvement, as detailed in the Australian Government Natural Resource Management Monitoring, Evaluation, Reporting and Improvement Framework.  The Monitoring, Evaluation, Reporting and Improvement Tool, the Department's online MERI tool.
<b>NRM Region</b>	the natural resource management region identified by the Commonwealth within the boundaries of which the Site is located.
<b>Programme</b>	Reef Trust
<b>Programme Outcomes</b>	The Programme may deliver the following Outcomes to the Great Barrier Reef World Heritage Area:  (a) improve water quality and the coastal habitat;  (b) address threats to the environment; or  (c) to protect, repair or mitigate damage.
<b>Project Budget</b>	the budget specified in Part A detailing how the Recipient will spend the Funds, and identifying the Recipient's Contributions and Other Contributions (if any) to the Project and the proposed expenditure of such amounts for the purposes of conducting the Project and otherwise performing its obligations under this Agreement as amended from time to time in accordance with clause 26(a).
<b>Project Generated Income</b>	any income earned or generated by the Recipient from its use of the Funds, including interest earned from the investment of the Funds, but does not include income earned or generated from the use of the Assets.
<b>Project MERI</b>	the plan detailing how the Recipient will conduct and complete the Project, including relevant monitoring and evaluation activities to be undertaken, in

## APPENDIX 17: EXAMPLE TEXT TAKEN FROM THE AUSTRALIAN GOVERNMENT REEF PROGRAM WEBPAGE

<http://www.nrm.gov.au/national/continuing-investment/reef-programme>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.36**

Sentences: 29 \* 1.03

Big Words (>= 3 syllables): 180      Conversion: 180 \* 1.03 = 185.4

**17.36 = 3.1291 + 1.043 \* square root of (((185.4) / 29.87) \* 30)**

The Australian Government Reef Programme | National Landcare Prog...      <http://www.nrm.gov.au/national/continuing-investment/reef-programme>



National  
Landcare  
Programme



### The Australian Government Reef Programme

The Australian Government Reef Programme is an ongoing and key component of the Australian Government's natural resource management programmes.

The Reef Programme represents a coordinated approach to environmental management in Australia and is the single largest commitment ever made to address the threats of declining water quality and climate change to the Great Barrier Reef World Heritage Area.

In the first phase of the Caring for our Country Reef Rescue program, the Australian Government committed \$200 million over five years (2008-09 to 2012-13) to improve the quality of water entering the Great Barrier Reef lagoon.

Over the course of the program more than 3200 individual land managers received water quality grants for on-farm projects.

The Australian Government has committed to continue efforts to protect the Great Barrier Reef through existing contracted Reef Programme projects from 2013-2018. These projects are designed to improve the quality of water flowing into the Great Barrier Reef lagoon and will enhance the reef's resilience to the threats posed by climate change and nutrients, pesticides and sediment runoff through a number of complimentary approaches.

#### Components

Applications for Water Quality Grants and Partnerships and System Repairs and Urban Grants have been assessed.

The Reef Programme (2013-18) will focus on six integrated components within the Great Barrier Reef catchments.

#### Water Quality Grants and Partnerships

- This component will increase the voluntary uptake of improved land management practices by landholders that will reduce the discharge of sediments, nutrients and pesticides into the Great Barrier Reef.
- \$64 million has been committed to Water Quality Grants over the next three years (2013-14 – 2015-16) and \$3 million (GST excl.) allocated to Water Quality Partnerships over five years (2013-14 – 2017-18).
- Funding was made available for this component through the 2013-14 Reef Rescue guidelines.

#### Systems Repair and Urban Grants

- Funding will support the programme to increase the Great Barrier Reef's resilience to climate change. Funding will be available for wetland, riparian and mangrove protection, and restoration projects. Funding will also be provided to support planning and on-ground projects to improve the quality of water entering the Great Barrier Reef from highly developed areas of the reef catchment.
- Funding was made available for this component through the 2013-14 Reef Rescue guidelines.

#### Water Quality Monitoring and Reporting and Research and Development (R&D)



## APPENDIX 18: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS – SUSTAINABLE AGRICULTURE

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 19.40**

Sentences: 9 \* 3.0

Big Words (>= 3 syllables): 73      Conversion: 73 \* 3.0 = 219

**19.40 = 3.1291 + 1.043 \* square root of (((219) / 27) \* 30)**

Sustainable Agriculture | NQ Dry Tropics

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/>

### NQ Dry Tropics

## SUSTAINABLE AGRICULTURE

The vision of the Sustainable Agriculture Programme is resilient landscapes and productive enterprises, agricultural producers maximising outputs while minimising environmental impacts.

The Sustainable Agriculture Programme aims to support and empower producers in the use of best management practices for natural resource management within the agricultural industries of the Burdekin Dry Tropics NRM Region. This is done through:

- planning for the sustainable management of land and water resources;
- managing and delivering programs that help protect, maintain and restore land and water resources; enhancing the capacity of the community to manage for sustainability;
- sharing knowledge;
- promoting learning, continuous improvement and best practice; and
- developing partnerships.

The Sustainable Agriculture Programme works across the region providing information, training and assistance to graziers through workshops, training and grants to enhance the capacity of farmers and graziers to manage their land sustainably.

The Sustainable Agriculture team supports the delivery of innovation, training, extension and water quality improvement grants for sugar related projects in the Burdekin Dry Tropics region. At a broad level, these projects are aimed at supporting and facilitating:

- An improved understanding of the links between management practices and the condition of natural resources, particularly in relation to catchment and reef water quality;
- The adoption of best management practices for water quality management, and
- The management of a financial incentives scheme for growers.



### Sustainable Agriculture Projects

[Saving Our Soils](#)   [Holistic Management Project](#)   [Sustainable Soils Project](#)   [Grazing BMP Project](#)  
[Project Catalyst](#)   [Gamechanger Project](#)   [Paisley Project](#)   [Reef Programme](#)

### Case Studies

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## APPENDIX 19: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – CASE STUDIES – BRAD ROSTEN

