Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill 2019 Submission No 126



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15 March 2019

#### Inquiry into: Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill 2019

Dear Committee Members,

The Great Barrier Reef is a global asset, attracting Australians and travellers from around the world to experience the awesome beauty it offers. With such great good fortune comes great responsibility to protect the Reef for both current and future generations.

WWF's recent public opinion survey The <u>Backyard Barometer</u> found that 89% of Australians identify the Great Barrier Reef as one of the top three natural places we need to protect. Other natural assets lag far behind the Reef in terms of public recognition and concern.

The economic contribution of the Reef is well-documented: over \$6 billion of economic value is generated for the Australian economy every year, and Reef-related tourism provides employment for over 60,000 people. These statistics are cited so frequently that the economic significance of the Reef may be taken for granted, while the economic risks of damage to the Reef are easily forgotten.

In 2016, WWF joined forces with the Queensland Farmers' Federation, the Queensland Tourism Industry Council and the Association of Marine Park Tourism Operators to commission a report from leading engineering consultancy firm Jacobs on the economic value of the Great Barrier Reef ("Investing in the Great Barrier Reef as economic infrastructure"). Jacobs found that if the Reef was treated like a piece of built infrastructure of comparable economic value, such as a dam or a road, it would receive much greater investment for its upkeep than is currently invested in the Reef.

Meanwhile, the threats to the Reef are growing. The <u>Outlook Report</u> published every five years by the Great Barrier Reef Marine Park Authority has consistently flagged climate change and polluted run-off as the two main threats to the health of the Reef. Coral bleaching events in 2015 and 2016, when almost half of the Reef's corals died, underscore the urgent need for stronger policy and concerted action to protect the Great Barrier Reef.

The <u>Reef Consensus Statement</u> is another key source of scientific input to Reef policy. The most recent Consensus Statement, published in 2017, reported:

- "The modelled mean annual river fine sediment loads to the Great Barrier Reef lagoon have increased ~5-fold for the entire Great Barrier Reef catchment"
- "a 2.1-fold increase for total nitrogen and 2.9-fold increase for total phosphorus"
- "The decline of marine water quality associated with land-based run-off from the adjacent catchments is a major cause of the current poor state of many of the coastal and marine ecosystems of the Great Barrier Reef."
- "The main source of the primary pollutants (nutrients, fine sediments and pesticides) from Great Barrier Reef catchments is diffuse source pollution from agriculture"
- "The condition of mid-shelf and outer shelf coral reefs in the Cairns/Cooktown Management Area also continues to be affected by a population outbreak of crown-of-thorns starfish, arguably the most important indirect effect of excess nutrients on Great Barrier Reef coral"
- "Progress towards the Reef Water Quality Protection Plan 2013 targets has been slow and the present trajectory will not meet the targets. This puts the Outstanding Universal Value of the Great Barrier Reef under increasing pressure, especially in the context of other pressures such as climate change. Greater effort to improve reef water quality is urgently required to restore and protect the Great Barrier Reef ecosystem."

Despite strong scientific consensus on the major sources and impacts of catchment pollution on the Reef, the response to-date has been inadequate. The most recently published <u>Reef Report</u> <u>Card</u> revealed that progress on pollution targets and management action was far off track:

- 1. Both sugarcane and grazing received a 'D' grade, with only 32% and 36% of producers respectively rated at best practice, towards a target of 90% by 2018; and
- 2. Actions to reduce fertiliser pollution received an 'E' rating, with only 20.9% reductions achieved towards a target of 50% by 2018.

Reef Report Cards have sadly become an annual reminder of on-going program failure. In response, the Queensland Government established the <u>Reef Water Quality Science Taskforce</u> to advice on the actions and investments needed to deliver the 2025 clean water targets for the Great Barrier Reef. The Taskforce found that:

• "Despite significant investment and goodwill from all parties, and improvements in some areas of marine condition, not enough has been achieved to prevent the further decline of the Reef."

The Taskforce made several recommendations including a call for stronger regulations as a critical step towards achieving the 2025 pollution reduction targets. WWF recognises that many farmers are voluntarily adopting improved practices, which not only cut pollution from their farms but can also reduce production risks and increase profitability. The efforts made by these farmers are admirable and should be applauded. However, the adoption of improved practices by a subset of responsible producers will not deliver the 2025 clean water targets. Millions of taxpayer dollars are being spent to assist farmers to improve their practices, but this money will be largely wasted unless those who persist with outdated and highly polluting practices are regulated.

