

# **Public Benefit Test**

For the Great Barrier Reef Protection Package

May 2009

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## **Executive Summary and Competition Impact Statement**

### **Title of the Legislation**

This Public Benefit Test (PBT) addresses the impacts of the proposed Great Barrier Reef Protection Amendment Bill 2009 (the Bill) which is intended to amend the *Environmental Protection Act 1994* to include a new regulatory regime for specified agricultural activities in priority catchments of the Great Barrier Reef (GBR).

### **Policy Objectives**

The Great Barrier Reef is an internationally treasured natural icon, World Heritage listed and protected under the *Convention on Biological Diversity*. It is the world's largest World Heritage Area and contributes significant economic, environmental and social benefits to the community. It is vital that the GBR be maintained to ensure that the community can continue enjoying these benefits into the future.

It is estimated that around 16 million tonnes of soil and 60,000 tonnes of nutrients are lost annually in Reef catchments (Brodie *et al* 2003), at a vast cost to the entire economy and at the expense of reef water quality. For farms that release excess nutrients and sediments, these costs include lost production, the direct cost of the inputs, reduced productivity of the land and the reduced land value/net present value. The Queensland Premier recently committed to reducing the discharge of dangerous pesticides and fertilisers capable of killing the GBR. This intent is also reflected in the updated Reef Water Quality Protection Plan.

This Bill delivers on Queensland's obligations for ecologically sustainable development and the commitment to protect the health of the GBR. The overall objective of the regulation is to reduce the amounts of sediment, nutrients and pesticides entering the Great Barrier Reef Lagoon from agricultural sources. This will contribute to achieving the target of reducing by 50% in four years, the discharge of dangerous pesticides and fertilisers capable of killing the GBR.

The restrictions are vital for maintaining Reef health. The restrictions will effectively reduce the pollutants of concern through improved management of agricultural inputs and resource condition. The Department of Environment and Resource Management (DERM) will be responsible for implementing the legislation.

### **Overview of Options and Potential Restrictive Provisions**

DERM explored a range of legislative options for regulating agricultural activities in the Mackay-Whitsundays, Burdekin-Dry Tropics and Wet Tropics reef catchments. The key requirements under the legislation include chemical restrictions and actions that require operators adopt land management practices to minimise the risk of run-off to the reef.

A review of the restrictions on competition in the proposed Package is necessary to comply with the Competition Principles Agreement which Queensland recommitted to under the National Reform Agenda. The following options were analysed:

Option 1 - No legislative intervention

Option 2 - Risk Management model

Option 3 - Monitoring and compliance

Option 4 - Combination – Prescriptive, Risk Management, Monitoring

Option 5 - Prescriptive requirements (Code of Environmental Compliance)

DERM prepared a PBT to address the potentially restrictive components of:

- creating differential regulatory arrangements in the market
- restricting the conduct of a business

## ***Key Stakeholders and Consultation***

The key stakeholders are cattle and cane farmers, particularly those who use fertilisers and pesticides that form the target of this regulation.

Consultation on the concept of regulation was undertaken in late 2008 and early 2009. The primary vehicle for consultation was through a Reef Protection Stakeholder Advisory Committee, chaired by the then Minister for Sustainability, Climate Change and Innovation. This group included industry associations, conservation groups and government representatives. Individual stakeholder meetings were also held on an as needs basis. The former Minister also hosted four public meetings in the region which were attended by a total of 440 sugarcane farmers, graziers, community groups and others. These meetings focussed on the key issues and considerations that Government should consider when developing an option for regulating agricultural activities.

## ***Overview of Costs and Benefits***

Whilst a non-regulatory option (Option 1) imposes no new costs on industry, it is highly unlikely that the reef water quality targets can be achieved within the given timeframes, which would result in a loss of one of the State's principal natural assets and the associated social, environmental and economic benefits that it provides. It would also mean that existing management practices and inefficiencies would be able to continue in the absence of any regulatory safety net to require change.

Whilst all regulatory options (Options 2 to 5) could achieve the reef targets, the timeframes will vary, as will the costs and benefits to government and industry. Option 4 is most likely to meet the reef targets within the desired timeframes due to the requirements for immediate changes in land management. Accordingly, Option 4 is the preferred option. Option 4 is likely to lead to more efficient on-farm practices with the resultant costs outweighed by the environmental impacts and therefore a net benefit to Queensland.

### ***Costs/Benefits to Industry and Community***

Option 4 has the potential to increase the productive efficiency of primary producers by reducing the waste of water, fertiliser, pesticide, soil and fuel, which will ultimately increase both their economic and their environmental sustainability. The resultant financial costs and environmental impacts are likely to produce a net benefit for them and for the public.

The new legislation will result in additional upfront costs to some cattle and cane farmers, particularly those operators whose risks to the Reef are highest due to inefficient practices relating to pesticides, nutrients and soil management. The costs associated with inefficient management practices include lost production, higher input costs, reduced productivity of the land and potentially even reduced land value. Other costs in the short term may include training to gain certification in chemical handling and application, purchase of equipment and/or alternative pesticides and the costs associated with preparing an Environmental Risk Management Plan.

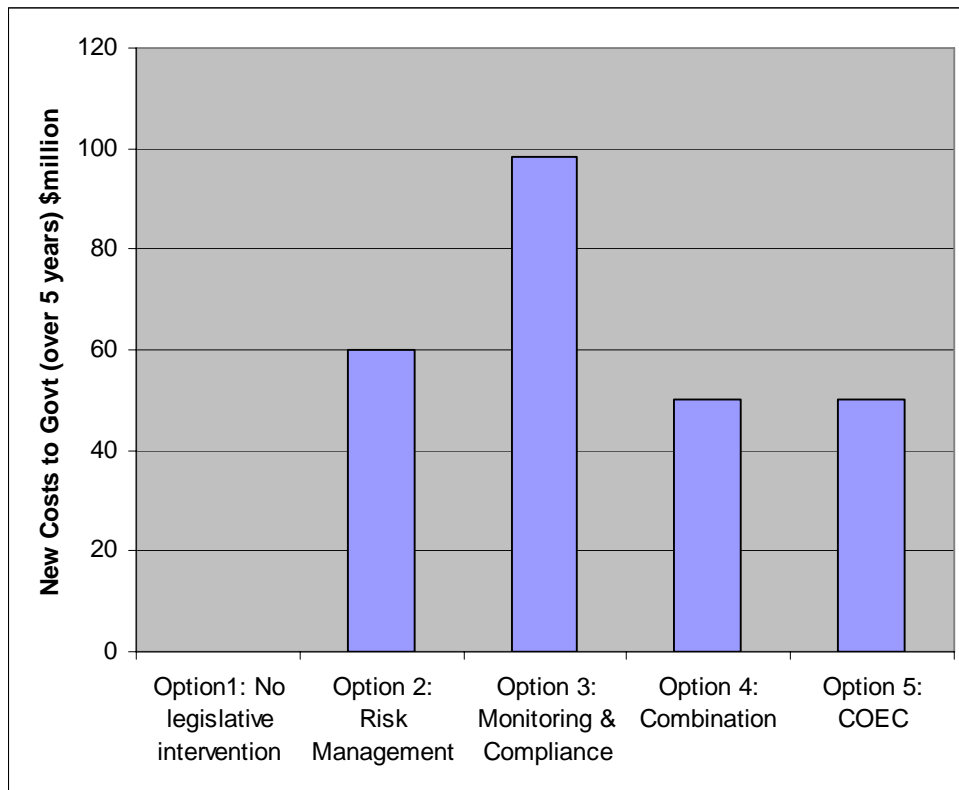
The new requirements are expected to impact on downstream industries by increasing demand for soil testing and chemical use training in the short term and maintaining the viability of tourism and reef fisheries. The price taking nature of beef, cattle and cane farming sector means it is unlikely that any increased costs will be passed onto meat and dairy processors/wholesalers/retailers or consumers.

The most obvious benefit of Option 4 is reduced nutrient and sediment run off to the GBR which will ultimately lead to improvements to reef water quality which will ensure the viability of the GBR as an important cultural and recreational resource.

### Costs/Benefits to Government

The estimated cost to Government will be \$50 million over five years, which is comparable to Option 5 and cheaper than Options 2 and 3. Option 5 was not chosen because it risks imposing a higher cost on industry due to the introduction of standard conditions that are inflexible and unable to be tailored to individual farm circumstances. Option 2 would have limited enforceability, would be expensive to implement and is likely to take a long time to roll out. Option 3 would require no legislative amendment but is the most expensive option (by far) if it were to be implemented with the enforcement resources necessary to meet the targets.

Figure 1: Summary of new costs to government between options



### Sunset and Review

DERM will review the effectiveness of the new legislation after four years of operation (i.e. 2013). This coincides with the timeframe for the Premier's target of a 50% reduction in pesticide and fertiliser run-off to the GBR. If the targets have been met and there is evidence of a change in practices, consideration will be given to rolling back the provisions to a minimal oversight role. It will not be possible to attribute the full extent of a reduction in pesticide and fertiliser run-off specifically to the Package because the actions will occur in conjunction with other policy and program initiatives aimed at improving Reef water quality, including the Commonwealth Government's \$200 million Reef Rescue initiative. Proposed State government initiatives such as restricting clearing in riparian zones and protecting wetlands in the GBR catchments may also contribute to the targets in the future. However, the targets will be met by the expected cumulative impact of all actions.

