Management practice methods



Great Barrier Reef

Report Card 2016

Reef Water Quality Protection Plan

Australian Government

Queensland Government

Management practice methods

This report summarises the development of revised management practice baselines for the Reef Water Quality Protection Plan 2013 and how progress toward the plan's target for adoption of best practice is assessed.

The target for adoption of best practice is as follows (Australian and Queensland governments, 2013):

- 90 per cent of sugarcane, horticulture, cropping and grazing lands are managed using best management practice systems (soil, nutrient and pesticides) in priority areas by 2018.

Paddock to Reef program – water quality risk frameworks

The Paddock to Reef Integrated Monitoring, Modelling and Reporting Program ('Paddock to Reef program') has developed water quality risk frameworks for each agricultural industry. These frameworks articulate best practice in relation to the Reef Water Quality Protection Plan adoption target. The features of the Paddock to Reef water quality risk frameworks are as follows:

- The suites of practices relevant to each pollutant are described in the frameworks. Not all of the practices in the production system are described, only those practices that pose the greatest potential water quality risk, through movement of sediments, nutrients or pesticides off farm, are described. The majority of these practices also present productivity and/or profitability enhancements.
- Not all practices are equal. The frameworks allocate a percentage weighting to each practice depending upon its relative potential influence on off-farm water quality.
- The 'best practice' level is the level targeted by Reef Water Quality Protection Plan investments.

These practices are described in terms of their relative water quality risk, which range from Low to High.

For the purpose of describing industry status and progress towards the Reef Water Quality Protection Plan 2013 adoption target, best management practice (BMP) is defined as the area managed under Low and Moderate-Low risk levels.

Table 1: Grazing industry – Paddock to Reef program classification of management practices based on relative risk to water quality

Water Quality Risk	Low	Moderate-Low	Moderate-High	High
Resource condition objective	Practices are highly likely to maintain land in good (A) condition and/or improve land in lesser condition	Practices are likely to maintain land in good or fair (A/B) condition and/or improve land in lesser condition	Practices are likely to degrade some land to poor (C) condition or very poor (D) condition	Practices are highly likely to degrade land to poor (C) or very poor (D) condition

For sugarcane, horticulture and grains, the water quality risk framework describes management practices relating to managing nutrients, pesticides and sediments. For grazing systems, the framework describes management practices relating to dominant sources of soil erosion; and pasture (hillslope), streambank and gully erosion.

Table 2: Cropping industries (sugarcane, bananas, grains and horticulture) – Paddock to Reef program classification of management practices based on relative risk to water quality

Water quality risk	Low	Moderate-Low	Moderate-High	High
Description	Lowest water quality risk, commercial feasibility not well understood	Best Management Practice	Minimum Standard	Superseded

Water quality risk frameworks provide the basis for describing:

- industry status in relation to achievement of best practice systems. The Paddock to Reef program has developed new management practice baselines to correspond with the revision of targets, actions and investments under the Reef Water Quality Protection Plan 2013.
- annual progress from these 2013 baselines toward the 90 per cent adoption target.

Establishing farm management baselines for the Reef Water Quality Protection Plan 2013

Paddock to Reef program management practice and management system benchmarks have been developed for each agricultural industry sector, and in each major river basin within each region. There are varying levels of uncertainty or confidence in these benchmarks for many reasons (see Table 3).

Table 3: Summary of data sources and uncertainty around management system baselines developed for the Reef Water Quality Protection Plan 2013

Industry	Primary data sources	Confidence in management system baselines	Sources of uncertainty
Bananas	1:1 growers survey Banana BMP Guide (anonymous, aggregated) Reef Programme grant applications (anonymous)	Medium	High level of heterogeneity within the industry, particularly with respect to farm size. A relatively small number of very large farms that can skew results.
Grains	Grains BMP program (anonymous) Expert agronomist workshops	High	Over 80% of the industry is represented in the baseline sample. However, some Grains BMP questions that do not allow discrimination of practices at a fine level.
Grazing	Grazier 1:1 survey	Medium	The survey has enabled an excellent appreciation of farm management. However, there is an assumption that good management corresponds to good resource condition. Some river basins have insufficient sample size to develop a baseline that is specific to that basin. In these instances the broader regional baseline is used.