<https://drive.google.com/file/d/0BwSfEIDILIEZdU8zNFloMnIWWIk/view>

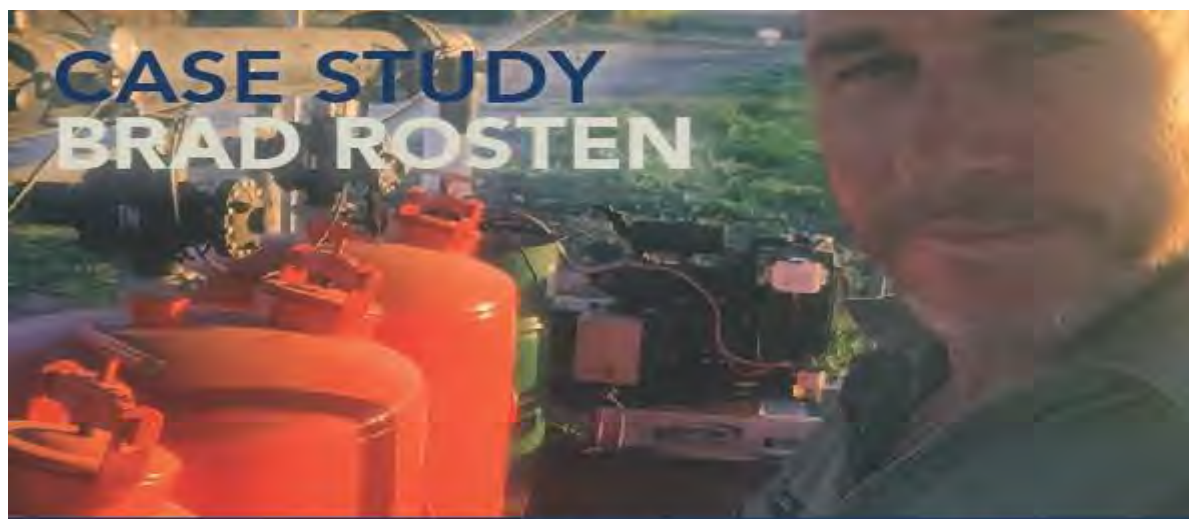
WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 15.99**

Sentences: 15 \*2.0

Big Words (>= 3 syllables): 76      Conversion: 76 \*2.0 = 152

**15.99 = 3.1291 + 1.043 \* square root of (((152.0) / 30.0) \* 30)**



**Who**  
Pumpkin Pickers

**Location**  
Mona Park, Queensland

**Catchment**  
Burdekin River

**Rainfall**  
882mm

**Property size**  
50ha

**Land use**  
Horticulture

### Background

Brad Rosten grows a mix of pumpkins and melons in the Mona Park area on the banks of the Burdekin River. His enterprise has evolved from a contract picking company, working across Northern Australia, to a horticultural production company.

Pumpkin Pickers has a long-term business objective to ensure their farming practises are sustainable and profitable. Over the past three to five years, with support from Reef Water Quality Grants through NQ Dry Tropics, Brad has had the confidence to bring forward the investment in practice changes.

### Motivator to change

As a relatively new production company, Brad took the opportunity to attend a Reef Programme workshop on fertigation techniques in 2014. As a result, he identified two management practices, that if changed, would improve overall water quality leaving the farm.

"Firstly we had to become more efficient at irrigation and secondly to reduce nutrient inputs preferably with the aid of scheduling tools," said Brad.

### Changes

Supported by Growcom, the peak representative body for Queensland horticulture and partner in the NQ Dry Tropics Reef Programme delivery team, Brad submitted a successful grant application.

He embarked on a gradual approach to the investment into new practises and technology as he felt that his block-by-block approach would offer positive environmental outcomes.

In preparation for 2015 growing season, Brad purchased a versatile portable skid unit with the ability to be towed from block to block with filtration, fertigation and schedule tools.

He also improved his irrigation practices on 25 per cent of his land, using plastic, trickle tape and moisture probes to improve on-farm water management.

Brad now applies fertiliser in multiple, smaller applications providing the benefit of reduced weed pressure which has allowed for a reduction of herbicides and the opportunity to use alternate herbicides.

By making the changes before the new growing season, Brad could compare and monitor the old and new systems throughout the year and at season's end. This information and record keeping will help to make better business decisions.

### Benefits

This practice change it not only delivers environmental outcomes, but also, according to Brad: "has further reduced farm inputs and is something we can control as a business."

Brad has suggested early results

**NQ DRY TROPICS**



## APPENDIX 20: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – CASE STUDIES – TERRY CREEK

<https://drive.google.com/file/d/0BwSfEIDILIEZdUVhQlqzN1BkY0E/view>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

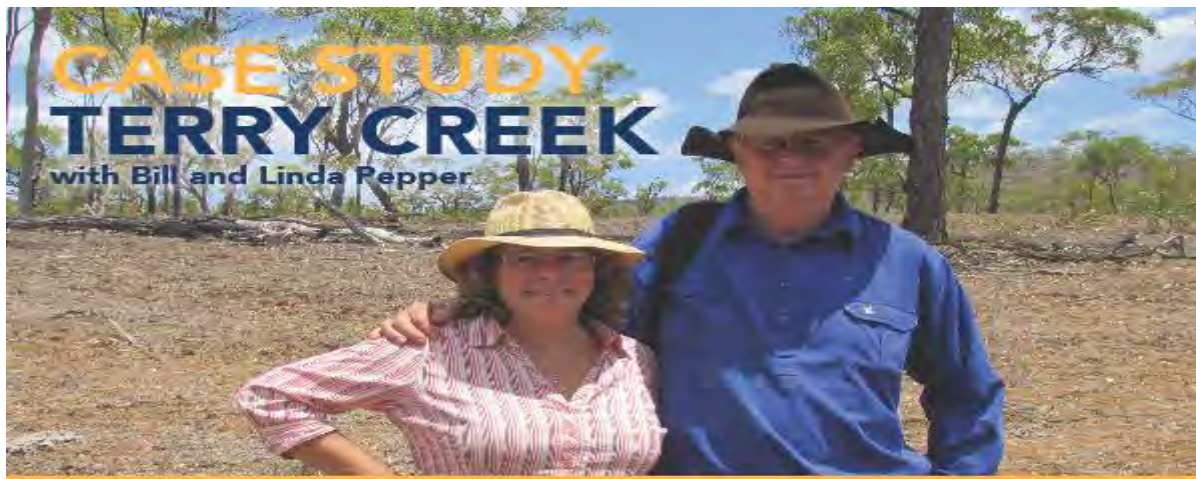
**Smog Grade: 15.97**

Sentences: 18 \* 1.67

Big Words (>= 3 syllables): 91

Conversion: 91 \* 1.67 = 151.97

**15.97 = 3.1291 + 1.043 \* square root of (((151.97) / 30.06) \* 30)**



### Who

Bill and Linda Pepper

### Location

Terry Creek Station, Collinsville, Queensland

### Basin

Bowen, Broken, Bogie

### Rainfall

700mm average/annum

### Property size

3,615ha

### Enterprise

Beef cattle breeding

### Family history

Bill and Linda Pepper purchased Terry Creek in 1976 as additional grazing country to their existing cane and cattle property in the Proserpine district.

This marked a return to the area where Bill grew up, following time leasing a property in the Charters Towers district.

### Practices

Since its purchase 39 years ago, Bill and Linda have undertaken a variety of infrastructure improvements to the property of predominantly red Goldfields country.

Terry Creek is currently fenced into seven paddocks and historically has carried around 500 breeders.

Motivated by the drought and stock water challenges, they reduced their stock

numbers to approximately 200 breeders. They will continue with the reduced rate regardless of water issues to allow for easier management of the property.

The Peppers have implemented conservative stocking and regular wet season spelling over the entire property.

This has contributed to the current good ground cover levels across most of the property, despite poor seasons in recent years.