Stronger laws are needed to ensure that *all* farmers achieve minimum standards and that highly polluting practices are rapidly phased out. This will not only benefit the Reef but will also help to protect the social license of the agricultural sector as a whole, so that the good work and responsible practices of the many are not undermined by a few persistent polluters.

The Bill presently before the Queensland Parliament provides the Head of Power for the regulatory recommendations of the Reef Taskforce to be put in place and implemented. We strongly support the following key elements of the Bill:

#### 1. Catchment pollution targets that will give the Reef clean water

The proposed regulations will, for the first time, specify pollution reductions for each of the 35 catchments that flow into the Great Barrier Reef. These targets are based on the best available evidence and will ensure the Reef gets the clean water it needs to regain its health.

#### 2. The ability to regulate all industries, all agriculture sectors and all catchments

Previously only some agricultural sectors in some catchments were regulated. But the Reef does not distinguish where pollution comes from. Pollution laws should apply to everyone, so progress can be made as rapidly and as equitably as possible.

#### 3. Industry voluntary standards offered as an alternative means of compliance

Farmers who voluntarily adopt and are credibly verified as meeting production standards that are demonstrably equivalent to or better than the regulatory minimum standard should not be required to undergo a further assessment of compliance. This allows farmer to choose their own pathways to compliance, whether by adopting industry best practice standards or submitting to regulation. In practice, only those who fail to meet their industry BMP (verified as above industry standard) will need to address regulatory requirements.

#### 4. The ability to set minimum standards to ensure significant cuts to water pollution

The Bill provides government the power to set minimum standards for agriculture. These standards need to be set out clearly in regulations and should include the full Six Easy Steps for cane farming, and for all grazing land currently rated in 'C' or 'D' class to be restored to good condition ('B' class or better). These standards are proven to enhance farm productivity whilst cutting pollution.

#### 5. The ability to collect essential data for monitoring and enforcement

Performance data must be collected and published regularly to show what management changes are occurring and to estimate the expected resulting pollution reductions. No industry should be exempt from providing data to show compliance with the law and avoidance of Reef pollution.

#### 6. New developments must not increase water pollution

Millions of dollars have been invested over many years to reduce pollution on the Reef. Farmers have undertaken significant practice changes to reduce pollution coming off their properties. These investments and on-ground efforts would be wasted if new development is allowed to increase the amount of pollution flowing onto the Reef. WWF firmly believes that any new developments must not add to the existing excessive pollution load that is harming the Reef.

Despite implementing many of the recommendations of the Reef Taskforce, WWF believes there are significant gaps in the Bill that must be addressed if we are to make meaningful progress to achieve the 2025 water quality targets and restore Reef health. These gaps are set out below:

#### 1. Management of activities in high risk areas

Some areas are especially prone to exporting pollutants to the Reef, such as riparian zones, highly erodible soils and 'leaky' farm land. Special measures are needed for such areas, setting out what activities may occur and what restoration actions are required. Water quality modelling suggests that farming practice change alone will not be sufficient to deliver the 2025 pollution targets and that additional measures are required for such pollution 'hot spots'. This is one key issue raised by the Reef Taskforce which the current Bill does not address.

#### 2. All activities should have access to offsets to achieve least cost pollution abatement

The Bill allows for point source pollution from industrial development to be offset, but agriculture is excluded and will not be able to access least cost options for pollution abatement. This will force many agricultural operators to undertake on-site works to ensure no net increase in pollution, which in many instances will be more expensive than offsets. Recommendation 5.6 of the Reef Taskforce report called for "a water quality offset framework that can apply across industries (urban, ports, agriculture)." The current Bill does not address this Recommendation. Attached is a paper that WWF commissioned on how a comprehensive and effective offsets regime could work.