Industry	Primary data sources	Confidence in management system baselines	Sources of uncertainty
Horticulture	Growcom Farm Management System (anonymous)	High	A very large proportion of industry is represented in the baseline sample (depending on region). However, some Horticulture farm management systems questions do not allow discrimination of practices at a fine level.
Sugarcane	1:1 grower surveys Smartcane BMP program (anonymous, aggregated) Reef Programme grant applications (anonymous)	Medium	There is uncertainty around management related to timing of fertiliser and herbicide applications. It mostly relates to variance in interpretation by field staff capturing data on farm. Conflicting evidence emerging around degrees of adoption of some practices in some areas.

Grazing

The prevalence of different management practices used in grazing businesses was determined through surveys of commercial-scale graziers between late 2011 and early 2014. Surveys took the form of one-on-one, semi-structured interviews conducted on farm by experienced professional grazing extension officers. Survey questions were designed to align with the practices articulated in the grazing water quality risk framework i.e. the responses recorded align with varying degrees of water quality risk associated with that management. The framework further aligns these practices with the erosion process that is most directly influenced by those practices. While the key management categories remained consistent, the questions and practice descriptions used in wet coastal landscapes were different to those used in rangelands grazing systems.

For reporting and modelling purposes, the specific management practice data was analysed to develop management system risk ratings (from Low to High) that reflect the water quality risk of the mix of individual practices on a farm. Survey responses to individual questions (practice descriptions) were weighted and aggregated to develop a water quality risk score for the practices associated with each erosion process—pasture (hillslope) erosion, streambank erosion and gully erosion. As an example, Table 4 shows the scoring method for responses to a question about objectively determining long-term carrying capacity.

Table 4: Grazing land management survey question 11 - the categories of response and the water quality risk score allocated for each category of response

Survey Question: For long-term planning, what do you base your average carrying capacity on?	Score	Risk level
Historical experience and/or anecdotal advice (not documented)	0	High
Long-term stock and stocking rate records (documented in diaries, paddock records etc.)	4	Moderate
Some objective measure of safe stocking rate calculations, including property map and based on historical data, subjective assessment of resource condition	7	Low-moderate
Documented records, including property map and safe stocking rate calculations based on land type, property infrastructure and objective assessments of land condition	10	Low

The survey question in Table 4 accounts for 10 per cent of the total water quality risk score for practices related to hillslope erosion risk. The ‘best practice’ response is allocated a score of 10, and the least

sophisticated management is allocated a score of zero. A total water quality risk score for the practices related to hillslope erosion was derived by combining scores for all relevant questions.

Scores for each erosion process were then assigned a management risk rating (Table 5), based on expert review of specific combinations of management practices.

Table 5: Water quality risk scores used to categorise management risk ratings

Erosion process	Water quality risk rating			
	Low	Low-Moderate	Moderate	High
Hillslope erosion	81–100	59–80	33–58	0–32
Streambank erosion	100	66–99	33–65	0
Gully erosion	85–100	62–84	32–61	0–31

Table 6: Key grazing management categories and weightings used in developing water quality risk scores and ratings

Erosion process	Management category (each informed by a suite of practices)	Paddock to Reef Weighting (%)
Hillslope erosion	1. Average stocking rates imposed on paddocks are consistent with district long-term carrying capacity benchmarks for comparable land types, current land condition, and level of property development	20%
	2. Retention of adequate pasture and ground cover at the end of the dry season is informed by (1) knowledge of ground cover needs and (2) by deliberate assessment of pasture availability in relation to stocking rates in each paddock during the latter half of the growing season or early dry season	40%
	3. Strategies implemented to recover any land in poor or very poor condition (C or D condition)	25%
	4. The condition of selectively-grazed land types is effectively managed	15%
	Hillslope erosion assessment	100%
Streambank erosion	5. Timing and intensity of grazing is managed in frontages of rivers and major streams (including associated riparian areas) and wetland areas (includes control of stock access to streams and provision of off-stream watering points)	100%
Gully erosion	6. Strategies implemented, where practical and affordable, to remediate gullied areas	30%
	7. Linear features (roads, tracks, fences, firebreaks, and water points located and constructed to minimise their risk of initiating erosion	40%
	1 – 4 Hillslope erosion assessment	30%
	Gully erosion assessment	100%

Grazing management system baselines for the Reef Water Quality Protection Plan 2013 were based on management system ratings for individual businesses, aggregated to form baselines for representative river basins within natural resource management (NRM) regions. These individual ratings and baselines were reviewed by regional experts and compared with corresponding data, where available (such as aggregated, anonymous assessments conducted by graziers participating in the Grazing BMP program). Where insufficient samples were available to discriminate management at the level of river basins, the baseline for the entire NRM region was used.