### Motivators for change

Bill and Linda's change management decisions have been supported by attending a Resource Consulting Services Grazing for Profit School in the early 2000s and various other information days.

The Peppers have always had a keen interest in land management and found out about Reef Water Quality Grant funding through AgForce.

"One of my pet hates is erosion," said Bill, "When working on the property we've always taken note of condition of the country, particularly in fragile areas and would discuss ways to improve conditions with like-minded people."

"Being involved in the project didn't change, but reaffirmed our views on land management," said Linda.

### Project involvement

With assistance from NQ Dry Tropics, Reef Water Quality Grant funding in 2010, and technical advice provided

by the Queensland Department of Agriculture and Fisheries (DAF), the Peppers were able to undertake two projects.

These helped them tackle erosion issues on the property and included riparian fencing along both sides of Terry Creek and gully rehabilitation.

As part of the gully rehabilitation project, Bill and Linda hosted a grader workshop on the property in 2011 with guest presenter and erosion control expert Darryl Hill and DAF Soil Conservation Officer Bob Shepherd.

Following a plan, the Peppers reshaped the gully and subdivided the paddock to allow for wet season spelling.

They constructed a diversion bank above the gully using a grader to minimise the amount of runoff entering the rehabilitated area and spread the local runoff from the 10ha catchment on an adjacent ridge.

The slope above the diversion bank was surveyed and contour ripped at 6m intervals to promote infiltration and sown with buffel and stylo pastures.

As part of the gully project, cattle were excluded for two wet seasons

**NQ DRY TROPICS**



## APPENDIX 21: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – CASE STUDIES – JOSEPH MAGATELLI

<https://drive.google.com/file/d/0BwSfEIDILIEZOTc0eVI1RmlmVzQ/view>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.15**

Sentences: 42

Big Words (>= 3 syllables): 253

**17.15 = 3.1291 + 1.043 \* square root of (((253.0) / 42.0) \* 30)**



**Who**  
Joseph Magatelli

**Location**  
Jarvisfield, 9km east of Ayr

**Catchment**  
Plantation Creek

**Rainfall**  
1022mm

**Property size**  
75ha

**Landuse**  
Sugarcane production

**Family History**  
Following in his grandfather's footsteps, Joe has been growing sugarcane on his 75ha farm in the Jarvisfield area since 1995.

After completing a cabinet making apprenticeship and working in the trade for five years, Joe returned to work on the family farm with his brother Michael and father Jim.

As the economics of farming sugarcane changed, the family enterprise property size was becoming insufficient to support all the families. This motivated Joe to take the opportunity to expand the business, buying another 73ha farm in Brandon.

**Practices**  
Joe uses GPS guidance on a controlled traffic farming system using minimum tillage, planting via conventional billet planter on single row at 1.55m centres.

Fallow management involves discing the paddock twice, ripping centres and then bedforming. He plants legumes on the bed which are incorporated as a green manure before planting cane. The entire farm is flood irrigated in a furrow system.

From 2009-10 Joe implemented practice changes on his farm through the support of Reef Water Quality Grants. These practices included precision fertiliser and chemical application, and the incorporation of a legume fallow.

**Chemical practices**  
Joe uses a block specific weed management plan based on his experience which targets soil zones and correlates with weed pressures.

Rate and timing of applications are also guided by his experience and he takes into account label rates and agronomist recommendations.

GPS guidance is used on all applications which

use hooded and boom spray equipment.

To compensate for no flow rate monitor, Joe calculates by the area for every tank applied to maintain accuracy. He hasn't used PSII herbicides for eight years and uses a contractor for any high clearance work needed.

**Nutrient practices**  
Joe uses a block specific nutrient plan at rates which are guided by regular soil testing on fallow blocks, crop class and agronomist recommendations.

He has EM mapped the entire farm which, combined with the soil testing, is used to calibrate rates of a standard blend fertiliser. This is applied subsurface using a variable rate controlled stool splitter or as side dressing when required.

Joe uses GPS guidance for all applications so he can continuously check calibration of rates applied as well as recalibrate between products.

**NQ DRY TROPICS**

## APPENDIX 22: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM WEBPAGE

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 15.5**

Sentences: 20 \* 1.5

Big Words (>= 3 syllables): 94      Conversion: 94 \* 1.5 = 141

**15.5 = 3.1291 + 1.043 \* square root of (((141) / 30) \* 30)**

Reef Programme | NQ Dry Tropics

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-p...>

### NQ Dry Tropics

## REEF PROGRAMME

### *A Healthier Burdekin for a Healthier Reef*

*All Water Quality grant dollars are now fully committed.*

From 2008-2013 the Australian Government invested over \$32 million into grazing/farming communities within the Burdekin Dry Tropics region to assist with practice changes that will reduce sediment, nutrients and pesticides leaving farms and entering the Great Barrier Reef Lagoon. These grants were made available by the Australian Government's Caring for Our Country program through the \$200 million Reef Rescue initiative.

Building on the success of the Reef Rescue Program, the Reef Programme is a current Australian Government initiative to minimise the impacts of agricultural run-off and improve water quality entering the Great Barrier Reef lagoon. It includes a \$146 million Water Quality Grants Scheme. The programme forms part of a \$200 million 2013-2018 initiative.

A further \$15 million has been allocated to the Burdekin Dry Tropics NRM region over the next three years (2013-2016) to continue the work towards a healthy Great Barrier Reef. This will fund the implementation of a water quality improvement program to achieve sustainable agricultural practices in the sugar and other intensive farming systems, and grazing industries of the Burdekin Dry Tropics NRM region, through a targeted extension and financial incentives program.

Project outputs include:





## APPENDIX 23: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM – SUGARCANE ACTIVITIES

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-programme/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 19.4**

Sentences: 11 \* 2.7

Big Words (>= 3 syllables): 89      Conversion: 89 \* 2.7 = 240.3

**1.35** = 3.1291 + 1.043 \* square root of (((**240.3.0**) / **29.7**) \* 30)

Project has completed – link no longer available SMOG count completed 2 July 2016

Reef Programme | NQ Dry Tropics

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/reef-...>

### NQ Dry Tropics

## REEF PROGRAMME

**This project has been completed.**

#### A Healthier Burdekin for a Healthier Reef

From 2008-2013 the Australian Government invested over \$32 million into grazing/farming communities within the Burdekin Dry Tropics region to assist with practice changes that will reduce sediment, nutrients and pesticides leaving farms and entering the Great Barrier Reef Lagoon. These grants were made available by the Australian Government's Caring for Our Country program through the \$200 million Reef Rescue Initiative. Building on the success of the Reef Rescue Program, the Reef Programme is a current Australian Government Initiative to minimise the impacts of agricultural run-off and improve water quality entering the Great Barrier Reef lagoon. It includes a \$146 million Water Quality Grants Scheme. The programme forms part of a \$200 million 2013-2018 Initiative.