## **Background**

### **Key Drivers**

The GBR is the world largest coral reef and covers more than 300,000 square kilometres. The area has 2900 reefs, 600 continental islands and 300 coral cays. It abounds with wildlife, including dugong and green turtles, varieties of dolphins and whales, more than 1500 species of fish, 4000 types of mollusc and more than 200 species of bird life. These important environmental values were recognised internationally in 1981 with the addition of the GBR on the World Heritage List. GBR is the largest World Heritage Area in the world.

The Great Barrier Reef provides a wealth of ecosystem services. These include:

- Provisioning Services such as fisheries, bio-prospecting, materials for the aquarium trade.
- Regulating Services such as physical protection of the coast against extreme weather events, erosion control, waste assimilation and as a carbon store
- Cultural Services such as recreation, tourism, research and education, aesthetic and spiritual services.
- Supporting Services such as primary production, habitat/refugia and nutrient cycling.

The GBR directly contributes \$5.8 billion annually to the Australian economy (\$5.1 billion from the tourism industry, \$610 million from recreational activity and \$149 million from commercial fishing) and supports approximately 63,000 jobs. Agricultural production in Reef catchments also provides a significant but lower contribution to the Queensland economy, with agricultural production of cattle, cane and horticulture in Reef catchments contributing approximately \$3.8 billion annually.

In 2003, the Australian and Queensland Government's made a 10 year commitment and established the Reef Water Quality Protection Plan (Reef Plan) to address the diffuse pollution from broadscale land use and to halt and reverse the decline in water quality entering the Reef. The establishment of the Plan was in response to evidence suggesting a decline in water quality on the GBR. This evidence was compiled by a Reef Protection Taskforce who prepared an assessment of the water quality in and adjacent to the GBR. The key findings of the Taskforce were that major land use practices in the Reef catchments have led to accelerated erosion and greatly increased the delivery of nutrients. These land uses include, amongst others, extensive grazing practices and agricultural production.

The Reef Plan sets out a series of targets and actions that focus on assisting landholders in adopting best management practices. This has been delivered through a range of non-regulatory measures.

In 2008, the Taskforce was reconvened to update the statement of evidence in context of significant advances in knowledge and increased efforts to improve water quality. The conclusions, which are based on analysis of the most recently published and peer reviewed articles about the reef, highlight that water discharged from rivers to the GBR continues to be of poor quality, that land derived contaminants are present at concentrations likely to cause environmental harm and that current management actions are not effectively solving the problem.

The latest statement has been endorsed by various scientific research institutions including CSIRO, the University of Queensland, Central Queensland University, James Cook University and the Australian Institute of Marine Sciences.

The Reef Plan also stated that there was a need for regulation 'where there was a risk that voluntary approaches will fail to deliver significant water quality improvements'. This was publicly reaffirmed by the then Premier of Queensland when he signed the 2003 Reef Plan with the then Prime Minister. In 2008, the Premier announced that \$50 million over five years would be made available to support a Reef Protection Package (the Package) of regulatory and support measures to protect the GBR from nutrient, sediment and pesticide water pollution by broadscale agriculture. During the Queensland election campaign in 2009 the Premier made a commitment that the discharge of dangerous pesticides and fertilisers capable of killing the GBR would be cut by 50% within four years. These targets mirror the targets in the updated Reef Plan.

A review of the restrictions on competition in the proposed Package is necessary to comply with the Competition Principles Agreement which Queensland recommitted to under the National Reform Agenda. Regulations should not restrict competition unless it can be demonstrated that the benefits to the community, as a whole, outweigh the costs, and that the objectives of the legislation can only be achieved by restricting competition.

### ***Methodology***

DERM prepared a reduced PBT assessment in accordance with Queensland Treasury's PBT guidelines and in consultation with officers at Queensland Treasury.

This PBT examines the likely costs and benefits associated with the proposed Regulation, options and alternatives, and the effects on businesses, competition, employment, regional development, the community and the environment.

The PBT incorporates feedback received during consultation with key stakeholders. The primary vehicle for consultation with industry and other stakeholder groups was through a Reef Protection Stakeholder Advisory Committee (RPSAC), chaired by the then Minister for Sustainability, Climate Change and Innovation. This committee included representatives from the peak agricultural organisations (Queensland Farmers Federation, AgForce, Growcom, Canegrowers, Australian Cane Farmers Association), World Wildlife Fund, Queensland Conservation Council, Queensland Tourism Council, Regional NRM Groups, Great Barrier Reef Marine Park Authority, (GBRMPA), the Local Government Association of Queensland and CropLife. The RPSAC met twice in December 2008 and February 2009. A series of smaller out-of-session meetings were also held to discuss individual stakeholder issues and the then Minister for Sustainability, Climate Change and Innovation held four public meetings in the GBR region which were attended by a total of 440 farmers, graziers, community groups and others.

### ***Potentially competitive restrictions***

The legislation will include the first prioritisation areas; all sugar cane production systems and all cattle grazing with more than 100 standard cattle units in the three priority catchments of the Wet Tropics, Mackay-Whitsundays and the Burdekin Dry Tropics. Given that grazing and cane farming relies on access to fertile soil, which is not readily substitutable, the geographic location of these agricultural activities implies a natural conflict with the quality of the reef adjacent to these locations. The PBT addresses two potentially restrictive provisions in the proposed legislation:

- 1. Creating differential regulatory arrangements in the market* by limiting the regulatory net to certain activities in three priority catchments in Queensland. This means that only a subset of Queensland's cattle and cane farming sector will be regulated which may result in additional regulatory imposts that are not applicable to businesses in other areas of the State (e.g. cane farms on the Sunshine Coast) or country (e.g. beef farms in Southern Queensland). For example, a farmer may face higher input costs as a result of: the pesticide restrictions (e.g.

requirement to be certified in chemical handling and application, a switch to more expensive chemical substitutes in some cases); the requirement to prepare and implement an Environmental Risk Management Plan (e.g. new equipment); as well as the requirement to do soil testing to ensure that over-fertilisation (e.g. laboratory costs).

Whilst this has the benefit of maximising cost effectiveness for government and minimising impact on the industry as a whole, the effects on competition warrants investigation as it may affect the productivity and competitiveness of a subset of the industry relative to its counterparts. The rationale for limiting the regulatory net to these three priority areas is simple. These operators have been prioritised as the highest source of nutrient and sediment release into the GBR and reducing pollution from larger farms will achieve greater improvements in water quality for least cost.

Competing sugarcane farms in the Sunshine Coast and northern New South Wales are not located adjacent to such an important asset and are thus not having the same effect on an internationally significant resource. This is similarly the case for competitors of beef and dairy cattle farms in southern parts of Queensland and Northern New South Wales.

*2. Restricting the conduct of a business* by limiting the use of pesticides/fertilisers, prohibiting certain practices and requiring actions under an Environmental Risk Management Plan (ERMP). All of these may increase costs and affect the operating arrangements of a business (e.g. costs to undertake training and new investments in pollution control equipment to meet a defined environmental outcome). Examples of additional imposts include increased input costs as a result of a change in either labour costs (e.g. mechanical weeding in those areas where herbicides are not allowed to be used) or the costs associated with preparing and implementing environmental risk management plans. This could affect the productivity and competitiveness of the operators relative to their non-regulated counterparts.

Consultation with the Regional Groups Collective and Growcom revealed concerns (based on their experience of other programs) about the potential for a system that results in inconsistent or inequitable treatment between regions or within an industry sector. This was viewed as unfavourable.

### ***Stakeholder Analysis***

The introduction of a regulatory framework for agriculture will potentially impact on a number of stakeholders. An analysis of key stakeholders is provided below, divided into the upstream/downstream players in the cattle and cane market, which will form the focus of the regulation.

#### *Upstream Impacts*

- Commercial manufacturers/suppliers of pesticides/fertiliser.
- Manufacturers of agricultural equipment who supply capital and technological solutions to ensure effective on-farm management and operations.

#### *Direct Impacts*

- Cattle (beef and dairy) farmers who may be required to change farm management practices in order to meet the requirements of the regulation.
- Sugarcane farmers who may be required to change farm management practices in order to meet the requirements of the regulation.
- The state government (DERM) as the administering body for the new regulations.

#### *Downstream Impacts*

- Tourism operators who rely on reef health as a principal natural attraction for 1.9 million tourists who visit the GBR each year.

- Commercial fisheries are a major use of the GBR Marine Park and annually produce around \$120 million worth of seafood (GBRMPA, 2009). Key fisheries reliant on reef health and abundant resources include the East Coast Otter Trawl Fishery, East Coast Coral Reef Line Fishery, East Coast Inshore Finfish Fishery and the East Coast Dive-Based Fishery.
- Recreational/cultural users of the GBR – recreational and charter fisheries (valued at \$4.2 billion a year), boating, diving and indigenous fishing.
- Wholesalers and processing industries such as sugar mills, dairy and meat processors that purchase primary produce from the priority catchments.
- Consumers in the local (e.g. dairy and meat) and global (e.g. meat and sugar) markets and the prices paid for Queensland's primary produce.