#### 3. Halt or offset the dumping of dredge spoil on the Reef

Whilst the Bill focuses on phasing out outdated polluting practices in Reef catchments, the practice of dumping maintenance dredge spoil continues. This must be stopped or at the very least effective offsetting of dredge pollution must be put in place. With all the efforts being made to cut catchment pollution running into the Reef, it makes no sense to allow continued dumping of dredge spoil in Reef waters. This is again contrary to the Recommendations of the Reef Taskforce. WWF believes that ports and the shipping companies that visit them have a responsibility to minimise their impacts on the waters they use. Also attached is a second paper that WWF commissioned on how an offsets system for maintenance dredging could be established.

Protecting the Great Barrier Reef is one of Australia's top environmental priorities and a longstanding focus for WWF. Our work to protect the Reef includes helping to secure the green zones, advocating for increased government funding, stopping the dumping of capital dredge spoil, and supporting innovation in farming to reduce agricultural pollution while improving productivity. WWF has focused intensively on improving the quality of water entering the Reef lagoon, which is critical to restore the Reef's health and increase resilience in the face of climate impacts.

Queensland must play its part to tackle climate change and should take a leadership role to help fast-track efforts to reduce greenhouse gas emissions. At the same time, we must take action to cut the massive loads of unnatural sediment and chemical pollution running into Reef waters.

Catchment pollution is an immediate threat to the Reef that we can address here and now - in fact, it is up to Queenslanders to solve this problem. The new laws before Parliament are essential to give the Reef the clean water it needs to help restore its health.

WWF believes the present Bill provides a sound framework for tackling pollution harming the Reef. To be truly effective, however, the Bill will need to be backed up by effective regulations that set out the necessary standards and implementation details, together with sufficient administrative resources and enforcement capacity to ensure full compliance with the Law.

I urge the Committee to support this important Bill to help safeguard the future of our Great Barrier Reef and to recommend the improvements outlined above in order to ensure efficient delivery of the 2025 clean water targets.

To discuss this submission please contact: Ms Rachel Lowry

m:

Yours sincerely,

Dermot O'Gorman CEO, WWF-Australia

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## Establishing a Water Quality Offset Framework for the Great Barrier Reef

Briefing Paper August 2018

Sean Hoobin Senior Manager Reef and Water WWF-Australia

# **Executive Summary**

The Great Barrier Reef Water Science Taskforce made two recommendations critical to achieving ambitious 2025 Reef pollution reduction targets:

## 5.5. Establish regulations to ensure no net decline in water quality from intensification and expansion in the agricultural sector.

5.6. Establish a water quality offset framework that can apply across industries (urban, ports, agriculture).

If pollution from new development is not controlled the investments already made, and water quality improvements achieved, will be negated. Offsets provide a means for new development to address pollution at least cost – making significant cost savings compared to on-site treatment options.

The Queensland Government committed to implement all Recommendations 'In-Principle' in August 2016. In correspondence of 23 November 2017 the Deputy Premier Jackie Trad went further stating the Government "is committed to fully implementing the recommendations of the Great Barrier Reef Water Science Taskforce, including the establishment of enhanced reef regulations" and that these regulations would "establish a water quality offset framework that can apply across agriculture and industrial sectors as a measure to manage water quality impacts for new, expanded or intensified development".

This paper sets out proposed measures to be included in the offset framework so that it is effective at addressing pollution from new development whilst minimising compliance costs. There is significant potential for growth across a range of industries, and therefore significant potential for increased pollution loads. Key elements of an offset framework to cost effectively address this risk include:

- Residual pollution across all types and scales of development to be offset (not just significant residual pollution) to have sufficient funds to address all water quality impacts.
- Efficient mechanisms to establish the residual pollution that needs to be abated including standard loads for small scale developments.
- Significant cost savings for developments to meet pollution standards.
- Utilising the Reef Credit methods to provide a low cost means to measure pollution reductions for payment across a range of actions.
- Prioritisation and risk sharing to increase the uptake of the Point Source Water Quality Offsets Policy by wastewater treatment plants as part of a broader offsets scheme.
- The establishment of a water quality bank (advanced offsets) to:
  - invest in on-ground pollution reduction actions to cut pollution prior to impacts
  - verify and 'bank' pollution reduction for ready purchase by new developments
  - use payments to invest in further pollution reductions works (revolving fund)
  - provide a source of money to support Land Restoration Fund investments