A further \$15 million was allocated to the Burdekin Dry Tropics NRM region over the three years (2013-2016) to continue the work towards a healthy Great Barrier Reef. This funded the implementation of a water quality improvement program to achieve sustainable agricultural practices in the sugar and other intensive farming systems, and grazing industries of the Burdekin Dry Tropics NRM region, through a targeted extension and financial incentives program.

**Project outputs included:**



## APPENDIX 23A: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM – SUGARCANE AUTOMATION FIELD DAY

Supplied by NQ Dry Tropics

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 13.5

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 33      Conversion: 33 \* 3.0 = 99

$1.35 = 3.1291 + 1.043 * \text{square root of } (((99.0) / 30) * 30)$

Sugarcane Innovation Program  
**Automated Irrigation Field Day**  
NQ DRY TROPICS  
SUSTAINABLE AGRICULTURE

**3.00 pm, Tuesday 1 December**  
Willy Lucas Farm, corner Hurney and Osbourne Rds, Osbourne

Are you interested in learning about the advances being made in low-cost automation within furrow irrigation?

NQ Dry Tropics invites you to inspect the prototype low cost furrow irrigation automated system developed through the NQ Dry Tropics, Sugarcane Innovations Program.

Take the opportunity to inspect, operate and provide your perspective on the practicality of the low cost automation and telemetry irrigation system.

- Inspect first hand, the systems componentry
- Discuss infield placement of end of row sensors and feedback mechanisms
- See working automated linear valve actuators paired with radio stations
- Inspect the pump station set-up; base station, solar powered system and fail safe measures.
- Interact with a fully operational bench top model
- Learn about remote control ability through the Phone App
- Discuss the costs involved, longevity and potential commercialisation of the system.

Presented by: Willy Lucas (host farmer), Peter McDonnell (Farmer), Greg Paine (GPS/Laser technician) and Anthony Curro (NQ Dry Tropics).



Presented by the NQ Dry Tropics Sugarcane Innovation Program trial implementation team



**REGISTER NOW**  
On 4722 5752 / 0408 272 613 or [anthony.curro@nqdrytropics.com.au](mailto:anthony.curro@nqdrytropics.com.au)  
Smoko provided, catering cannot be guaranteed without prior registration.

The NQ Dry Tropics Sugarcane Innovations Program is supported through funding from the Australian Government, WWF and the Coca-Cola Foundation. The "Gamechanger" Project and Reef Water Quality Grants are funded through the Australian Government Reef Programme and Project Catalyst is funded by the Coca-Cola Foundation and the World Wildlife Fund. Burdekin regional delivery partners include The Department of Agriculture and Forestry and Farmacist.





**APPENDIX 23B: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM – SUGARCANE WATER QUALITY GRANT FLYER**

Supplied by NQ Dry Tropics

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 15.7**

Sentences: 33

Big Words (>= 3 syllables): 159

**15.7 = 3.1291 + 1.043 \* square root of (((159) / 33) \* 30)**



**Applications now open.**

Funding is available for practices that reduce nutrients and pesticides leaving Burdekin sugarcane farms.

**Contact a Field Officer:**

**NO Dry Tropics**

David Olsen 0488 741 609  
Laurent Verpeaux 0417 799 003

**DAFFO**

Brock Dembowski 0467 819 592

**BBIFMAC**

Tom McShane 0429 834 344

**Save money through:**

- Effective chemical application rates
- Precision fertiliser placement
- Improved irrigation efficiency
- Reduced off-farm runoff

NQ Dry Tropics is providing support through the Australian Government Reef Programme to help farmers implement changes that improve management practices and productivity, while also reducing agricultural run-off into the Great Barrier Reef lagoon.

Call **NO Dry Tropics** on 07 4724 3544.



**APPENDIX 24A: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM – GRAZING – EROSION CONTROL FIELD WALK**

Supplied by NQ Dry Tropics

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 12.0**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 24      Conversion: 24 \* 3.0 = 72

**12.0** = 3.1291 + 1.043 \* square root of (((72.0) / 30.0) \* 30)



The poster features a background of a field with trees and a blue sky. At the top, the text 'Erosion control field walk' is written in a large, bold, blue font. To the right, the NQ Dry Tropics logo is displayed, consisting of two yellow hills above the text 'NQ DRY TROPICS' and 'SUSTAINABLE AGRICULTURE'. Below the title, the event details are listed: 'Worona Station, Flinders Hwy' and 'Wednesday 23 September 2015, 1.00pm-4.30pm'. A central message reads 'Keep your soil safe!'. The main body of text invites attendees to a field walk to learn about erosion management. It mentions that the event will be hosted by Chris LeFeuvre, who has trialed various erosion control techniques. At the bottom, there is a photograph of several brown cows in a field. Below the photo, contact information for Jared Sunderland is provided: 'FOR MORE INFORMATION, OR TO REGISTER Contact Jared Sunderland on E: jared.sunderland@nqdrytropics.com.au or M: 0411 462 745'.



This event is an initiative of NQ Dry Tropics and is supported through funding from the Australian Government Reef Programme that is reducing the impacts of agriculture on the Great Barrier Reef.



**APPENDIX 24B: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – REEF PROGRAM – GRAZING – EROSION CONTROL GRADER WORKSHOP**

Supplied by NQ Dry Tropics

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 14.7**

Sentences: 9 \* 3.0

Big Words (>= 3 syllables): 37      Conversion: 37 \* 3.0 = 111

**14.7 = 3.1291 + 1.043 \* square root of (((111.0) / 27.0) \* 30)**

**EROSION CONTROL GRADER WORKSHOP**  
 NQ DRY TROPICS  
 SUSTAINABLE AGRICULTURE

**9AM TUESDAY 23 SEPTEMBER  
 WANDOVALE STATION**

NQ Dry Tropics invites you to a workshop that includes practical guidelines, hands on training and demonstrations using a grader in the paddock. Presenter Darryl Hill is highly recognised throughout Australia for his practical knowledge and experience using graders and other machinery. For more than 40 years he has studied soil erosion from a variety of viewpoints: as a ringer, head stockman, property manager and Landcare officer.

**Information on design and maintenance of:**

- Fire plough tracks
- Property access roads
- Fence lines
- Formed roads

**Learn how to achieve:**

- More effective firebreaks
- Effective fenceline erosion control leading to better stock handling and fewer fencing repairs
- Reduction of between 30-50% in maintenance time for access tracks
- Reduced travelling time on property access roads by 10%
- Reduced levels of soil and silt flowing into stock waters and watercourses
- A safer working environment.

**How to best treat:**

- Washouts
- Eroded fence lines

**REGISTER NOW  
 ON 0439 661 961**  
 5pm finish. Smoko & lunch provided.

Landcare Australia  
 The Reef is supported through funding from the Australian Government Reef Program.