### ***Industry Profiles***

The following information provides a more detailed analysis of the key industries that will be affected by the regulatory proposals.

#### ***Beef Cattle***

The grazing industry in Australia is a price taker with approximately 65% of Australia's beef production exported. The remainder is consumed domestically. In 2008, Queensland accounted for 47 per cent of Australian beef cattle numbers with approximately 12 million head of cattle. From the available data it is difficult to determine the markets used by producers in the Reef catchments however the key exports markets for Queensland beef are. Discussions with farmers in the region suggest that approximately 75 percent of the north Queensland market is slaughter for export trade to Japan, USA, South Korea and the European Union to a lesser extent. Approximately 15 per cent is live export to South East Asia and the Middle East whilst 10 per cent is for feedlots and pasture fattening in southern and central Queensland. In addition there is some niche marketing of high quality local beef into local restaurants and supermarkets. Meat in supermarkets is a mixture of local product and southern product, while local butcher shops carry mostly local product.

ABARE farm surveys are not accorded to catchment boundaries but data has been analysed for the Central North region of Queensland and the North Queensland Coastal region which includes the area from Mackay to Cairns.

Estimates of profit at full equity (the return produced by all the resources used in the farm business) between 1998 and 2008 were on average \$107,114 for the Central North and \$21,400 for the North Queensland Coastal region. The figures include the losses during the recent drought.

An ABARE report from 2003 on NRM in the Burdekin catchment notes that the average beef property in the Burdekin region has more than doubled in size since 1977-78. In 2001-02, the average area of land operated per property is estimated to have been around 30,000 hectares. Average beef cattle numbers per property were estimated to be nearly 3,400 and average farm profit was \$206,845.

#### ***Dairy Cattle***

According to Dairy Australia's regional breakdown of dairy industries, the dairy farms in the key reef catchments are situated in Australia's subtropical dairy industry (which spans from northern New South Wales to Far North Queensland). The dairy industry is predominantly pasture-based with some supplementary feeding with grains.

The majority of milk produced in the northern areas goes to one of two northern milk processors which service a local market including Western Queensland towns such as Mount Isa.

### *Sugarcane*

The Australian sugar industry is also a price taker with around 98% of Australia's production exposed to the world market price. Queensland dominates the sugar market (88% of growers) and the predominant export is raw sugar (Japan, Korea, Malaysia, New Zealand, Canada and the USA). However an increase in sugar supply by other major exporting countries (e.g. Brazil, European Union and Thailand) has put pressure on prices in Australia's export markets over the past decade, and subsequently on returns for Australian growers (ABARE, 2008 and Canegrowers, 2009). However short to medium prospects for exports are favourable in Australian dollar terms and growers are cautiously optimistic about the coming seasons.

The industry has seen a general trend in recent years towards larger farms and diversification to mixed crop rotation systems (e.g. leguminous crops such as soybeans and peanuts) and beef cattle. The average farm size is 77 hectares but farms range from 30 to more than 250 hectares (Canegrowers, 2009). In Queensland, sugar cane farmers sell direct to sugar refineries/mills and are usually consigned to mills by contracts. In 2006-07, farm cash receipts averaged \$363,000 a farm with approximately three-quarters of this attribute to sugar cane with the remainder being generated by the sale of other crops (particularly fruit and vegetables) and beef cattle (ABARE, 2008).

The Gross Value of Agricultural Production for Queensland for sugarcane has increased from \$617.3m in 200-01 to \$1 143.0m in 2006-07 (ABS, 2009). Nationally, sugar cane growing farm business profitability fell on average from a profit of \$32 000/farm in 2006-07 to a loss of \$58 400/farm in 2007-08. Only 25 per cent of sugar cane businesses are estimated to have recorded a profit in 2007-08, compared with 49 per cent in 2006-07. About 25 percent of the farms in the Herbert River, Burdekin, Mackay and southern Queensland regions realised a profit in 2007-08.

In 2006-07, sugar cane production cash costs averaged \$181,000 a farm, ranging from almost \$80,000 a farm for small scale producers (< 7,500 tonnes) to around \$2.2 million a farm for growers producing more than 50,000 tonnes. Across all farms, contract harvesting and fertilisers were the largest cost items, accounting for almost half of total sugar cane related production costs. Fertiliser as a percentage of total cash costs (average per farm) is approximately 17 per cent although this varies considerably across regions. While growers in northern Queensland still have the low production costs for Queensland, unit costs in NSW are now the lowest in Australia.

### ***Experience in other states***

#### *NSW – Acid Sulphate Soils*

In New South Wales, drain management plans are required, under Local Environmental Plans, for all cane farms which have acid sulphate soils. These plans are prepared in accordance with the Sugar Industry Best Practice Guidelines and any works that are carried out must be lodged with and endorsed by the NSW Sugar Milling Co-operative or the Council. The mills can refuse to take cane from growers who fail to farm in accordance with the guidelines.

#### *European Union - Nitrates Directive*

A Nitrates Directive has been implemented in the European Union in order to limit the losses linked to agricultural activities. An analysis of the program undertaken by the European Commission in 2002 included a preliminary assessment of the economics of the Action Programmes. The Directive required operators to undertake a soil analysis to optimise nitrogen input to crop needs, and the report found that the cost of the soil tests would be fully accounted

for if nitrogen inputs were reduced by 10- 45 kgs per hectare per year. It was thought this reduction was feasible.

The report also noted that reductions in inputs did not lead to any yield reductions because of the positive impacts of improved practices. Further the report noted that the cost of reduction of nitrates through the Directives was much less than the alternative of treating water through a biological denitrification treatment.

On 1 January 2009, the *Nitrate Pollution Prevention Regulations 2008* commenced to give effect to the Nitrates Directive in England. It includes strict requirements (e.g. 'closed periods' for spreading organic manure, annual loading limits etc) for certain agricultural activities that are located in Nitrate Vulnerable Zones (NVZ's). NVZ's are designated areas that drain into waters that are polluted or likely to become polluted without action. Around 60% of the nitrate pollution found in rivers, lakes and ground waters in England is caused by agriculture. The new regulations aim to protect and sustain the quality of water supplies and to minimise other environmental impacts. These Regulations will sit alongside the many voluntary actions farmers are already taking to adjust farming practices to minimise the impact on water bodies.

#### *United States of America – Nutrient Management Plans*

A number of states in the USA require farmers to prepare a nutrient management plan. For example, the Wisconsin's Nutrient Management Standard 590 requires that farmers applying nutrients must have and follow an annual nutrient management plan if required by a municipality or if cost sharing is offered.

However, in most cases, farmers cannot be required to change an existing cropland practice or livestock facility on a farm to meet the standards, unless they are offered cost sharing. Farmers are eligible for at least 70% cost sharing — more if there is economic hardship.

### **Outline and Analysis of Options**

The Government investigated a range of options including no regulatory intervention and various regulatory options ranging from prescriptive requirements, a risk based approach and a model based on monitoring and compliance action. Option 1 would have no new effects on agriculture businesses whilst Options 2 to 5 would affect all sugar cane production systems as well as cattle farms (beef and dairy) with more than 100 cattle units. Options 2 to 5 assume ongoing implementation of all other programs under the Reef Plan in order to cumulatively meet the reef health targets. The legislation applies to three regional catchments of Burdekin Dry Tropics, Wet Tropics and Mackay-Whitsundays.

Each option was analysed in line with the following criteria:

- Likelihood that the option will meet reef health targets
- Regulatory efficiency in terms of costs and time to industry (e.g. regulatory burden, new fees, impact on time and cost inputs, ability to pass on costs, yield/productivity, regional employment effects)
- Regulatory efficiency in terms of costs and time to government (e.g. administrative time and costs, compliance costs, required legislative amendments)
- Impacts and flow on effects for supply chain stakeholders
- Overall public benefit (end-consumers, recreational users, other environmental impacts)

## **Option 1 - No legislative intervention**

### *Outline*

This option relies on the existing voluntary and non-regulatory measures to meet the targets for Reef health within five years time. This means that no farmers would be affected by new regulations. The Reef Plan first introduced in 2003, is a joint commitment of the Queensland and Australian governments. It identifies actions that will help minimise the risk to the Reef from a decline in the quality of water entering the Reef from the adjacent catchments. It incorporates and supports the actions of government, industry and community groups that impact on Reef health and has links with a number of other legislative and planning initiatives.

The Reef Plan aims to halt and reverse the decline in water quality entering the Reef and focuses on actions to address pollutants for diffuse agricultural land use sources through an integrated natural resource management approach.