Table 7: Number of individual grazing businesses and area represented in grazing baseline estimates

Region	Rangelands	Wet coastal	Area represented (hectares)	Area as % of region
Cape York (Normanby)	11 + 17*	-	1,263,673 ha	58%
Wet Tropics	8	117	123,129 ha	18%
Burdekin	98	-	3,103,197 ha	24%
Mackay Whitsunday	-	28 + 43*	154,089 ha	38%
Fitzroy	98	-	991,677 ha	8%
Burnett Mary	55	30	368,130 ha	10%

*Additional detailed samples provided courtesy of Cape York Sustainable Futures and Reef Catchments Mackay Whitsunday Isaac NRM.

Sugarcane

Key management practices relevant to water quality risk of sugarcane farming systems were articulated in a water quality risk framework for sugarcane in 2013.

Table 8: Key sugarcane management categories and weightings articulated in the Paddock to Reef program water quality risk framework

Management category	Weighting
Sediment (runoff and soil loss)	
Crop residue cover (green cane trash blanketing)	30%
Controlled traffic farming	25%
Land management during cane fallow	25%
Tillage in plant cane (land preparation)	20%
Nutrients (nitrogen)	
Matching nitrogen supply to crop nitrogen requirements	60%
Timing of fertiliser application with respect to rainfall or irrigation	30%
Application method (surface or subsurface)	10%
Pesticides	
Timing the application of residual herbicides	40%
Targeting application to reduce the volume of herbicide applied	40%
Residual herbicide use in ratoons	20%
Water	
Calculating the amount of water to apply	70%
Managing surface runoff	30%

The prevalence of each of these key management practices in the sugarcane industry was estimated through a benchmarking process conducted throughout 2013–14.

- A suite of questions directly relating to the Paddock to Reef program water quality risk framework was the basis of a survey conducted by regional NRM organisations on behalf of the program. Sampling was targeted as much as possible to ensure that up to 50 per cent of the growers sampled had not previously had high levels of engagement with the initiatives of the Reef Water Quality Protection Plan. In each region, a target was set of a minimum of 100 randomly selected growers across catchments.

- Congruent datasets were obtained through the Smartcane BMP program and recent applications (2012–13 and 2013–14 where available) for the Australian Government's incentive programs.
- In each region, small expert panels were convened to review the adoption levels indicated by the source data and confirm adoption estimates for each practice level, for each management issue. The proportion of growers and the area at each level were checked for sensibility and modified if sufficient supporting evidence was available. Supporting evidence was in the form of discrete data (data from mills, data from local productivity service organisations, specific project data, other Paddock to Reef program data on rates and volumes of nutrient and pesticide use) and the weight of local opinion.

Best management practice systems for sediment, nutrient, or pesticide management are assessed through aggregating the adoption levels of each practice according to their framework weighting.

Bananas

The Paddock to Reef program water quality risk framework for bananas is based on the Australian Banana Grower's Council (ABGC) *Banana BMP Environmental Guideline* (http://bmp.abgc.org.au/). The specific practices of the banana farming system that are most relevant to water quality risk were collated into a focused framework that also aligns with the management practice monitoring system used by Terrain NRM (the regional NRM organisation in the Wet Tropics). Prioritising and weighting these practices for relative water quality risk was done in consultation with Queensland Government scientists, officers from the ABGC, Terrain NRM and extension officers from the Queensland Department of Agriculture and Fisheries.

The pollutants of most concern with respect to the banana industry are sediments and nutrients. There is little to no use of the residual herbicides (with relatively high ecological toxicities) that are common in other cropping sectors. Herbicides commonly used with bananas have relatively low ecological toxicity and are not priorities for the Reef Water Quality Protection Plan 2013. Offsite movement of these herbicides, when it occurs, is largely a function of runoff and soil loss, which is a focus area in the framework.

Table 9: Key banana management categories and weightings articulated in the Paddock to Reef program water quality risk framework

Management category	Weighting
Sediment (runoff and soil loss)	
Crop removal	10%
Fallow management	20%
Tillage – plant crop	15%
Ground cover (inter-rows and headlands)	35%
Controlling runoff (contouring)	10%
Controlling runoff (drains)	5%
Sediment traps	5%
Nutrients	
Soil testing	10%
Matching nutrient supply to crop demand	60%
Fertiliser application frequency	15%
Fertiliser application method	15%
Water	
Calculating the amount of water to apply	70%
Managing surface runoff	30%

The prevalence of each of these key management practices in the Wet Tropics was estimated through a benchmarking process conducted during 2013–14. No data was available to support baseline development in the banana production areas of southern Cape York. Anonymous data sources for the Wet Tropics included:

- a grower survey conducted in 2012 by Terrain NRM and the ABGC, representing 125 growers and approximately 75 per cent of the cropped area of bananas
- management practice data collected by Terrain NRM from 2012–13 applications for the Australian Government's Reef Rescue program
- aggregated anonymous data from the *Banana BMP Environmental Guideline*, available for discussion while reviewing adoption benchmarks with experienced extension officers.