## APPENDIX 25: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – GRAZING BMP WEBPAGE

Supplied by NQ Dry Tropics

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.6**

Sentences: 9 \* 3.0

Big Words (>= 3 syllables): 50      Conversion: 50 \* 3.0 = 150

**16.6 = 3.1291 + 1.043 \* square root of (((150.0) / 27.0) \* 30)**

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Grazing BMP Project | NQ Dry Tropics

<http://www.nqdrytropics.com.au/projects/sustainable-agriculture/grazin...>

### NQ Dry Tropics

## GRAZING BMP PROJECT

The Grazing BMP program has been developed from the collaborative efforts of the **Queensland Department of Agriculture, Fisheries and Forestry (QDAFF)**, **Fitzroy Basin Association (FBA)** and **AgForce Queensland**.

The Grazing BMP Program is jointly funded by the Australian and Queensland governments and its success is dependent on a strong collaboration between governments, industry bodies, regional natural resource management bodies and land managers.

Delivery of the Burdekin subprogram is through a partnership including NQ Dry Tropics, Queensland Department of Agriculture, Fisheries and Forestry (DAFF) and AgForce. Following a pilot project ending June 2014, the Queensland Department of Environment and Heritage Protection has funded a three year extension to 2017.

The Grazing BMP Program is a voluntary, industry led process which helps graziers to identify improved practices which can help improve the long term profitability of their enterprise. It also helps identify the steps that need to be taken to incorporate best management practices into enterprises.

NQ Dry Tropics is delivering the Grazing BMP to graziers through one-on-one and small groups on property. Training is offered to graziers around topics that are identified through the Grazing BMP



## APPENDIX 26: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – GRAZING BMP WEBPAGE

<https://www.bmpgrazing.com.au/#&panel1-5>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 18.64**

Sentences: 16 \* 1.87

Big Words (>= 3 syllables): 118      Conversion: 118 \* 1.87 = 220.66

**18.64 = 3.1291 + 1.043 \* square root of (((220.66) / 29.92) \* 30)**

<https://www.bmpgrazing.com.au/#&panel1-6>

### What is Grazing BMP?

The Grazing BMP program is a voluntary, industry led process which helps graziers to identify improved practices which can help improve the long term profitability of their enterprises. It also helps identify the steps you need to take to incorporate best management practices into your enterprise. In time it will also allow the grazing industry to demonstrate good environmental management to the wider community.

[Register \(user/registration/Signup.asp\)](#)

[Sign In \(user/registration/SignIn.asp\)](#)



#### 1 2 3 4 5 6 7 Recent Activities

27 June 2016 Low Stress Stockhandling - ticking boxes for Animal Welfare and Production

### Low Stress Stockhandling - ticking boxes for Animal Welfare and Production



Livestock producers work within a competitive space under ever increasing scrutiny from both animal activist groups and consumers. Cost of production can be prohibitive, but there are certain things that can be done to improve the quality and value of the product. LSS is one of them. Production and ultimately financial reward are key drivers behind the concepts embraced through Low Stress Stockhandling Schools.

Research has shown that animals can lose as much as 6% in shrinkage and "dark cutters" are severely discounted if not condemned. Dark cutting beef (DCB) is largely linked with stress and the mobilisation of muscle glycogen (energy stores) in the

live animal prior to slaughter. Discounts of up to \$0.60/kg can be applied for such carcasses determined to be a dark cutter. This equates to a \$150 discount for a 250kg carcass. Shrinkage directly affects the income of all cattle producers. Shrinkage can be reduced through better handling techniques, attention to environment and diet, market planning and an appreciation of animal



## APPENDIX 26A: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – GRAZING BMP – ACCREDITATION INFORMATION – CERTIFICATION AND AUDIT ASSURANCE STRATEGY

[https://www.bmpgrazing.com.au/images/public\\_audit\\_docs/caas.pdf](https://www.bmpgrazing.com.au/images/public_audit_docs/caas.pdf)


WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 13.82

Sentences: 44

Big Words (>= 3 syllables): 154

13.82 = 3.1291 + 1.043 \* square root of (((154.0) / 44.0) \* 30)



# GRAZING BMP

## CERTIFICATION AND AUDIT ASSURANCE STRATEGY

**WHAT IS IT?**  
The aim of the Grazing BMP program is to transition the grazing industry from its current position toward a voluntary grazing management system that drives sustainable, profitable and ethical beef industry development, whilst demonstrating world leading stewardship to the broader community.

**WHY WOULD I WANT TO DO IT?**

- To demonstrate and validate world leading stewardship to the government and broader community using reliable, relevant and robust information.
- To reinforce the integrity of the Grazing BMP data collected, thus validating and giving confidence to external stakeholders and the broader community in the BMP process.
- Government has an expectation for less need for regulation once there is high adoption of BMP programs.

**WHO CAN DO IT?**

- Any grazer who wishes to have their Recognition of Self-assessment endorsed by the industry.
- Grazing BMP participants are now being invited to participate in a review of their self-assessment.
- This component is voluntary and offered free of charge to graziers to help ratify our industry position.

**WHO ARE THE INDUSTRY AUDITORS?**

- Contractors are selected for their high level of relevant industry experience.
- Auditors are external to the Grazing BMP program, but are strongly involved in the industry.
- Auditors have completed program specific auditing training course.

**HOW DO I DO IT?**

- Applicants are invited to engage in the process by expressing interest in the review process.

- A local Grazing BMP officer is assigned to work with the applicant through the initial process to ensure the applicant is comfortable with and equipped for the audit process, although this is not mandatory.
- Sufficient evidence to meet the requirements of the audit is collected. For example, property maps, property diaries, paddock records, kill sheets, work plans, chemical inventories and chemical treatment records. A full list of evidence is provided in the checklist.

**INFORMATION AND EVIDENCE GATHERING**

- Gathered information is forwarded to the Grazing BMP team who validates the information supplied against the Grazing BMP checklist. This process is to ensure the appropriate evidence is available to progress to the on-ground assessment.
- The Grazing BMP team verifies that documentation has met the requirements and organises a time and date for the next stage.

**ON-GROUND VALIDATION**

- Following a successful desktop audit, an appointment for the on-ground phase of the audit will be negotiated to best suit the applicant.
- The auditor will conduct the on-ground visit, which generally takes just a few hours. The aim is to validate that the practices identified during the desktop audit are being followed.

**AUDIT FINDINGS...WHAT NEXT?**  
On successful completion you will be recognised as an Accredited Producer. The individual accreditation will provide confidence that your performance is endorsed, scientifically robust and recognised. It is envisaged the accreditation could be used by graziers to endorse or recommend their performance or product in an identified market and the broader community. This accreditation is valid for three years.