Reef Plan has provided a strong foundation for the delivery of on-ground actions to improve management practices that can help restore the Reef's health. The following are some of the key achievements of the Reef Plan:

- Reef Water Quality Partnership (to enable coordinated and integrated water quality target setting, monitoring and reporting regional natural resource management bodies in Reef catchments and the Australian and Queensland governments).
- The Delbessie Agreement (rural leasehold strategy) commenced in 2008, providing extended leases to those landholders that improved land condition.
- Water Quality Improvement Plans for key catchments which identified regional targets for improvement and key management changes to be made to reach those targets.
- Identification of Nutrient Management Zones and Sediment Loss Zones that will help focus work in 'hot spot' locations.
- A number of collaborative education and extension projects involving regional Natural Resource Management bodies, industry and the Queensland Government have been completed that promote and support uptake of sustainable agriculture, such as: the Reef Extension program; Farm Management Systems; Mackay Whitsundays Sustainable Landscapes program; Rural Water Use Efficiency initiative; community-based water quality monitoring through 'Waterwatch'; the fertiliser industry's 'Fertcare' program; and others.
- Industry-led changes to land management practices have taken place in the agricultural industry through the development of Farm Management Systems and codes of practice and initiatives such as the 'Six Easy Steps' for nutrient management in sugarcane and the AgForward program within the grazing industry.
- The Queensland Wetland Programme has delivered more than 38 projects, including a range of mapping, information and decision-making tools to enable land managers and regional bodies to protect and manage wetlands.
- Significant community monitoring, education and extension has occurred through regional NRM bodies.

In the absence of any new regulatory requirements, this option would continue these programs (or similar programs) into the future.

### *Analysis*

An analysis of Option 1 reveals that voluntary and non-regulatory measures alone will not meet the targets identified by the Queensland Government and listed in the Reef Plan as critical to ensuring reef health. No legislative intervention would mean the persistence of inefficient practices and ongoing release of large volumes of sediment and nutrients into the GBR.

Without legislative intervention improvements to management practices cannot be guaranteed. Therefore there will continue to be high costs to farmers from loss of fertiliser, pesticide and soil. An average cane farm loses about \$7,000 to \$10,000 worth of fertiliser every year (Thorburn et al, 2007 and Dight, 2009). This totals an estimated \$30-\$60 million worth of fertiliser wasted annually in the Reef catchments. This wasted fertiliser not only reduces the productivity of the farmer, but it can end up in the Reef, contributing to its declining health and the consequent loss of jobs in fishing and tourism.

Since the release of Reef Plan the Queensland Government has pursued a voluntary approach with the focus on voluntary uptake of best management practices (BMPs). Whilst there are some good examples of adoption there is no clear evidence that the voluntary approach has produced wide adoption of the necessary BMPs. Latest available evidence (i.e. the Scientific Consensus Statement) indicates that water discharged from rivers to the GBR continues to be of poor quality in many locations and current management interventions are not working. Land derived contaminants, including suspended sediments, nutrients and pesticides are still present in the GBR at concentrations likely to cause environmental harm.

The impending threat of climate change to the GBR has been recognised as far more serious since the commencement of Reef Plan in 2003 and escalated the urgency of taking remedial action.

Whilst this option results in nil regulatory fees or upfront costs to industry or government in the short term, this option has an overall net cost to the community and environment because it does nothing further to manage the continuing decline of water quality in the GBR. The continued decline in reef health will have flow on effects and result in significant cultural, economic and environmental costs in the long term. This would include deleterious impacts to the Queensland 'reef fish' fishery, tourism and recreation industries.

Since the release of the Reef Plan the Queensland Government has invested about \$25 million annually into natural resource management in Reef catchments. This contribution was part of bilateral agreements with the Commonwealth for the National Heritage Trust Extension and the National Action Plan for Salinity and Water Quality. This was an investment in the health of the entire catchment which ultimately supports a healthy reef ecosystem. A significant proportion of this investment was used to build the knowledge and skills of land managers and promote and support uptake of sustainable agricultural practices.

Given that the Queensland Government has made a significant investment in the long term protection of the GBR, adopting this option means that not only will the Government not meet its objective of ecologically sustainable development under the *Environmental Protection Act 1994*, responsibilities under the World Heritage Convention or its targets under the Reef Plan, Option 1 will also undermine a significant amount of past expenditure and effort. Without legislative intervention improvements to management practices cannot be guaranteed.

The results from consultation indicate that some key stakeholders including Growcom, Canegrowers, Regional Groups Collective, the Australian Cane Farmers Association and individual canefarmers do not support a legislative approach and believe that a regulatory approach would not achieve the desired outcome. Some believed that voluntary risk management approaches and providing incentives to farmers is a more effective approach to reducing agricultural pollution. In practice, this would mean the development of new incentive programs and continuation of existing programs such as the National Landcare Water Quality Incentives Scheme delivered by the regional natural resource management (NRM) bodies, the Rural Water Use Efficiency initiative and incentives programs delivered by Regional NRM bodies including the Sustainable Landscapes Programme (Reef Catchments NRM) and the Neighbourhood Catchments program (Fitzroy Basin association). Whilst economic instruments

such as incentives can contribute improvements to water quality by encouraging a positive change in farm practices, they alone will not lead to the rapid change in practices that is needed to ensure reef health. Incentives are best adopted as part of a suite of regulatory and non-regulatory initiatives aimed at protecting reef health.

Conversely, the World Wildlife Fund supports targeted regulation. The Queensland Tourism Council noted that regulation should not be ruled out if it was necessary to protect one of Queensland's principal assets. The table below summarises the costs/benefits to the various parties.

Stakeholders	Costs / disadvantages	Benefits / advantages
Community & Economy	<ul style="list-style-type: none"> <li>○ Continued decline in the health of the GBR and no legislative mechanism to manage threatening process such as nutrient and sediment run off</li> </ul>	<ul style="list-style-type: none"> <li>○ There are no benefits or advantages to the community</li> </ul>
Industry	<ul style="list-style-type: none"> <li>○ Potential risks/impacts for long term viability of industries that are reliant on reef health (e.g. tourism and fishing)</li> <li>○ Continuation of current practices leads to losses due to excess pesticides and soil being released from properties.</li> </ul>	<ul style="list-style-type: none"> <li>○ No regulatory costs to agricultural activities in the short term</li> </ul>
Government	<ul style="list-style-type: none"> <li>○ Government unlikely to meet reef health targets and meet objectives and responsibilities under the Reef Plan, environmental protection legislation under the World Heritage Convention</li> <li>○ Significant losses as a result of wasted resources on past expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>○ No new administration costs in the short term</li> <li>○ Continued support for development of voluntary best management practices and farm management systems.</li> </ul>

## **Option 2 - Risk Management model**

### *Outline*

This option is a risk management model that requires operators to produce an Environmental Risk Management Plan (ERMP). An ERMP is a farm scale risk management plan which identifies the risks inherent in a land holding and the associated agricultural practices including release of nutrients, sediment and pesticides into waters and provides an enforceable roadmap of how each operator's risks will be managed over a set time period. The ERMP would set out specific measures to address these risks.

For example, a cane farmer would be required to prepare a nutrient and pesticide management plan (given that nutrient and pesticide run off is an issue for cane farms), whilst a cattle grazier would prepare a sediment management plan (to address sediment run off related to stocking rates and other practices). The ERMPs would be submitted and accredited and regularly audited by government, providing an enforceable roadmap of how each operator's risk will be managed over a set time period. It is hard to estimate how many farmers would be affected by this option but it is likely to be similar to the number estimated for Option 4 (approximately 1000) as this reflects those who have been identified as being the highest risk (refer Option 4 for more detail).

DERM would produce a manual outlining the detailed requirements of an ERMP and would undertake extension work and training to assist landholders to develop an ERMP. To ensure that operators are not required to duplicate existing effort, an operator may gain recognition for existing systems or management plans that are equivalent to an ERMP or part of an ERMP. For example, a cattle grazing operation with a Land Management Agreement under the Delbessie arrangements for leasehold land are likely to be able to satisfy the ERMP requirements for sediment management on grazing lands without significant additional work. Similarly, requirements for land and water use management plans under the *Water Act 2000* may be able to satisfy some of the ERMP requirements.

This option was investigated as it provides the flexibility to allow variation on a site-by-site basis and can encourage innovation by giving operators the flexibility to determine how to address a particular issue on their site.

### *Analysis*

An analysis of Option 2 shows that whilst providing flexibility to operators, it would result in high upfront cost to Government and an implementation lag that would jeopardise the reef health targets. This option has an overall net cost to government with an implementation lag that would limit the improvements to water quality in the GBR.

For the affected agricultural operators, the ERMP approach provides adequate flexibility to allow variation of responses on a site-by-site basis and can encourage innovation by giving operators the flexibility to determine how to address a particular issue on their site.

However, this option would take 5 to 10 years to roll out to all operators in the catchment, unless high levels of investment in initial years ensured rapid uptake. Whilst this option could guarantee practice change and improved water quality over time, it would be difficult to meet the targets without more significant upfront investment by government.

Over five years, this option has been costed at \$60 million (including \$1.4 million on program development, \$30 million in extension work, \$5 million on monitoring and \$22.5 million on enforcement). Compared to the other options, this has a higher upfront administrative cost than Option 5 (i.e. to develop and accredit the ERMPs). However given that abatement actions can be tailored to each property and each operator is only committed to the extent of their risk, abatement costs are likely to be lower than Option 5.