#### **Great Barrier Reef Water Science Taskforce**

The Great Barrier Reef Water Science Taskforce Report released in May 2016 made five key recommendations that if effectively implemented as a package will provide a cost-effective regulatory and water quality offset regime to achieve substantive pollution reduction for the Great Barrier Reef. The five recommendations are:

5.1. Set and progressively reduce catchment pollution load limits in legislation to provide a regulatory framework to help drive load reductions to meet water quality targets

5.2. Incentives to continuously improve practices should be complemented by staged regulations that should

- Improve existing minimum regulated standards (for example for urban, stormwater and point source) over time
- Establish minimum standards across all agricultural industries to address sediment and nutrient pollution
- Mandate the provision of farm level yield data, nutrient and other relevant data across all agricultural industries
- Consider progression to other approaches, including farm based caps, if other stages are not successful within 5 years

5.5. Establish regulations to ensure not net decline in water quality from intensification and expansion in the agricultural sector

5.6. Establish a water quality offset framework that can apply across all industries (urban, ports, agriculture).

5.7 Seek continuous improvements in regulations and compliance capacity for point source pollution, stormwater, and erosion and sediment control in urban and industrial areas.

Catchment load limits and a 'no net decline' setting for new development effectively caps pollution – an essential factor to stimulate demand for pollution credits. Minimum standards set the baseline to ensure investment doesn't go to pollution reductions which should be part of a duty of care. Mandated data ensures there will information available to effectively account for the buying and selling of pollution reductions. Continual improvement in regulations will ensure an ongoing investment stream. As a package these provisions will facilitate significant investment in the most cost-effective pollution reductions

#### Water Quality Offsets

Offsets allow a development impact to be addressed offsite when it cannot be avoided or mitigated effectively or economically on-site. A developer purchases pollution reduction elsewhere in a catchment so offsets are the beginning of a water quality trading market. Water quality offsets/trading is a market-based approach that provides for innovation, cost-savings and flexibility in how development conditions are met. The ability to offset pollution impacts can lower regulatory compliance and abatement costs and if implemented correctly provide additional environmental benefit. Three types of water quality markets have been implemented elsewhere:

- Point to point trading between point sources such as waste water treatment plants usually under a bubble licence.
- Point to non-point trading between a point source polluter and a non-point source such as an agricultural enterprise
- Non -point to non-point source trading between non-point source under a regulated cap.

Point source pollution has been identified as a small but significant contributor to overall pollution in the Great Barrier Reef. Given the distances and small number of potential market participants, a point to point source trading scheme under a bubble licence would not be effective at achieving significant pollution abatement.

Point to non-point source trading is a cost effective way to meet regulatory compliance. Under this approach regulated point source pollution sources such as waste water treatment plants (nitrogen discharge) and ports (sediment discharge through maintenance dredging) will be able to buy offsets from catchment based providers implementing approved nitrogen and sediment reduction processes to meet pollution standards.

An offset system would allow point source polluters to meet obligations to not pollute the Reef at a significant lower cost than on-site treatment. The Point Source Water Quality Offsets Policy allows for the above two trading approaches but to date has had very limited uptake due to its design.

A non-point to non-point offset scheme would involve trading between agricultural and urban developments. As agriculture is the source of 90% of the unnatural pollution flowing to the Great Barrier Reef it is critical they are part of an offsets regime for all pollution impacts not just 'significant residual' pollution. Offsets will allow agriculture to meet no net decline water quality requirements cost-effectively when cheap on-site mitigation and treatment options have been exhausted.

#### **Demand for Water Quality Offsets**

Offset systems are like any other markets in that their success is based on the existence sufficient demand and supply. Demand for offsets and water quality trading can only be stimulated through regulation.

The Taskforce recommended that catchment pollutant loads limits should be introduced to define the maximum nutrient or sediment loads in the catchment. They furthermore recommended that these load limits should be used as part of the decision making for approving any new development within the Reef catchments to ensure that any new nutrient and sediment discharge is only allowed where the load limits are not exceeded.

In most instances catchment load limits have already been significantly exceeded. Without the implementation of a supportive offsets framework to provide cost effective pollution reductions, urban and industrial development could become prohibitively expensive and potentially technically unfeasible.