Horticulture

The Paddock to Reef program water quality risk framework for the horticulture industry is based on the water quality management module of Growcom's Hort360 best management practice program (http://www.growcom.com.au/land-water/hort360/). The 50 management issues covered in the farm management system module were reviewed in collaboration with Growcom to focus on a smaller subset of the 17 management issues with greatest influence on offsite water quality.

Table 10: Key horticulture management categories and weightings articulated in the Paddock to Reef program water quality risk framework

Management category	Weighting
Sediment (runoff and soil loss)	
Use of vegetated buffers	5%
Fallow management	35%
Managing in-field runoff	20%
Managing inter-rows	25%
Managing roads and headlands	10%
Sediment trapping	5%
Nutrients	
Soil testing to inform nutrient budgeting	10%
Leaf testing to inform nutrient budgeting	10%
Objective nutrient budgeting	30%
Fertiliser application method	25%
Determining crop nutrient requirements	25%
Pesticides	
Determining pesticide requirements	30%
Managing risk of runoff and drift	30%
Integrated Pest Management (IPM)	40%
Water	
Irrigation scheduling	30%
Matching irrigation interval and volume with crop requirements	50%
Water recapture and use	20%

Anonymous data from growers completing Growcom's farm management system modules during 2012–14 was analysed according to the water quality risk framework weightings. This specific management practice data was analysed to develop management system risk ratings (from Low to High) that reflect the water quality risk of the mix of individual practices on a farm. Data was available for the Burnett Mary, Fitzroy, and Burdekin NRM regions. Farm management system data was not available for the Wet Tropics and the Mackay Whitsunday NRM regions (where there is no current Reef Water Quality Protection Plan investment in horticulture).

Table 11: Number of individual horticulture businesses and area represented in horticulture baseline estimates

Region	Businesses	Area (hectares)
Burnett Mary	303	21,900
Fitzroy	45	2,025
Burdekin	122	22,056

Grains

The Paddock to Reef program water quality risk framework for the grain farming industry is based on a range of key management areas selected from four modules of the Grains BMP program (www.grainsbmp.com.au). Eighteen management issues were assigned weightings according to their potential for influencing offsite water quality. These weightings were developed through a review process by Queensland Government scientists and experienced Central Queensland agronomists and agricultural consultants.

Table 12: Grains BMP program modules and management questions used in developing the Reef Water Quality Protection Plan 2013 management baseline

BMP Module	Management category	Weighting
Sediment (runoff and soil loss)		
Property design layout	Use of contour and diversion banks in sloping cropping areas	15%
Property design layout	Sediment trapping devices	5%
Property design layout	Waterways and drainage lines	5%
Making best use of rainfall	Stubble volume and persistence	15%
Making best use of rainfall	Retain stubble during the fallow	20%
Making best use of rainfall	Cropping frequency	10%
Making best use of rainfall	Need for tillage	20%
Making best use of rainfall	Wheel traffic	10%
Pesticides		
Pesticide application	Pest identification	5%
Pesticide application	Resistance management	10%
Pesticide application	Product selection	5%
Pesticide application	Risk of residual pesticide movement	40%
Property design layout	Pesticide and sediment movement	40%
Nutrients		
Crop nutrition	Records of crop yield and quality	10%
Crop nutrition	Frequency of soil testing for nitrogen	30%

BMP Module	Management category	Weighting
Crop nutrition	Influence of stored soil moisture on yield and fertiliser decisions	30%
Crop nutrition	Impact of seasonal outlook on making fertiliser decisions	20%
Crop nutrition	Application timing to minimise potential losses and maximise uptake	10%

Anonymous data from BMP program participants was analysed according to these weightings in order to develop management system risk ratings (from Low to High) that reflect the water quality risk of the mix of individual practices on a farm. Where insufficient samples were available to discriminate management at the level of river basins, the baseline for the entire NRM region was used for Paddock to Reef reporting.

The number of businesses represented in management system baselines for each category was:

- sediment (runoff and soil loss): 301
- pesticides: 327
- nutrients: 262.