Consultation with key stakeholders such as the World Wildlife Fund and the Queensland Tourism Council support the concept of targeted regulation whereas Canegrowers and individual canefarmers do not support any legislative approach.

Stakeholders	Costs / disadvantages	Benefits / advantages
Community & Economy	<ul style="list-style-type: none"> <li>○ Targets may not be met within the required timeframes which may threaten long term reef health.</li> </ul>	<ul style="list-style-type: none"> <li>○ Likely to be observed improvements in water quality</li> </ul>
Industry	<ul style="list-style-type: none"> <li>○ Increased regulatory costs for affected operators</li> </ul>	<ul style="list-style-type: none"> <li>○ Likely to ensure the long term viability of industries that are reliant on reef health</li> <li>○ Regulatory framework provides flexibility to tailor management actions on a site by site basis.</li> <li>○ Continued support for development of voluntary best management practices and farm management systems.</li> </ul>
Government	<ul style="list-style-type: none"> <li>○ High upfront and ongoing administration costs</li> </ul>	<ul style="list-style-type: none"> <li>○ No advantages to government</li> </ul>

### ***Option 3 - Monitoring and compliance***

#### *Outline*

This option proposes to focus on monitoring water quality rather than farm practices with compliance action targeted against operators that are identified as causing pollution. Following the identification of an issue in an area, such as high nutrient loads, the government would require operators in that area to take remedial action. Under this option, water quality samplers would be strategically placed in high risk areas. For example, if a high level of pesticide is detected, then investigative monitoring action is undertaken by compliance officers to follow the contaminant to the highest identifiable point. This may narrow down the source of the contaminant so further compliance action can be taken, if the responsible operator can be adequately identified. There are approximately 4500 operators in the priority catchments. Of this total, it is estimated that approximately 2000 operators will be affected by this option.

This option has the advantage of using the existing compliance and enforcement tools under the EP Act without legislative amendment. An example of an existing enforcement tool under the Act is a Transitional Environmental Program which is an action plan that identifies and addresses environmental risks and sets out a series of actions to be undertaken over a period of time.

## Analysis

An analysis of Option 3 shows that this option has the highest costs to Government, with limited enforceability. It has an overall net cost to government and industry but does result in benefits to the environment. The estimated costs to Government of adopting a monitoring program of the scale necessary to provide support for compliance action are high. DERM estimates that an effective monitoring program that will supply sufficient data to support compliance action will require two monitoring points per property. For 2,000 properties, this would cost approximately \$76 million over five years and does not include compliance and enforcement costs to respond to identified issues (at least \$22.5 million over five years). However, monitoring results are also problematic with regards to enforcement because pesticides, nutrients and sediments enter waterways through a range of processes and may flow directly to the Reef lagoon through groundwater or overland flow across adjacent properties.

It should also be noted that due to the compliance nature of this approach and the fact that it is a reactive tool, responses to identified issues would take time and this may affect the ability to achieve water quality targets.

Given that the ERMP is only used as a compliance tool under this option, the upfront costs to affected operators is less than other regulatory options. The compliance costs would compare with those in the Option 2 for risk management which also requires an ERMP. This option would require significant community education, extension and compliance effort and thus is likely to have a positive employment effect in the government and/or scientific research sector. The effects on employment to the agricultural sector are harder to determine for this option because the compliance requirements would be set out in the ERMP and tailored to each property. Depending on the actions that are required under an ERMP, the main cost to agricultural operators will be increased labour costs if particular actions are required and/or investments in capital to adopt new practices in order to meet the environmental outcomes required under the ERMP. There is also an element of uncertainty for the farmer under this option, because the criteria for needing to do an ERMP are not clearly defined.

Consultation with key stakeholders such as the WWF and the Queensland Tourism Council support the concept of targeted regulation. Industry groups including Canegrowers and individual canefarmers do not support any legislative approach. The Queensland Farmers Federation raised concern about the cost to farmers of doing an ERMP and questioned whether enough scientific knowledge is available. They believed that ERMPs may be a better goal for the long term.

Stakeholders	Costs / disadvantages	Benefits / advantages
Community & Economy	<ul style="list-style-type: none"> <li>○ Lag time in actions being implemented may jeopardise reef health targets</li> </ul>	<ul style="list-style-type: none"> <li>○ Likely to be observed improvements in water quality and reef health</li> <li>○ Positive regional employment effect</li> </ul>
Industry	<ul style="list-style-type: none"> <li>○ Compliance costs are likely to be high</li> </ul>	<ul style="list-style-type: none"> <li>○ Will not impose costs on good operations who have done an ERMP or equivalent</li> <li>○ Compliance actions can be targeted to site specific issues</li> <li>○ Continued support for development of voluntary best management practices and farm management systems.</li> <li>○ Positive employment effect on the scientific research sector</li> </ul>
Government	<ul style="list-style-type: none"> <li>○ High upfront cost</li> <li>○ Enforcement would be complex and difficult given the diffuse and variable nature of sediment/nutrient run-off</li> </ul>	<ul style="list-style-type: none"> <li>○ Long term monitoring will lead to improved evidence base and better understanding of water quality and waterway processes</li> <li>○ Does not require any legislative amendment</li> </ul>

## **Option 4 - Combination – Prescriptive, Risk Management, Monitoring**

### *Outline*

This option features a combination of regulatory options, which affects operators in slightly different ways. The following activities will apply to all cattle and cane farms in the priority catchments (approximately 4500 operators):

- A prescriptive requirement in a regulation under the *Chemical Usage (Agricultural and Veterinary) Control Act 1988 (Chemical Controls Act)* restricting the use of key pesticides. The regulation will include a suite of additional use controls and restrictions for listed chemicals (Atrazine, Diuron, Ametryn, Hexazinone and Tebuthiuron). For example, Ametryn use in cane growing will be subject to restrictions such as distance setbacks, prohibition along drainage lines and the requirement for certification and training in order to use the chemical. This will be a temporary measure for the protection of sensitive receiving environments until each of the chemicals has undergone a full environmental risk assessment by the Australian Pesticides and Veterinary Medicines Authority. The restrictions are then expected to transition to a chemical labelling system consistent with the National Registration Scheme for Agricultural and Veterinary Chemicals, as is currently done for many other chemicals.
- One of the requirements will be that a person using a product containing one of the key chemicals must hold current Statements of Attainment, or be working under the direct supervision of a person holding current Statements of Attainment, certifying competency at Australian Qualifications Framework level 3, with respect to three national units of competency (relating to the preparation, application, transport, storage and handling of chemicals). These Statements of Attainment are issued by a Registered Training Organisation registered under the *Training and Employment Act 2000*.
- Another requirement is an offence under the *Environmental Protection Act 1994* for an operator who does not keep records relevant to their main practices and supply this data on request. This includes such things as reporting on the size of land used for production, pesticides and fertilisers applied to the land; all soil testing undertaken; and stocking rates. Penalties will apply (on the spot fine or prosecution) for non compliance.
- There will also be an offence under the *Environmental Protection Act 1994* to apply fertiliser without undertaking soil testing and using the results to calculate the optimum application rate and then applying no more than the optimum rate. A methodology for calculating the optimum rate may be prescribed by regulation and will take into account variables such as soil and fertiliser type. DERM intends to develop a calculator-type approach for calculating optimum fertiliser rates and will provide all of the necessary training and support to help operators interpret the results of soil tests and calculate the optimum rate.
- A performance requirement under the *Environmental Protection Act 1994* which will allow for hotspot areas to be declared as requiring an ERMP if considered necessary (e.g. in response to new scientific evidence) or as a compliance measure. These requirements will occur on a case by case basis.

The following restrictions will apply to cane farming (> 70 ha) in the Wet Tropics and cattle grazing (> 2000 ha) in the Burdekin Dry Tropics (approximately 1000 operators):

- This is a compulsory performance component requiring an ERMP for those operators who fall into this group. These operators have been prioritised as the highest risk of nutrient and sediment release in the priority catchments as reducing pollution from larger farms will achieve greater improvements in water quality for least cost. Accordingly, relatively high thresholds for operators were chosen. As the average size of cane farms in the Wet Tropics is about 60 to 70 hectares, a threshold of 70 hectares was chosen. The threshold for ERMP targeting for cattle grazing in the Burdekin Dry Tropics is based on an estimation that about a third of grazing properties are larger than 2000 hectares. However, no definitive data is available at this stage. Attachment 4 contains further detail justifying the thresholds.
- This requirement will mostly affect sugarcane farming and beef cattle farms (as dairy farms are located in Mackay-Whitsundays catchment) and the estimated number of affected operators was calculated based on 2006 Australian Bureau of Statistics data.

DERM will undertake extension work and training support services in order to facilitate implementation and minimise upfront costs. There may also be the opportunity for affected operators to access grants and funding from other sources to assist implementation.

Tracking the achievement of the targets requires a reliance on existing data available under complementary monitoring and evaluation programs (for the Reef) in conjunction with modelled data derived from practice change improvement.