The Point Source Water Quality Offsets Policy already allow flexibility in terms of how water quality conditions can be met. However, there has been very little uptake by water water treatment plant operators due to flaws in the policy. A revised policy is soon to be finalised and will need to address these issues if it is to drive significant investment in offsets from new point sources and provide low cost compliance.

Predicted urban and industrial growth in Townsville, Cairns, McKay and Gladstone over the next twenty years will provide a significant market for offsets provided a supportive regulatory regime and tightened standards are implemented. Moreover, in the absence of an offsets framework the cost of meeting development requirements may be prohibitive.

Taskforce Recommendation 5.5 singled out agriculture for the application of the 'no net decline' requirement. As agriculture is the source of 90% of unnatural Reef pollution, it is essential it be included in controls and offsetting if water quality targets are to be achieved.

There are significant drivers for agricultural development. The Government's biofuels program will likely lead to agricultural expansion. There are large amounts of available water under government allocation plans as well as many proposed dams being formally assessed under government funded programs. More imminent is the development of land that has already been provided approval for clearing for High Value Agriculture – around 43 000 hectares in Reef catchments.

A no net decline requirement will drive innovation for low polluting agricultural development. Where no net decline cannot be achieved on-site, an offset scheme will provide least cost abatement options. A threshold of only offsetting 'significant residual' pollution is completely inappropriate for agriculture as pollution loads come from numerous small operations rather than a handful of significant sources. If all new agricultural development does not offset residual pollution, increased public funds will need to be provided.

Targets established under the Reef 2050 Water Quality Improvement Plan identify the need for a 60% reduction in dissolved inorganic nitrogen loads and a 25% reduction in fine sediment loads on average across Reef catchments. Agricultural groups have been clear that they should only be required to address their proportional contribution to these targets. This therefore means that other sectors must do the same. Offset will allow other sectors to meet their abatement responsibilities – even though they may purchase reductions in the land sector.

No net worsening provisions and a tightening of existing regulatory standards for existing discharge licence holders in line with Reef 2050 targets would significantly stimulate the market for offset provision and investment in catchment based pollution reduction activities.

Finally, the impact of tree clearing on Reef water quality has received much attention of recent. The newly passed vegetation laws will certainly reduce the scale of

clearing. However, significant clearing will still occur. There should be requirements placed on tree clearing to avoid and minimise water quality impacts. If there are residual pollution loads offsets, should be considered.

#### Supply of Water Quality Offsets

The significant investments made in reef catchments to date have demonstrated the ability to reduce nitrogen and sediment pollution in the broader landscape. Methodologies, modelling and monitoring frameworks have been established and the offset supply side of the market is rapidly maturing. The ongoing stream of investment provided by a water quality offset scheme would further stimulate the diversity of project and organisations undertaking pollution reduction activities.

For an offset scheme to operate effectively there needs to be an agreed and costeffective approach to measuring the quantum of pollution reductions achieved by any given project for a buyer to purchase. The Queensland Government supported Reef Credit Initiative offers a way to verify water quality offsets.

Reef Credits will be issued to projects according to methodologies that calculate or model the reduction of sediment, nutrients and pesticides flowing onto the Great Barrier Reef due to land management change activities such as revegetation, riverbank stabilisation, and reduction of nitrogen application. Reef Credits can then be sold to government, industry and other organisations including developments looking to source offsets.

#### **Policy and Approval Requirements**

The current regulatory framework can deliver a water quality offsets system, with some key amendments. The Point Source Water Quality Offsets Policy provides for environmental authority (EA) holders to meet their point source water emission discharge requirements through investing in offsets such as river restoration, improved farm practice or wetland construction. Achieving pollution reductions though offsets provides very substantial cost savings compared to expensive treatment technologies.

However, despite the opportunity for cost-saving there has been little uptake of the policy by waste water treatment plant operators due to the complexity of developing and maintaining offsets, and the burden of risk lying solely with the operators. The revised policy which is near finalisation needs to address these issues. Implementing a Water Quality Bank (below section) would go a long way to overcoming these obstacles. The final Policy will also need to be tailored to meet Reef water quality needs e.g. provisions for inter-catchment offsetting could have perverse outcomes for catchment specific Reef targets.