Table 13: Area of grain farms represented in baselines by region and river basin

Region	River basin	Area (hectares)
Burnett Mary	Barambah	961
	Burnett	2,275
Burdekin	Suttor	76,054
Fitzroy	Boyne	285
	Comet	74,869
	Dawson	62,463
	Fitzroy	12,140
	Isaac	16,076
	Mackenzie	31,022
	Nogoa	75,248

Describing annual progress toward achieving the Reef Water Quality Protection Plan 2013 adoption target

Management practice baselines have been developed for each of the critical practices, for each agricultural industry, each region and each river basin. At the farm scale, these management practices combine to form a management system. Progress in the adoption over time of improved and/or best management practice is monitored. Where management change has occurred, the 2013 baseline is amended to reflect that change.

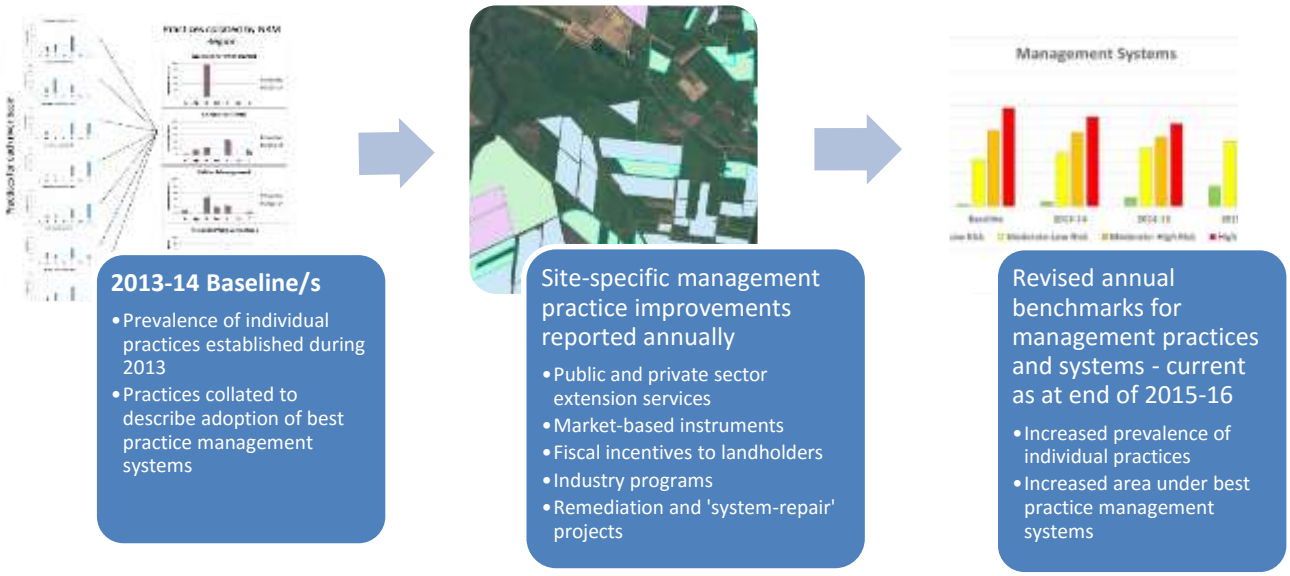

Figure 1: The process for monitoring baselines and management practice improvements and benchmarks

The limitations with this approach are as follows:

- Management change is identified where and when it is reported to have occurred. This relies on delivery organisations sensibly and appropriately reporting on their activities and the impacts of those activities. The Paddock to Reef program describes and reports on the impacts of change for which there is reasonable and sensible evidence.
- Management improvements that occur without the intervention of third party delivery organisations are not detected as there are no industry-wide mechanisms for capturing or reporting management practice change. There is likely to be a degree of *understatement* of improvements for this reason.
- Any regression of practices (i.e. adopting practices with greater water quality risk) is difficult to detect as these are unlikely to be reported. However, the approach can appropriately reflect regression if necessary. For this reason, it is possible that some impacts may be *overstated*.

Evidence of management practice change

Organisations receiving funding through the Reef Water Quality Protection Plan 2013 for the purpose of increasing the adoption of best management practice are required to report the impacts of their work as per the relevant industry water quality risk framework. They report on how individual sites or farm enterprises are managed—using the practice descriptions in the water quality risk frameworks—both before an intervention and after (as a result of) that intervention. The 'interventions' reported on for the 2016 Great Barrier Reef Report Card (Table 14) include financial incentives (cash grants and reverse tenders), capacity-building extension, on-farm trials, private sector consulting, remediation of severe erosion features, and industry training.

The process for evaluating reported impacts is summarised in Figure 2.