Intuitively, it can be expected the water quality improvement commensurate with the target would be evidenced through water quality monitoring. However, evaluation of the impact of the Package through water quality monitoring presents challenges, mainly due to the diffuse nature of discharge from farm properties as well as the fact that water monitoring results can be skewed by natural weather events, such as the major flooding experienced in early 2009.

During these events, agricultural pollutants hit the Reef in 'pulses', meaning that water monitoring would reveal a significant decline in quality following these events. Accordingly, monitoring to establish progress towards the targets cannot be done effectively by ambient sampling (e.g. monthly). Instead, longer term trend data must be established through more frequent and event-based monitoring (such as after a major storm) interpreted by modelling.

This option also includes a monitoring component which will be a combination of water quality monitoring mapped back to the target and the proxy of improvements in land use practices. The uptake of improved management practices and water quality monitoring in sites that have significant regulated practice change will enable modelling to estimate impact reduction and long term water quality improvements taking into account other program initiatives over the whole Reef area. DERM will undertake this monitoring and will design the framework in such a way that it complements existing programs being undertaken as part of the Reef Plan and other monitoring initiatives in the region.

## *Analysis*

Option 4, whilst it will impose costs to industry and government, is most likely to meet the reef health targets within the required timeframes. It is regarded as having the highest benefit to reef health even after the costs to industry and government have been accounted for. The extent to which this option impacts on individual operators will vary considerably depending on the level of inherent hazards on an individual's land holding and the effectiveness of an operator's management practices. The model does not include fees or any other cost recovery component so that the operator invests all available funds in improving practices in order to meet the targets.

Further, those operators who can demonstrate that they are implementing management practices that adequately address the identified risks of their operation will not incur any additional costs associated with implementing improved practices. It is highly likely that this option will increase the productive efficiency of primary producers by reducing the waste of water, fertiliser, pesticide, soil and fuel. This will increase both their economic and their environmental sustainability. A detailed analysis of the likely impacts is below:

### *Prescriptive requirements limiting the use of pesticides*

- In response to the restrictions on pesticides, operators are more likely to substitute their pesticides use than revert to mechanical measures or manual labour. This is because the cost of labour is not cost effective and depending on the restricted practice, the option to use manual labour may be limited by factors such as accessibility. For example, drainage lines may have steep banks so will not allow access for slashing equipment. This is dangerous for occupational health and safety reasons.
- The Department of Employment, Economic Development and Innovation advises that there is some potential for an increased use of knockdown pesticides in the absence of residual chemicals. Alternative products include RoundUp (glyphosate) or 2-4-D although these products would not necessarily have the exact same effect because Round Up is known to kill everything, including the crop so this could only be applied in a manner that does not affect the crop.
- With a restriction on pesticide applications in the cane and grazing sectors, it is likely that chemical companies will seek to fill these gaps with "new" alternative products. The development of new chemicals is subject to many factors and it is hard to say whether this regulation will generate the demand for new, less environmentally "hazardous" chemicals. Chemical companies may seek to have other existing chemicals registered for use in these sectors to fill the gap, although the likelihood of this isn't high. For example, with a restriction on the prescribed chemicals, chemical companies may seek to have another chemical registered for use in cane. Any application to have a new chemical registered for use in a sector will undergo review, including an environmental review, by the Australian Pesticides and Veterinary Medicines Authority.
- The Government should monitor for any deleterious cumulative impacts on reef health, the environment and productivity as a result of the new restrictions. For example, the impacts of chemical substitutes should be monitored for the potential for weeds to develop a resistance to the alternative pesticides (as has happened in the grains industry where some weeds have developed a resistance to glyphosphate). The likelihood of this occurring in the cane industry is unknown, but current opinions regard the immediate threat to be low. In any case, other potential environmental impacts should be closely monitored.

- The table below provides a price comparison for substitutes for those chemicals which shows that the cost of Round Up is a comparable price to those pesticides however in some circumstances (e.g. where crop viability could be affected by using Round Up) the more expensive substitute might need to be used.

Prescribed Pesticide	Cost/kg	Substitute	Cost/kg
Atrazine,	Atradex \$10/kg (90% active)	No direct substitute but likely to use other products such as glyphosate (Round UP) in non-cropping areas. Glyphosate cannot be used on the crop.  Alternatively, other products such as Flame (active ingredient imazapyr) could act as an atrazine replacement with varying effects on the full suite of weeds that atrazine addresses.	\$ 6.70/L for Weedmaster or \$10.07/L for Powermax (premium brand)  \$95.50/L
Diuron,	Diurex \$ 15.30/ kg. 90% active	No direct substitute but likely to use other products such as glyphosate (Round UP) in non-cropping areas. Glyphosate cannot be used on the crop.  No direct substitute but other products such as Balance (active ingredient isoxaflutole) could act as an diuron replacement with varying effects on the full suite of weeds that diuron addresses.	\$ 6.70/L for Weedmaster or \$10.07/L for Powermax (premium brand)  \$386/kg
Ametryn,	Viking (liquid) \$12.20/L 90% active	No direct substitute but likely to use other products such as glyphosate (Round UP) in non-cropping areas. Glyphosate cannot be used on the crop.  No direct substitute but other products such as Krismat (active ingredients ametryn + trifloxysulfuron sodium) could act as an ametryn replacement with varying effects on the full suite of weeds that ametryn addresses.	\$ 6.70/L for Weedmaster or \$10.07/L for Powermax (premium brand)  \$34.60/kg
Hexazinone	Mixed with diuron. \$23.40/kg. Velpar K4. 13.2% hexazinone 46.8% diuron.	No direct substitute but likely to use other products such as glyphosate (Round UP) in non-cropping areas. Glyphosate cannot be used on the crop.  No direct substitute but other products such as Balance (active ingredient isoxaflutole) could act as an diuron replacement with varying effects on the full suite of weeds that diuron addresses.	\$ 6.70/L for Weedmaster or \$10.07/L for Powermax (premium brand)  \$386/kg
Tebuthiuron	Graslan or Tebulan.	There is no substitute for the aerial application of tebuthiuron.  Tordon (active ingredient Picloram) - – stem injection of spot spray. Not aerial  Velpar L (active ingredient hexazinone), spot spray or stem injection. Not aerial	N/A

Source: Department of Employment, Economic Development and Innovation, 2009.

- The use of pesticides is an integral component of a well designed integrated pest management plan, and is vital to the adoption of zero and minimum till production systems. Increasing restrictions on the use of residual herbicides may jeopardise these practices, both of which are currently advocated as an integral component of any good farm management plan in the cane industry. However, as the regulation is not banning the outright use of the pesticides, but rather restricting their use within certain distances to waterways and drainage lines and during certain atmospheric conditions, it is unlikely to have significant impacts on these production systems.
- Operators (or contracted parties who apply the pesticide) who apply one or more of the listed pesticides without holding the necessary qualifications will face additional costs related to accreditation. To achieve accreditation from a Registered Training Organisation (RTO) for the 3 competencies, the approximate cost is \$400-\$500. This would also involve a 3 day training course.
- According to the Department of Employment, Economic Development and Innovation it is likely that only a very small percentage, if any, cane farmers currently hold the competencies that will be required by the regulation.
- However it is highly likely that many operators have undertaken some aspect of chemicals training (e.g. ChemCert accreditation). In some areas the number of cane farmers holding ChemCert accreditation may be as high as 70% (e.g. Herbert region) however, across all the reef catchments, this figure is more likely to fall to 40%. Whilst the ChemCert accreditation will not be sufficient to comply with the regulation, based on recognition of prior learning, any RTO should recognise most ChemCert accreditations and the landholder would only need to pay to complete the remaining competency.
- ChemCert accreditation in the extensive grazing industry is likely to be low as not much pesticide is used. When treating woody weed regrowth (i.e. tebuthiuron) most graziers apply pesticides aerially and therefore are already required under existing legislation to employ a licensed commercial applicator.
- For those operators who do not have any chemicals training experience, some of the above cost may be subsidised by DERM and possibly by the Bureau of Sugar Experiment Stations (BSES) should it wish to continue its current practice of providing free chemicals training to its members (noting that approximately 90 percent of Queensland's canegrowers are members). The training provided through these avenues can assist farmers to partially meet their requirements so it is not likely that many operators will have to pay the estimated \$400 to \$500 cost of certification. Further, the level of certification required under the legislation is perpetual and can be likened to obtaining a tertiary degree. This means that there are no ongoing costs to the operator associated with the proposed accreditation process.
- Depending on the level set for distance setbacks, the impact of the regulations would be more pronounced for small farms because the setback could limit the amount of area used for cane and this may affect yield. This could affect the farm income and would have a flow on effect for mills which require a certain supply to remain feasible. The distance will need to be set at a level that balances the environmental objectives with the potential regional employment effects.
- The results from consultation reveal that Agforce and the Regional Groups Collective support for banning unacceptable practices although this comment was not provided with an understanding of the exact practices that are proposed to be prohibited.

*Prescriptive requirement to keep records about land management practices*

- This requirement will have a limited financial impact on operators as it is estimated that the reporting framework will be approximately 1 to 2 hours per year. Penalties apply for not keeping records and for not supplying records upon request but these are not regarded as additional costs because they can be avoided as the operator has a choice to comply.