While the policy provides an important basis for water quality offsets on its own it is unlikely to have a major impact on Reef water quality. The policy will only impact on new large scale developments and not existing pollutant sources which form most of the nitrogen and sediment load. The policy only supports point to point and point to non-point trading. The policy itself will not create the demand for water quality offsets. It does not establish stronger targets or reflect catchment load limits. A strengthened regulatory approach for all sectors to meet their share of water quality targets is required to drive demand for water quality offsets.

There needs to be a clear policy on what contribution will be made by point source discharges to the achievement of the 2025 Reef water quality targets. Setting clear expectations will allow licence holders to make future investment decisions – including for offsets. There should be a Reef-wide plan for wastewater treatment plant upgrades (taking into account both local and Reef water quality objectives) so that investment in water quality improvements is rationally prioritised.

The assessment of new agricultural development, including the calculation of pollution to be offset is not as well provided for under current laws. New assessment processes will need to be developed. It may be appropriate for expansion or intensification below a certain threshold to be self-assessable. However, using self-assessment more broadly would almost ensure widespread non-compliance due to the low level of awareness, let alone adoption, in key agricultural sectors of recommended best practice.

Aside from large scale agricultural developments, assessment could be undertaken by local government in line with existing arrangements. A capacity building program and the provision of standard conditions to allow easy implementation will be required. For larger developments there should be case specific assessment of residual pollution loads that are required to be offset. However, for smaller or standard developments there can be a set amount of pollution prescribed to be offset to minimise assessment costs.

#### Water Quality Banking Opportunities

A key risk for an offset framework is that there will be a significant time lag between environmental impacts occurring and the offset being fully functional and providing environmental benefit. For example, in the case of port development, dumping of dredge spoil has an immediate detrimental impact but the results of offsetting, through riparian zone or wetland restoration, may take years to provide a full compensatory effect and has great uncertainty of outcomes. Another key risk is that the works do not end up compensating fully for the impact at all.

In the United States a offset banking system has been implemented to address this issue. After protecting and restoring land, the bank operator is allowed to sell credits to those needing to satisfy legal requirements for compensating (offsetting) their environmental impacts. Offsets can only be sold after they have been created and independently verified.

The introduction of a water quality banking scheme in the Great Barrier Reef is a key way of reducing the risks and costs to offset buyers such as waste water treatment plant operators. The offsets are created, delivered and verified before being sold. Offset sellers would be required to provide the ongoing verification of the performance of the offset and the delivery risk is borne by the offset seller rather

than the buyer. Government and/or the Great Barrier Reef Foundation could invest funds as per normal in pollution reduction programs, but then bank these for later sale, and then re-invest funds.

Within the Great Barrier Reef context an advanced water quality offset banking scheme would involve investing in above regulation farm practices, restoring riparian zones, gullies, wetlands or other areas in strategic locations to reduce nitrogen and sediment pollution. The works would be documented and the relevant plans and covenants established to fulfil the offset requirements. The offset would then be registered with the Queensland Government or a credit exchange operator as an advanced offset. Reef Credits methodologies could be one means by which pollution outcomes are verified for banking.

Developers or infrastructure providers requiring a sediment or nutrient offset in the future could then purchase the rights to the offset from the provider. Any funds received could be reinvested in further water quality restoration works to create the next set of offsets. The result would be a rolling investment fund that would maximise the outcomes from initial investment and increase outcomes in terms of water quality. Key advantages of the approach are:

- Mitigation and water quality improvement occur in advance of environmental impacts.
- Uncertainty over whether offsetting project will be successful and maintained is reduced.
- Provides a potential financial return on investment for current water quality funding programs and helps create a private market.
- Reduces the transaction costs and risks for organisations requiring an offset as they can purchase it from a pre-existing bank rather creating it.
- Establishes an alternative income source for landholders wishing to undertake environmental restoration.
- Addressing many of the barriers preventing greater use of the the Point Source Water Quality Offsets Policy.

Investment of funds in an advanced offsets banking pilot is a key mechanism to generate a market for water quality improvement. Risks to the investor are minimal, particularly if banks are developed in conjunction with demand side market development options. Initial investments could occur in areas where there will be a future likely demand for offsets such as a waste water treatment plant upgrade. A few successful applications of the Point Source Water Quality Offsets Policy would facilitate a much wider application.