<table>
<tr>
<td colspan="2">   </td>
<td>Delivery organisations provide annual evidence of impact to the Paddock to Reef program, in the form of GIS data and detailed management practice data (as coded responses to questions based on the water quality risk frameworks).</td>
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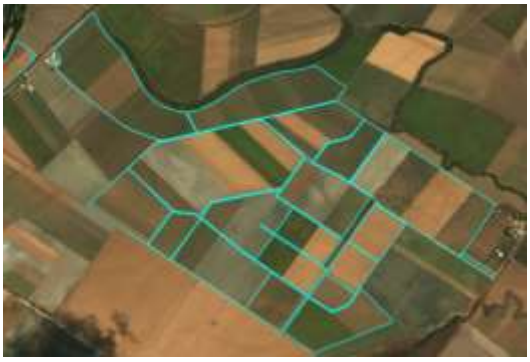
<td>  </td>
<td>A sugarcane farm is reported at the lowest risk management state for nitrogen fertiliser use in 2013–14.</td>
<td rowspan="2">The data is reviewed on a site-by-site basis to provide assurance that reporting towards adoption targets and modelled pollutant load reductions is sensible. This review includes:
identifying data handling errors
checking that the nature of the intervention aligns with the reported impact
checking that the degree of impact (farm management change) is sensible and realistic, including checking that the reported impacts correspond with other independent lines of evidence available to the Paddock to Reef program
checking that individual sites and impacts on those sites have not previously been reported to the Paddock to Reef program and included in estimates of progress towards Reef Water Quality Protection Plan targets.</td>
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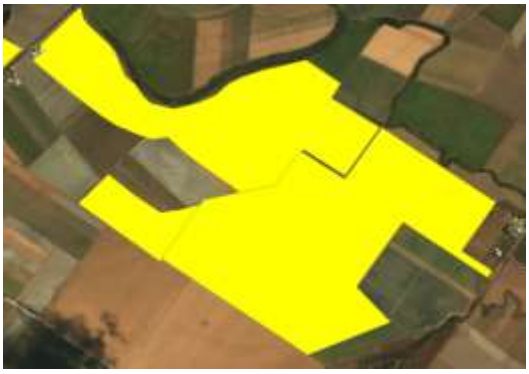
<td>  </td>
<td>The same sugarcane farm is reported at the highest risk management state for nitrogen fertiliser in 2015–16.

Identifying spatial and temporal conflicts is essential to ensure that impacts are sensible and not captured more than once.</td>
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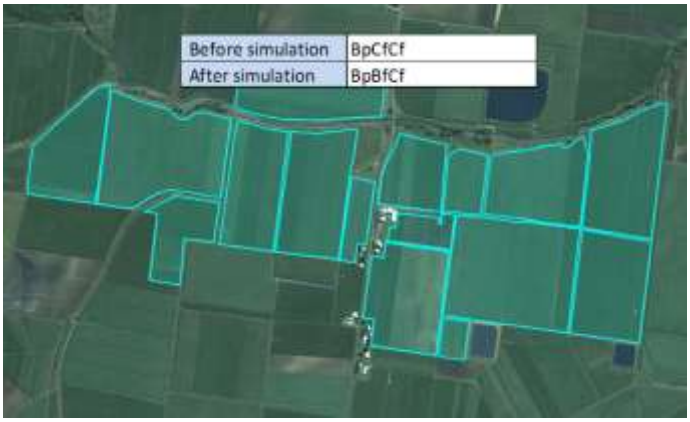
<td colspan="2"> 
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<td>For every site (usually a paddock or farm) the management regime and how it is has changed is aligned to modelling simulations which best represent that management (as ‘before’ and ‘after’ simulations). The example (left) codifies the trash management, machinery traffic and tillage regime, nutrient rates and timing, and weed management on a cane farm.

Data provided annually to Paddock to Reef catchment modelling constitutes layers that describe change in this way for many hundreds of individual sites.</td>
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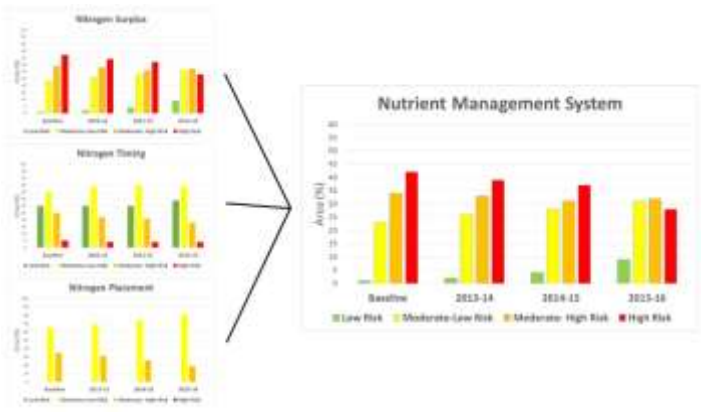


The management practice and management system baselines for each river basin and NRM region are adjusted annually to reflect the areas validated in the above steps.