*Prescriptive requirements requiring soil testing and optimum fertiliser application*

- Operators not currently utilising soil testing will face additional costs. For sugar cane production systems, it is likely that a soil test would only be needed once every crop cycle with an average cycle being six years. Whilst a soil test is only required once every crop cycle, it is common for a single property to be divided into several blocks with a number of cycles operating at any one time. The cost of a soil test will also vary depending on soil type, property size, rotation of production systems and other factors. An example of an onerous soil testing regime is a 60 hectare farm with 15 blocks and each block contains 2 soil types. This would equate to needing to do a soil test once a year for each block before the plant cane stage (beginning of the production cycle).
- Based on estimates for an existing test offered by Incitec Pivot in February 2009, the cost of a soil test for sugarcane top soil is approximately \$80 whereas a complete test can cost up to \$130. A farm with two blocks both with 2 soil types about to be planted to cane would require 4 samples thus equating to about \$320 per year. The laboratory would then provide scientific results and the farmer would be required to interpret them (training also supplied at no cost to the operator) and go through the process of determining the optimum fertiliser application. This latter process would probably take a few hours every year to guide the nutrient program for plant cane and 5 ratoons. This process would have a heavier cost impact on farms that are heavily divided by waterways and have many small blocks.
- DERM would cover the necessary costs to train farmers on how to collect samples. At the beginning of the production cycle, a farmer would be required to obtain the sample from their property (3 hours for samples being taken from 2 blocks with 2 soil types per year) and send it to a laboratory for testing.
- Given that soil testing would be a legislative requirement under the new legislation, the demand for the soil testing services will increase and this will have a positive effect on the soil testing companies in Queensland. If the legislation requires that soil tests are to be sent to a laboratory that is accredited by the National Association of Testing Authorities (NATA), this will limit the pool of available laboratories. NATA accreditation is a common requirement for other government regulations requiring water quality testing. There are currently two NATA accredited laboratories in Queensland – Toowoomba and Brisbane.

- One of the potential benefits is that the legislation embeds responsible fertiliser application as a standard industry practice. For those operators not already analysing and applying the optimum rate of fertiliser (i.e. the rate that ensures productivity gains and maximum efficiency in fertiliser use), there is the potential to save on input costs. The Great Barrier Reef Marine Park Authority estimates that 150,000 tonnes of fertiliser is used annually in the Reef catchments for cane growing. CSIRO estimates that about 32,000 tonnes of fertiliser is lost to the environment each year. At a price of \$1,000 per tonne (a figure likely to rise with increased oil prices), this equates to a cumulative loss of \$32 million. At a price of up to \$800 per tonne (a figure likely to rise with increased oil prices), this equates to a loss of \$25.6 million.
- For those farms where the 'optimum' amount of fertiliser is less than the amount being applied, recent farm modelling conducted by the Department of Employment, Economic Development and Innovation suggests that fertiliser use can be significantly reduced without loss of profitability.

#### *Requirement for an ERMP*

- The costs associated with preparing an ERMP will vary depending on the availability of resource condition information, the size and complexity of the resource base and the operators management practices (existing or proposed) to manage risks. Low risk operators will not be required to have an ERMP, medium and high risk operators only a simple, menu-driven ERMP. Those operators who have a plan to implement management practices equivalent to an ERMP will not incur any additional costs.
- A risk-based evaluation of these initial ERMPs would identify operators who would be required to develop more complex ERMPs in future years. DERM estimates that the average cost for an operator to develop a more sophisticated ERMP is \$3,500 and can vary from \$300 to \$4,000. This figure could include the cost of a landholder's time, assessment and mapping work, workshop attendance costs and the cost of a consultant. This figure is based on the typical cost of a comparable plan, Land and Water Management Plans (LWMPs) that are required by landowners under the *Water Act 2000*. LWMPs are property level plans that consist of written reports and maps and identify natural resources, risks and acceptable management actions/ practices, any implementation timeframes, and monitoring and reporting requirements. Like the ERMP, the cost of a LWMP will vary according to a number of factors including resource condition, complexity of the irrigation enterprise and existing management practices.
- DERM will be providing training and extension support (at no cost to operators) to provide assistance and advice on how farmers can prepare an ERMP on their own. However depending on the complexity of the ERMP requirements and capacity of the operator, external consultants may be required to assist the development of ERMPs in some cases. External assistance is estimated to be approximately 1 to 2 days work with costs to be incurred by the operator. LWMP's experience with consultant costs has been that they are usually in the vicinity of \$1,000 to \$1,500.
- It is important to note that operators may be able to avoid unnecessary duplication of effort and additional costs by having other documents and plans recognised as meeting the requirements of the ERMP. ABARE data shows that in 2007-08, an estimated 30 per cent of sugar cane producers had a written farm management plan, with nearly all producers' plans containing information on production activities, natural resource management and business activities. This will limit the resultant impact of the ERMP requirements on those operators.

- For cane properties, typical activities are likely to relate to soil tests, nutrient and pesticide management planning and the purchase of equipment (e.g. split stool variable rate fertiliser box for underground application and/or a hooded pesticide sprayer to contain any drift). Note that an ERMP can tailor actions and property targets over a set time period and to assist implementation, will be mindful of affordability for the operator.
- For grazing properties, typical activities are likely to be fencing of erosion hazard areas and vegetation cover management to reduce sediment loss by systematic control of stocking rates. The investment cost will vary greatly but is likely to be much less than \$10,000 annually. Work by the Central Queensland University indicates that graziers who overgraze their land can permanently degrade their land and hence reduce future productivity and income. This leads to a permanent loss of their land's net present value which far outweighs any once off or short term gain in income.
- The ERMP allows operators to spread their investment in new practices over a reasonably long period. There is evidence to suggest that investment in precision fertiliser equipment (costing about \$30,000) used within an appropriate management system might save about \$3,000/year in reduced fertiliser costs. A similar investment in additional equipment and management decision support tools to reduce fertiliser, pesticide, water and energy use could save an additional \$5,000 to \$7,000 per year. Operators could reduce capital investment costs by sharing equipment.

Improved management practices can significantly increase the productive efficiency of primary producers by reducing waste of water, fertiliser, pesticide and soil. In the Mackay-Whitsundays region, implementation of improved practices in cane has been demonstrated to improve profit by \$91 per hectare (Mackay-Whitsundays Water Quality Improvement Plan).

Whilst it is not possible to say that graziers in the reef catchments will not be affected by the regulation, there is clear evidence that improved natural resources management can lead to higher profits. Another example of this is found in research that was undertaken by the former Queensland Primary Industries and Fisheries with support from Meat and Livestock Australia at Wambiana station south of Charters Towers. The Wambiana trial was initiated in 1998 to test the ability of five grazing strategies to cope with rainfall variability and develop principles for sustainable, profitable management.

At the end of ten years the results showed that good pasture management through moderate stocking rates delivers a raft of triple bottom line benefits. Relative to the commonly used higher stocking rates throughout the industry, the moderate stocking rate increased accumulated cash surplus by \$9,000 per 100 hectares after ten years. Animals were on average 50-70 kg heavier, with less year-to-year liveweight variability, and produced higher quality carcasses that received approximately 20c/kg more at sale. While liveweight gain per hectare was lower there was no need for drought feeding. Under heavy stocking rates there was a 30 per cent decline in carrying capacity, a three-to four fold decline in cover of palatable, perennial pasture species and an increased frequency and intensity of runoff with increased nutrient loss.

So in summary, this option will impose additional costs on industry with cattle and cane farmers but also includes mechanisms for those costs to be minimised. Those who need to implement risk management plans in addition to the standard chemical restrictions are likely to be most affected. Further, many operators will have already implemented all or part of their requirements so many of the impacts can be treated as sunken costs.

A worse case scenario relates to the poorest of performers who:

- has done no training relating to pesticide handling and application;

- has no property plans relating to environmental management;
- uses the priority pesticides across all areas of their operation;
- does not do any soil testing;
- has implemented no, if any, practices that minimise environmental impact;
- does not access any subsidy or grants for training/implementation.

The upfront cost to the above operator would be approximately \$6,000 for training (\$500), soil testing (\$320) and preparation of an ERMP (\$5,000 assuming a consultant is used). The implementation cost would vary depending on the individual site circumstances and costs would need to be traded off against the benefits in productivity and/or profits as a results of lower input costs or increased yield etc.

One potential benefit to industry as a result of the regulations and that it provides an opportunity to positively promote the environmental credentials of sugar/cattle farms in these regions so that they can differentiate their product in key markets (i.e. that the product has been produced in a way that minimises harm to the GBR).

In terms of the impacts to downstream stakeholders in the supply chain, the price taking nature of the sugar and cattle industries means that there is a limited ability for any increased input costs to be passed on to other parties in the supply chain (i.e. mills/saleyards/processors or the end consumers). The ultimate benefit to the community and environment is the long health of the GBR and the maintenance of tourism and fisheries industries.

Consultation with key stakeholders such as the WWF and the Queensland Tourism Council support the concept of targeted regulation. Industry groups including Canegrowers and individual canefarmers do not support any legislative approach.