#### Establishing a Water Quality Offsets Exchange

The purpose of a water quality offsets exchange would be to match buyers and sellers of offsets. Buyers would be able to purchase pollutant reduction credits through a credit exchange managed by a third party, whether government, private, or non-profit. Sellers would able to register their current or future offset opportunities.

A variety of entities could administer the credit exchange, including state agencies, local governments, non- profit non-governmental entities, natural resource management bodies, private entities or other third parties.

The credit exchange would perform many of the functions that a buyers and sellers would otherwise have to perform such as trade negotiations. In addition to negotiating the trades, the credit exchange could provide continuity by establishing standards for trading, defining credits eligible for trading, setting credit prices, verifying the operation and maintenance of offset and credits, and tracking important trade information for all participants.

Funding could initially be provided for the establishment of the exchange although in the longer term it could be self-funding through an appropriate fee for service structure. Reef Credits is establishing an entity with a similar function. This may suffice for the initial trial phase but a more formalised entity should be established to manage the growing offsets market.

## **Conclusion and Recommendations**

The establishment of a well-designed and holistic water quality offsets framework will be critical to achieving the 2025 Reef pollution targets. It will drive greater investment in on-ground pollution reduction projects whilst providing a cost-effective means for developments to achieve water quality standards.

Many aspects of a framework for water quality offsets are already in place both technical and regulatory. However, an effective offsets system will require further policy and regulatory settings. Key recommendations are:

- Fully implement Reef Taskforce Recommendations.
- Establish a water quality offsets regime across all point and non-point sources and sinks.
- Mandate the collection of data from all businesses to set out their contribution to pollution loads and to enable verification of purchase or sale of water quality improvements.
- Build demand for water quality offsets by:
  - Requiring all point and non-point sources to have a no net increase in pollution (including maintenance dredging)
  - Set the pollution reduction each industry must achieve from current operations to meet their share of catchment pollution targets
  - All pollution increases from expanded agriculture to be offset not just 'significant residual' pollution from a handful of large developments
  - Use standard pollution offset amounts for standard small scale developments to reduce transaction costs.

- Ensure the ready supply of verified pollution reductions:
  - Development of agreed methodologies to achieve pollution reductions
  - Establishment of water quality offsets exchange to facilitate and verify the purchase and sale of pollution credits.
- Ensure the Point Source Water Quality Offsets Policy can effectively be implemented in Reef catchments including:
  - Develop a waste water treatment plant upgrade schedule which is prioritised based on Reef water quality targets
  - Identify and undertake pollution reduction offset projects to help treatment plants achieve pollution reductions at least cost.
- Establish a water quality bank which:
  - Invests in pollution reduction projects
  - Verifies pollution outcomes and sells these to those requiring offsets
  - Re-invests funds in further pollution reduction projects.

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## Offsetting the Impacts of Port Maintenance Dredging on the Great Barrier Reef World Heritage Area

July 2018

Sean Hoobin Senior Manager Reef and Water WWF-Australia

## **Executive Summary**

The World Heritage Committee's review of Australia's management of the Great Barrier Reef has had ports, dredging and dumping in Reef waters as one of its key focuses. In its 2015 Decision the Committee welcomed Australia's decision to ban the dumping of capital dredging material and instead dispose of it on land.

This historic decision left one key matter unaddressed – the disposal of maintenance dredge material. Due to cost and availability of land for disposal, maintenance dredge spoil continues to be dumped in Reef waters. The organisms in Reef waters aren't impacted less by maintenance dredge spoil – in fact the opposite is likely true with such spoil containing more fine particles which travel further when disturbed and dumped.

Nor is the volume of maintenance dredge spoil small – in fact the much greater volumes of maintenance spoil is the reason that on-land disposal is not seen as viable. The amount of maintenance dredging in the five years to 2014 was 5.7 million cubic meters. The dredging from Abbot Point which caused such strong public concern and drove the on-land disposal policy is to be 1.1 million  $m^3$ .

The dumping of maintenance dredging material is an ongoing and significant impact on the Outstanding Universal Values of the Great Barrier Reef. These impacts must be minimised to the greatest extent possible – but there will always be significant residual impacts from the dumping of dredge spoil. If the dumping of maintenance dredge spoil in Reef waters is to continue, then the impacts on Reef ecosystems must be offset.