**APPENDIX 26B: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – GRAZING BMP – SELF-ASSESSMENT GRAZING LAND MANAGEMENT**

[https://www.bmpgrazing.com.au/images/module/modules/2014/glm\\_2014.pdf](https://www.bmpgrazing.com.au/images/module/modules/2014/glm_2014.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.93**

Sentences: 38

Big Words (>= 3 syllables): 255

**17.93 = 3.1291 + 1.043 \* square root of (((255.0) / 38.0) \* 30)**



**Grazing BMP self-assessment  
Grazing land management**

Northern Australian module



**APPENDIX 26C: EXAMPLE TEXT TAKEN FROM NQ DRY TROPICS – PROJECTS & PROGRAMMES – SUSTAINABLE AGRICULTURE – GRAZING BMP – SELF-ASSESSMENT – SOIL HEALTH**

[https://www.bmpgrazing.com.au/images/module/modules/2014/soil\\_2014.pdf](https://www.bmpgrazing.com.au/images/module/modules/2014/soil_2014.pdf)

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.18**

Sentences: 46

Big Words (>= 3 syllables): 240

**16.18 = 3.1291 + 1.043 \* square root of (((240.0) / 46.0) \* 30)**



**Grazing BMP self-assessment  
Soil health**

[www.bmpgrazing.com.au](http://www.bmpgrazing.com.au)



## APPENDIX 27: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE REEF PROGRAMME PAGE

<http://www.terrain.org.au/Projects/Wet-Tropics-Agriculture/Reef-Programme>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.58**

Sentences: 10 \* 3.0

Big Words (>= 3 syllables): 64      Conversion: 64 \* 3.0 = 192

**17.58 = 3.1291 + 1.043 \* square root of (((192.0) / 30.0) \* 30)**

Reef Water Quality Program <http://www.terrain.org.au/Projects/Wet-Tropics-Agriculture/Reef-Programme>

**CONNECT WITH YOUR COMMUNITY** (/Projects/(community)yes)

### Reef Programme

The Reef Programme grants delivered by Terrain and industry partners in the Wet Tropics, help farmers to improve land management practices and contribute to the reduction of nutrients, sediments and pesticides running into the Great Barrier Reef lagoon.

**What is the Reef Programme (formerly Reef Rescue)?**

In 2008 the Australian Government committed \$200 million to Reef Rescue, to improve the quality of water flowing in to the Great Barrier Reef lagoon by encouraging land management practice change.

In April 2013, the Australian Government announced their commitment to a further \$200 million to fund the programme under the new name, the Australian Government Reef Programme. In partnership with industry bodies, government, landowners and other Reef NRM regions, Terrain NRM coordinates the delivery of the Reef Programme for the Wet Tropics region.

In the Wet Tropics, the Reef Programme is a joint partnership between: Terrain NRM, CANEGROWERS, Herbert Cane Productivity Services Ltd, Tully Cane Productivity Services Ltd, Mossman Agricultural Services, Queensland Dairyfarmers' Organisation, Australian Banana Growers' Council, Growcom and the Queensland Department of Agriculture Fisheries and Forestry.

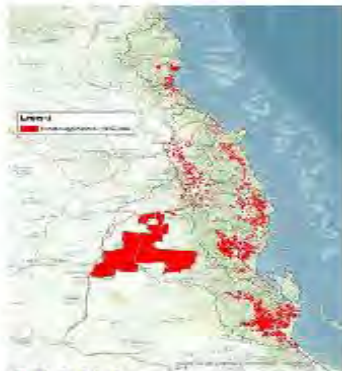
**For more information:**

For further information about the Wet Tropics Reef Programme contact Deb Bass, Reef Programme Manager, at [deb.bass@terrain.org.au](mailto:deb.bass@terrain.org.au) (<mailto:deb.bass@terrain.org.au>) or phone 4095 7106.

**Paddock to Reef**

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Click here (<http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef.aspx>) for more on the program.



### Quick Links

- REEF PROGRAMME**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme)
- ROUND 8 PROJECTS**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme/Round-8-Projects)
- GRANTS OFFICERS**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme/Grants-Officers)
- TRAINING & EXTENSION**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme/Training-Extension)
- IMPACT REPORTS**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme/Impact-Reports)
- INFORMATION AND RESEARCH**  
(/Projects/Wet-Tropics-Agriculture/Reef-Programme/Information-and-research)



## APPENDIX 28: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – PADDOCK TO REEF PROGRAM - REEF WATER QUALITY PROTECTION PLAN

<http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 16.84**

Sentences: 25 \* 1.2

Big Words (>= 3 syllables): 144      Conversion: 141 \* 1.2 = 169.2

**16.84 = 3.1291 + 1.043 \* square root of (((169.2) / 30.0) \* 30)**

Paddock to Reef - Reef Water Quality Protection Plan

<http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/>

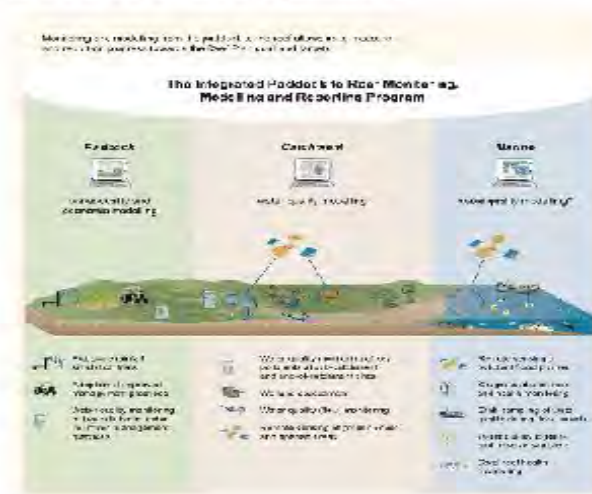


You are here:

Home> Paddock to Reef

### Paddock to Reef program

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program) is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.



[Click to enlarge](#)

( <http://www.reefplan.qld.gov.au/measuring-success/assets/paddock-to-reef-reporting-program-v3.gif> )

\* It is anticipated the eReefs project will deliver a receiving water model that will close the gap in modelling from the end of catchments to the marine environment.

Monitoring and modelling from the paddock to reef allows us to measure and report on progress towards Reef Plan's goal and targets.

Funded jointly by the Australian and Queensland governments, the program is a highly innovative approach to collecting and integrating data and information on agricultural management practices, catchment indicators, catchment loads and the health of the Great Barrier Reef.

**APPENDIX 29: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock to Reef Program – Paddock to Reef Overview**

<http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/assets/paddock-to-reef-overview.pdf>

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WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