With regards to the impact of this option on the government, this option is costed at \$10 million per year for five years. This includes program development of \$1.4 million, extension of around \$4.24 million per year, monitoring of \$1 million per year and compliance and enforcement averaging \$4.5 million per year.

Stakeholders	Costs / disadvantages	Benefits / advantages
Community & Economy	<ul style="list-style-type: none"> <li>○ Limited ability to pass on higher input costs through higher sugar/beef prices.</li> </ul>	<ul style="list-style-type: none"> <li>○ Most likely to meet reef health targets.</li> </ul>
Industry	<ul style="list-style-type: none"> <li>○ Increased costs due to new restrictions.</li> <li>○ Limited ability to pass these costs on to consumers.</li> <li>○ Greater level of regulation than other competitors in Queensland.</li> </ul>	<ul style="list-style-type: none"> <li>○ ERMP can be tailored to the individual site needs.</li> <li>○ Incorporates a system of recognition for existing management plans and actions.</li> <li>○ Continued support for development of voluntary best management practices and farm management systems.</li> <li>○ Positive employment effect on scientific testing laboratories.</li> <li>○ Efficiency improvements to the current cattle grazing/cane farming e.g. significant savings of fertiliser, pesticide and soil.</li> <li>○ Unique product marketing opportunities for environmental credentials</li> </ul>
Government	<ul style="list-style-type: none"> <li>○ High administration costs.</li> </ul>	<ul style="list-style-type: none"> <li>○ Cheaper administration cost than Options 2 and 3 and the same as Option 5.</li> </ul>

## **Option 5 - Prescriptive requirements in the form of a Code of Environmental Compliance**

### *Outline*

This option aims to achieve the targets primarily by setting a range of prescriptions and performance standards by preparing a code of environmental compliance (COEC) under the *Environmental Protection Act 1994*. The COEC would require operators to meet a performance standard in any appropriate way – it essentially acts as a standardised licence for all regulated operators. An ERMP may be required under this model as a compliance measure in response to failure to comply with a COEC or as a voluntary measure by the operator. This option would affect all of the farmers in the priority catchments (approximately 4500).

### *Analysis*

An analysis of this option shows that the use of a COEC would result in rigid requirements that results in limited flexibility with regards to operating conditions which potentially adds unnecessary costs to the operator.

The benefit of this option is that a COEC sets out the government’s expectations upfront without need for the operator to obtain an approval. This means that initial administrative costs in setting up the new regulatory system may be lower for government and operators. However, there is a strong risk of imposing blanket arbitrary rules which do not take into account the unique needs and features of each property.

In order to meet the targets for Reef protection, the minimum standards in the COEC would need to be set at a relatively high level. While some level of differentiation may be built into a COEC, the variation in agricultural operations in the target catchments would make it difficult to do this effectively. This runs the risk of over-regulating lower risk operations while not sufficiently targeting higher risk operations. Accordingly, the cost to operators would be disproportionate to the risk they present and the likely total cost burden on operators is higher than under a risk based approach.

With regards to the costs to government, this option is costed at \$10 million per year for five years. This includes \$1.3 million for program development, \$1 million per year each for extension and monitoring and \$7.7 million for compliance and enforcement (assuming an intensive compliance and monitoring function to ensure compliance with the COEC so that the targets are achieved)

Consultation with key stakeholders such as the World Wildlife Fund and the Queensland Tourism Council support the concept of targeted regulation. Industry groups including Canegrowers and individual canefarmers do not support any legislative approach.

Stakeholders	Costs / disadvantages	Benefits / advantages
Community & Economy	<ul style="list-style-type: none"> <li>○ Limited ability to pass on higher input costs through higher sugar/beef prices.</li> </ul>	<ul style="list-style-type: none"> <li>○ Likely to be observed improvements in water quality.</li> </ul>
Industry	<ul style="list-style-type: none"> <li>○ Greater level of regulation than other competitors in Queensland.</li> <li>○ Rigid conditions may not suit</li> </ul>	<ul style="list-style-type: none"> <li>○ Standard license means minimal paperwork.</li> </ul>

Stakeholders	Costs / disadvantages	Benefits / advantages
	<p>individual site needs (which may lead to higher costs).</p> <ul style="list-style-type: none"> <li>○ No formal system for recognition of existing systems.</li> </ul>	
Government	<ul style="list-style-type: none"> <li>○ Would be difficult to develop blanket conditions that apply to all operators in the regulatory net.</li> </ul>	<ul style="list-style-type: none"> <li>○ Cheaper administrative cost than Options 2 and 3 and the same as Option 4.</li> </ul>

## ***Conclusions and Recommendations***

### **Comparison of Options**

Whilst a non-regulatory option imposes no new costs on industry, it is highly unlikely that the reef targets can be achieved within the given timeframes, which would result in a loss of one of the State's principal natural assets and the associated social, environmental and economic benefits it provides.

With regards to the effects of competition, a subset of the industry will be subject to additional regulatory imposts that are not applicable to other competitors within the state however this is required in order to ensure reef health which is of international importance and would result in greater public benefit.

The restrictions may increase input costs but it is unclear whether this will automatically lead to reduced yields or productivity. Some evidence suggests that reduced fertiliser and chemical inputs and/or different stocking regimes may, when adopted as part of a whole-of-production system strategic approach, improve productivity and result in cost savings. Farms in this region could differentiate their product to be 'environmentally responsible' and conducted in a way that helps protect reef water quality.

Whilst all regulatory options are likely to achieve the reef targets eventually, the timeframes will vary, as will the costs and benefits to industry and government. Option 4 is the option most likely to meet the reef targets within the desired timeframes at the least cost per unit of abatement. It has the advantage of driving immediate changes in land management through the prescriptive provisions whilst using a risk management model to target more complex issues, such as sediment release. A risk management model is also cost effective.

This option will impose additional costs on industry with cattle and cane farmers but also includes mechanisms for those costs to be minimised. Those who need to implement risk management plans in addition to the standard chemical restrictions are likely to be most affected. This PBT has shown that many operators will have already implemented all or part of their requirements so many of the impacts can be treated as sunken costs.

A worse case scenario relates to the poorest of performers who:

- has done no training relating to pesticide handling and application;
- has no property plans relating to environmental management;
- uses the priority pesticides across all areas of their operation;
- does not do any soil testing;
- has implemented no, if any, practices that minimise environmental impact;
- does not access any subsidy or grants for training/implementation.

The upfront cost to the above operator would be approximately \$6,000 for training (\$500), soil testing (\$320) and preparation of an ERMP (\$5,000 assuming a consultant is used). The

implementation cost would vary depending on the individual site circumstances and costs would need to be traded off against the benefits in productivity and/or profits as a result of lower input costs or increased yield etc.

The estimated cost to Government will be \$50 million over five years, which is comparable to Option 5 and cheaper than Options 2 and 3 (see figure on page 5). Option 5 was not chosen because it risks imposing a higher cost on industry due to the introduction of standard conditions that are inflexible and unable to be tailored to individual farm circumstances. Option 2 would have limited enforceability, is expensive and is likely to take a longer time to implement. Option 3 would require no legislative amendment but is the most expensive option (by far) if it were to be implemented with the enforcement resources necessary to meet the targets.

## **Recommended Option**

DERM recommends Option 4 because it adds minimal additional compliance costs; results in more benefits than costs to the community and possibly also industry; and is the option most likely to meet the targets. This well designed package of measures will not only benefit the Reef but has the potential to increase the productive efficiency of primary producers by reducing the waste of water, fertiliser, pesticide, soil and fuel, which will ultimately increase both their economic and their environmental sustainability.

The preferred option will affect approximately 4,500 operators. Of that number, approximately one quarter (i.e. 1,000) will be required to prepare an ERMP in the first instance. No exemptions from the Queensland Competition Code or *Trade Practices Act 1974* are necessary for the new Regulation.

## **Implementation and Adjustment**

The new package will commence on 1 January 2010 with the majority of requirements effective immediately. Those operators that are required to do an ERMP will be required to prepare one within six months and those that are required to do an ERMP as a result of a declaration will be required to prepare an ERMP within three months of the declaration. It is unlikely that there will be any declarations within the first three months after the legislation has commenced.

Given that this is the first time the industry will be regulated, the package incorporates the following actions to facilitate implementation and update:

- Adopting standard minimum requirements for all properties where possible.
- Containing the ERMP requirements initially to the highest priority activities with thresholds based on property size, with a further mechanism to enable ERMPs to be required in other identified hot spots.
- Ensuring the package has the least cost impact on producers.
- No fees or any other cost recovery component in recognition of existing economic pressures and so that the operator invests all available funds in improving practice in order to meet the targets.
- High level of community information, education and extension and training support to regulated operators to facilitate implementation.
- An equivalence measure in the ERMP model so that existing systems/programs and practices can be deemed equivalent and meeting the needs of the ERMP requirements (i.e. not duplicating effort and recognising existing efforts).
- Seeking options for integration and efficiencies with other state and federal government programs (e.g. federal Reef Rescue which includes water quality grants or incentives to farmers to assist in the adoption of BMP).