Great Barrier Reef Report Cards contain data aggregated up to represent estimates of area under management systems, at the scale of NRM regions.

Figure 2: The process for evaluating impacts reported by organisations through the Reef Water Quality Protection Plan 2013

It is possible that the degree of adoption of best management practice during 2015–16 is a conservative estimate.

Many investments were aiming to facilitate the adoption of best management practice on farms during 2015–16 (Table 14). Most were able to describe the extent of their engagement (i.e. the people they interacted with) and offer some evidence of impact in terms of improved knowledge and skills of participants. However, not all of these were able to provide evidence of the spatial extent and the degree of change that could be attributed to the program. In some instances, this was due to privacy concerns, little or inadequate impact evaluation, or because the impacts are not yet apparent. Several programs and projects reported impacts for the first time in 2015–16.

The year 2015–16 also marked the end of a major investment program—the Australian Government's Reef Programme)—and, as such, the total on-ground effort of that program was relatively low in some areas. Other major investments under the Reef Trust commenced and were in establishment phases during 2015–16, so more on-ground impacts are likely to be reported next year and beyond.

Table 14: Program investments reviewed for Great Barrier Reef Report Card 2016

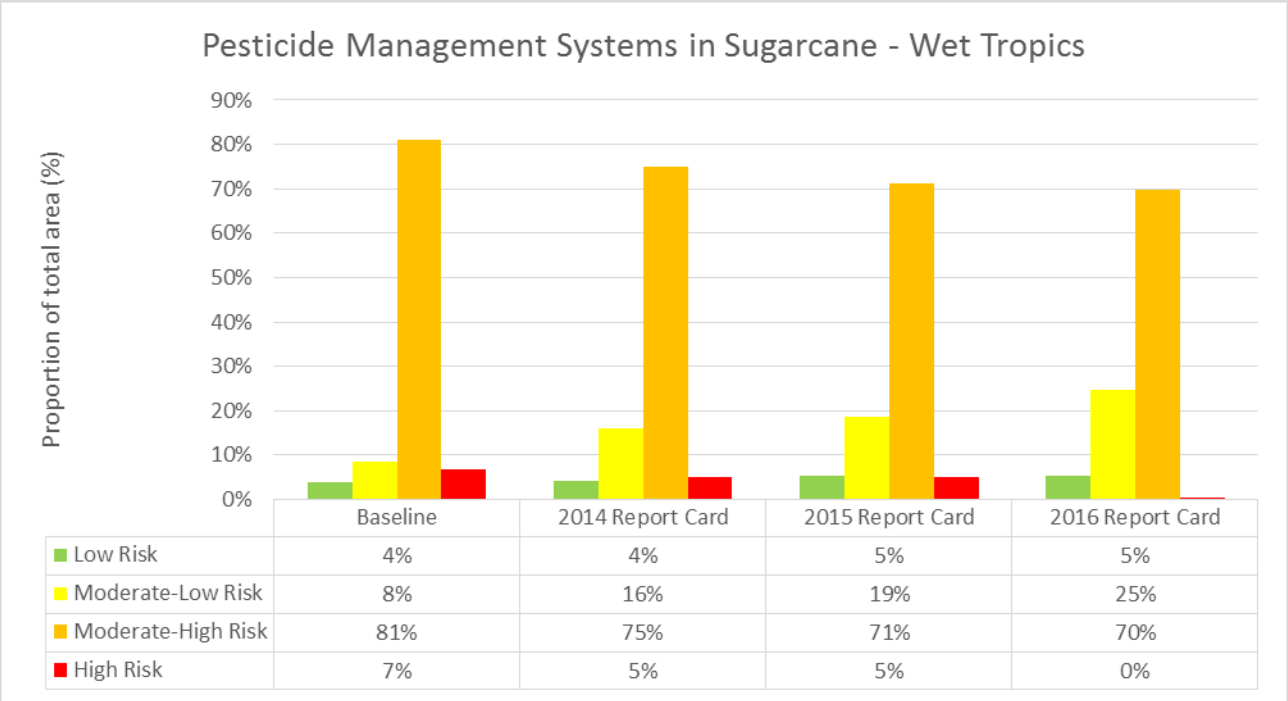
Region	Sector	Program	Total reported spatial extent of engagement reviewed (hectares, or km of stream)	Spatial extent utilised in determining progress toward Reef Plan targets for adoption and pollutant load reduction (hectares, or km of stream)
Burnett Mary	Sugarcane	Australian Government Reef Programme	7,587	7,587
		Smartcane BMP	16,111	-
	Grazing	Grazing BMP	91,232	-
		Australian Government Reef Programme	11,096	11,096
			70 km	70 km
		DNRM Sustainable Agriculture Project	4,920	4,920
		Australian Government Systems Repair Project	258	258
			12 km	12 km
	Grains	DNRM Sustainable Agriculture Project	944	-
Fitzroy	Grazing	Grazing BMP	1,136,026	-
		Queensland Government extension	104,112	30,267
		Australian Government Reef Programme	90,736	90,736
			921 km	921 km
		QNRM Programme	5,465	5,465
			31 km	31 km
		Australian Governments National Land Care Programme	96,375	-
	Grains	Australian Government Reef Programme	11,693	11,693
		QNRM Programme	18,132	18,132
		Grains BMP	139,815	-
	Horticulture	Australian Government Reef Programme	98	-