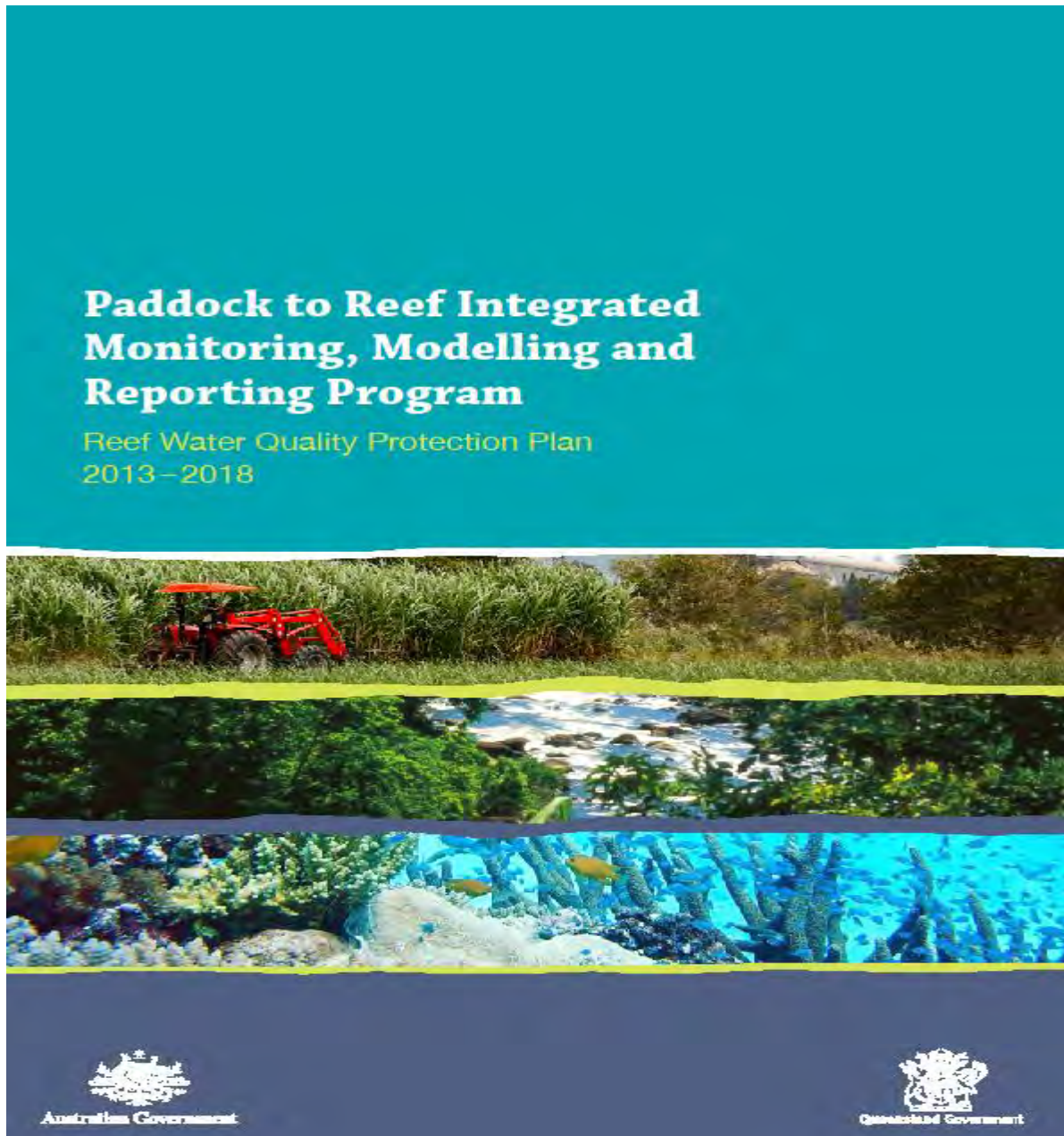
**Smog Grade: 17.31**

Sentences: 31

Big Words (>= 3 syllables): 191

**17.31** =  $3.1291 + 1.043 * \text{square root of } (((191) / 31.0) * 30)$

---





## APPENDIX 30: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock to Reef Program – SUGARCANE CASE STUDIES – COMPARING RUNOFF LOSS OF KNOCKDOWN AND RESIDUAL HERBICIDES IN THE HERBERT CATCHMENT

<http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/comparing-runoff-loss/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 15.47

Sentences: 30

Big Words (>= 3 syllables): 140

$15.47 = 3.1291 + 1.043 * \text{square root of } (((140) / 30.0) * 30)$



### Comparing runoff loss of knockdown and residual herbicides in the Herbert catchment

#### Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are an important component of the program. This work is funded by the Australian Government's Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

#### About this case study

Weeds are a major contributing factor to losses in both production and profits for the sugarcane industry. Under favourable conditions, they compete with the sugarcane for vital nutrients and access to water. Minimum tillage and green cane trash blanketing is considered best practice management in cane.

Herbicides are used to control weeds; however, there are concerns about chemicals including herbicides being transported to the Great Barrier Reef. The photosystem inhibiting (PSII) residual herbicides are of greatest concern due to their potential to affect algae, seagrasses and coral.

The objectives of this rainfall simulation study were to:

- measure the effectiveness of trash retention practices in reducing herbicide lost in runoff
- measure runoff loss of PSII herbicides soon after application
- compare runoff loss of PSII herbicides with knockdown and emerging (newly used) herbicides
- provide herbicide runoff loss data to enhance predictive modelling of the effectiveness of improved management practices.

#### Key findings

- The presence of cane trash reduced the runoff loss of PSII herbicides by almost half soon after herbicide application.
- The knockdown herbicides tested had a lower risk of runoff loss compared to PSII herbicides.
- Industry changes in management practices (trash retention and moving to knockdown products) reduce herbicide runoff.



## APPENDIX 31: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock to Reef Program – SUGARCANE CASE STUDIES – SUB-SURFACE FERTILISER APPLICATION REDUCES NUTRIENT RUNOFF IN THE HERBERT CATCHMENT

<http://www.reefplan.qld.gov.au/measuring-success/case-studies/case-studies-sugarcane/sub-surface-fertiliser/>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 16.35

Sentences: 31

Big Words (>= 3 syllables): 166

$16.35 = 3.1291 + 1.043 * \text{square root of } (((166) / 31.0) * 30)$



### Sub-surface fertiliser application reduces nutrient runoff in the Herbert catchment

#### Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are important components of the program. This work is funded by the Australian Government's Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

#### Key findings

- Sub-surface fertiliser application reduced runoff losses of nitrogen, phosphorus and sulphate-S from recent applications when compared to surface application.
- The presence of cane trash reduced the runoff loss of nitrogen, phosphorus and sulphate-S from recent applications when compared to trash removal.
- The improved practice of sub-surface fertiliser application increased yield (total sugar per hectare) over broadcast application and reduced the runoff nutrient loss.

#### About this case study

The application of fertiliser provides essential nutrients to enhance sugarcane growth and yield. The rate of application is important. Similarly the type of fertiliser (e.g. granular versus liquid) and where the fertiliser is placed in the soil profile can influence plant uptake and the loss through runoff and deep drainage.

The objectives of this rainfall simulation study were to:

- measure the effectiveness of sub-surface fertiliser application in reducing the amount of nutrients lost in runoff compared to surface application
- measure the effectiveness of liquid fertiliser application in reducing the amount of nutrient lost in runoff compared to granular application
- measure the impact of trash retention practices on nutrient loss
- measure the impact of different fertiliser practices on yield
- provide nutrient runoff loss data to enhance predictive modelling of the effectiveness of improved management practices.