Region	Sector	Program	Total reported spatial extent of engagement reviewed (hectares, or km of stream)	Spatial extent utilised in determining progress toward Reef Plan targets for adoption and pollutant load reduction (hectares, or km of stream)
	Cotton	Australian Government Reef Programme	3,956	-
Mackay Whitsunday	Sugarcane	Smartcane BMP	81,001	-
		Queensland Government extension	-	-
		Australian Government Reef Programme	21,833	21,833
	Grazing	Australian Government Reef Programme	2,112	2,112
			8 km	8 km
		Australian Government Systems Repair Project	6	6
			35 km	35 km
Burdekin	Sugarcane	Smartcane BMP	37,551	-
		QLD Government extension	89	89
		RP20C Burdekin Nitrogen Project	12,721	12,721
		Australian Government Reverse Tender	8,064	8,064
	Grazing	Australian Government Reef Programme	31,777	31,777
		Grazing BMP	2,530,411	-
		Queensland Government extension	1,853,729	248,033
	Grains	Grains BMP	6,000	-
Wet Tropics	Bananas	Australian Government Reef Programme	3,338	3,338
	Sugarcane	Australian Government Reef Programme	42,517	42,517
		Smartcane BMP	98,835	-

Region	Sector	Program	Total reported spatial extent of engagement reviewed (hectares, or km of stream)	Spatial extent utilised in determining progress toward Reef Plan targets for adoption and pollutant load reduction (hectares, or km of stream)
		Queensland Government extension	6,152	6,152
		Australian Government Reverse Tender	2,507	2,507
Cape York	Grazing	Australian Government Reef Programme	5,987	5,987

Describing progress

Management practices that are at the Moderate-Low risk and Low risk levels are taken to be 'best management practices'. These are summed in describing the proportion of area managed under best practice, and practices are combined according to their weightings to describe 'best management practice systems'. Figure 3 shows an example where the area managed at best practice in the 2013 baseline increased from 12 per cent (4 plus 8) to 30 per cent (5 plus 25) by the end of 2015–16.



	Baseline	2014 Report Card	2015 Report Card	2016 Report Card
Low Risk	4%	4%	5%	5%
Moderate-Low Risk	8%	16%	19%	25%
Moderate-High Risk	81%	75%	71%	70%
High Risk	7%	5%	5%	0%

Figure 3: Example showing an increase in the area managed under best practice

Colour coding based on five categories (Table 15) is also used to report progress toward the 90 per cent adoption target.

Table 15: The colour-coded scoring system for the Great Barrier Reef Report Card

Grade	Status	Criteria for June 2016	Colour
A	Very good	90–100%	Dark green
B	Good	68–89%	Light green
C	Moderate	46–67%	Yellow
D	Poor	23–45%	Orange
E	Very poor	0–22%	Red

Qualitative confidence rankings

Sugarcane

Grazing

Horticulture

Grains

A multi-criteria analysis has been used to qualitatively score the confidence in each indicator used in the Great Barrier Reef Report Card from low to high. The approach combined expert opinion and direct measures of error for program components where available.

Reference

Australian and Queensland governments 2013, Reef Water Quality Protection Plan 2013, Reef Water Quality Protection Plan Secretariat, Brisbane.