## APPENDIX 32: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock TO REEF PROGRAM – SUGARCANE CASE STUDIES – MODELLING PESTICIDE RUNOFF FROM IMPROVED LAND MANAGEMENT SCENARIOS

<http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-modelling-pesticide-runoff.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

**Smog Grade: 17.99**

Sentences: 34

Big Words (>= 3 syllables): 230

**17.99** =  $3.1291 + 1.043 * \text{square root of } (((230) / 34.0) * 30)$



### Modelling pesticide runoff from improved land management scenarios

#### Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are important components of the program. This work is funded by the Australian Government's Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

#### About this case study

Paddock scale models are important tools in assessing land management practice effects on the water quality of runoff from farms. The HowLeaky crop and water balance model has been updated to include a pesticide dissipation and transport model which predicts the runoff loss of pesticides from a paddock.

Under best management practice guidelines, reduced reliance on the use of 'residual' herbicides in favour of 'knockdown' herbicides is considered an improved farming practice. Residual herbicides are applied pre-emergence to prevent seeds germinating and/or emerging and, as such, are required to persist for a period of time after application. Knockdown herbicides are used to kill emerged weeds and therefore generally have shorter half-lives in soil than residual herbicides. Commonly applied residual herbicides are the photosystem II (PSII) inhibiting compounds which are frequently detected in Great Barrier Reef waterways and in the Great Barrier Reef lagoon: atrazine, diuron, hexazinone and ametryn (Lewis et al., 2009, Shaw et al., 2010).

#### Key findings

- Simulations showed a shift away from reliance on residual herbicides towards greater usage of knockdown products will lead to an improvement in runoff water quality. This is particularly true when the lower toxicity of the knockdown products is taken into account (ANZECC/ARMCANZ 2000).
- There is a need for information on the environmental persistence and toxicity of alternative residual herbicides such as s-metolachlor and pendimethalin before a full assessment of the benefits and disadvantages of their increased use can be made.
- Management of herbicides must always take into account effective, integrated weed management so as to avoid a weed outbreak and the need for further herbicide use.

#### Methods

Using the pesticides model in HowLeaky, a comparison was made of the potential offsite losses of a range of herbicide products: PSII residuals (atrazine and diuron), knockdowns (2,4-D and glyphosate) and emerging (newly developed) herbicides (s-metolachlor, isoxaflutole and pendimethalin).

Herbicides were applied according to best pesticide (B class) management for cane in the Mackay Whitsunday region, involving limited use of residuals in both plant and ratoon cane, with weed control achieved through increased use of knockdown herbicides. In this scenario, the 'emerging' herbicide s-metolachlor replaced an application of traditional residual herbicides in the plant cane. The herbicide management practices were modelled on a legume fallow followed by plant cane and four ratoons under zero tillage with green cane trash blanketing (Shaw et al. 2011).

## APPENDIX 33: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock to Reef Program – GRAZING CASE STUDIES – TRACKING GULLY ACTIVITY IN THE BURDEKIN RANGELANDS

<http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-tracking-gully-activity.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 15.46

Sentences: 32

Big Words (>= 3 syllables): 149

$15.46 = 3.1291 + 1.043 * \text{square root of } (((149) / 32.0) * 30)$



### Tracking gully activity in the Burdekin range lands

#### Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are important components of the program. This work is funded by the Australian Government's Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

#### About this case study

The Upper Burdekin catchment is the largest sediment source area within the Burdekin basin. Past erosion monitoring and sediment tracing in the Weany Creek catchment near Charters Towers shows that gully erosion is potentially an important source of fine sediment which can be washed into waterways and enter the Great Barrier Reef lagoon. However, erosion rates vary between different gullies and over time. Some gullies now have grass coverage in parts, suggesting they may have stabilised.

#### Methods

CSIRO scientists, collaborating with the Queensland Government Department of Natural Resources and Mines and NQ Dry Tropics staff, used historical air photographs from 1945 to 2010 to compare the recent growth of 30 gullies across the Weany Creek catchment with the average growth rate over the entire life of the gullies.

Gully activity is an important parameter in the Source Catchments modelling of sediment loads entering the Great Barrier Reef. Gully activity indicates how active gully networks have been in recent decades, which gives information on the importance of gully erosion relative to other sediment sources.

#### Key findings

- In this part of the Burdekin basin, Source Catchments modelling should represent upland gullies as eroding at approximately 50 per cent of their long-term average rate. This analysis is being further tested and extended to other sites in the Great Barrier Reef catchments.



Active gully erosion in the Weany Creek catchment following a large wet season, April 2008. Photographer: Mark Stewart, Queensland Government Department of Natural Resources and Mines.



## APPENDIX 34: EXAMPLE TEXT TAKEN FROM TERRAIN WEBSITE – Paddock to Reef Program – Grazing Case Studies – Grazing in the Burdekin Region: Achieving Better Returns and Saving Soils

<http://www.reefplan.qld.gov.au/measuring-success/case-studies/assets/case-study-grazing-burdekin.pdf>

WordsCount SMOG Results - [http://wordscount.info/wc/jsp/clear/analyze\\_smog.jsp](http://wordscount.info/wc/jsp/clear/analyze_smog.jsp)

Smog Grade: 15.59

Sentences: 37

Big Words (>= 3 syllables): 176

$15.59 = 3.1291 + 1.043 * \text{square root of } (((176) / 37.0) * 30)$



### Grazing in the Burdekin region - achieving better returns and saving soil

#### Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are important components of the program. This work is funded by the Australian Government's Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

#### About this case study

Grazing management and stocking rate relative to seasonal pasture growth influence the profitability of and water quality from North Queensland Dry Tropics grazing lands. A trial funded by Meat and Livestock Australia and the Paddock to Reef program in the Burdekin has investigated animal performance, pasture composition, land condition and runoff water quality for 14 years. This includes periods of drought and wet years.

The objective of this project is to assess the relative performance of different grazing strategies in terms of profitability, pasture condition and runoff.

#### Key findings

- Having a heavy stocking rate makes the least profit and causes degradation of pastures.
- The heavy stocking rate also increases runoff and sediment loss compared to a range of improved grazing management strategies.

#### Methods

This long-term grazing trial is located at Wambiana Station near Charters Towers. The land condition of the site at the beginning of the trial in 1997 was fair (B condition, using ABCD condition assessment).

Five grazing strategies are being tested:

1. Heavy stocking rate, at twice the long term carrying capacity.
2. Moderate stocking rate, at the long term carrying capacity of eight hectares per animal equivalent (AE).
3. Variable stocking rate, with stocking rates adjusted in May based on available forage - stocking rates ranged from four to 11 hectares per animal equivalent.
4. Southern Oscillation Index (SOI), with stocking rates adjusted in November based on available forage and southern oscillation index based seasonal rainfall forecasts (ranging from four to 11 hectares per animal equivalent).
5. Rotational wet-season spelling (R/Spell), at 1.5 times the long term carrying capacity.

The paddocks contain a mix of soil types typical of the region and are on a low slope. Data is collected annually on cattle weight gains, pasture condition change, and runoff and sediment loss. Measurement of runoff and water quality occurs via flumes on one hectare plots located on a texture-contrast (Sodosol) soil type.



(c) Lynne Eagle