The Great Barrier Reef is under enormous pressure from a range of impacts. Measures are being put in place to manage and offset these other impacts. The ongoing and significant impacts of dumping maintenance dredging is a glaring omission which must be addressed. The sediment released or resuspended through maintenance dredging is estimated to be equivalent to 10% of that delivered through catchment sources.

Most of Queensland's major export ports lie within or adjoin the Great Barrier Reef. The LNG, coal, minerals, agricultural and tourism industries depend on these ports for their ongoing viability and profitability. Transport vessells pay charges to cover the costs of building and maintaining ports in good working order. Offsetting of maintenance dredging impacts would be a small additional charge and would assist these industries to meet their responsibilities to not impact Reef values.

It is estimated that such an offset scheme would generate at least \$60 million annually for sediment reduction activities in catchments. Providers of catchments sediment reduction projects and a supportive modelling and monitoring environment already exists to facilitate the offsets program which could be implemented at minimal cost to the government.

The policy and legislative framework already exists to implement the offsetting of the dumping of maintenance dredging spoil. The *Queensland Government Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports* has a Principle

that dredging management plans should take into account Reef 2050 Plan policy developments in relation to cumulative impacts, offsetting impacts, and providing net benefits. The Reef 2050 Plan Net Benefit Policy was released in July 2018 and confirms that actions should achieve a net benefit for Reef values including decisions under law. More specifically the Great Barrier Reef Water Science Taskforce recommendation 5.6 stated "Establish a water quality offset framework that can apply across industries (urban, ports, agriculture)." Minor amendments would be needed to the non-statutory Significant Residual Impact Guide and related documents.

### Introduction

The purpose of this report is to put forward a rationale and program for the offsetting of the significant residual environmental impacts of port maintenance dredging on the Great Barrier Reef World Heritage Area. To do this it will outline the major ports located along the Great Barrier Reef, their central importance to the economic performance of Queensland and their requirements for maintenance dredging to maintain shipping channels. It will then describe the potential impacts of maintenance dredging and the need to offset the residual impacts of the activity. Following this the opportunity for terrestrially based offsets implementation, monitoring and evaluation requirements and potential costing structures are presented before conclusions and recommendations are drawn.

## Ports of the Great Barrier Reef

The below description of the ports indicates their importance to economic activity of Queensland. A large proportion of exports from the coal, gas and agricultural industries rely on port infrastructure. Tourism (cruise ships) and defence (navy) also heavily utilise the ports. Activity through the ports can only be maintained if shipping lanes are of sufficient depth to allow large vessels to access the port facilities and therefore ongoing maintenance dredging is required. The industries that rely on dredging and ports to transport their goods should share in the cost of ensuring the impacts on the Great Barrier Reef are fully addressed.

Of the 20 recognised ports in Queensland 12 are within or adjoin the Great Barrier Reef World Heritage Area (GBRWHA). Ports within the Great Barrier Reef World Heritage Area are spread over approximately 1,500 km along the east coast of Queensland and encompass a variety of coastal environments. The ports located along the Great Barrier Reef are managed and operated by four government owned port authorities.



Gladstone Ports Corporation operates the ports of Gladstone, Bundaberg and Alma. Gladstone is a major export port. LNG exports from the port were valued at more than \$32 billion in 2017. The port also serves as a major export centre for coal and aluminium. Other ports are smaller and handle sugar and other export commodities.

North Queensland Bulk Ports Corporation operates the ports of Hay Point, Mackay and Abbot Point. The Port of Hay Point is one of the largest coal export ports in the world. The Port of Abbot Point is the northernmost coal export port and includes the Adani terminal.

Port of Townsville operates the ports of Townsville and Lucinda The Port of Townsville is northern Australia's largest container, automotive and general cargo port. It is Australia's largest sugar, copper, zinc, lead and fertiliser port, servicing the North-West Minerals Province, the significant Burdekin sugar-growing district, major cattle and other agriculture precincts and the copper and zinc refineries located in Townsville. It is one of four designated Priority Ports in Queensland under the *Sustainable Ports Development Act 2015* (Qld). It also plays an increasingly strategic role in cruise shipping operations, and Australia's Defence capabilities



Ports North operates the Cairns port and a variety of other smaller regional ports. Ports North handle bulk shipments of sugar, molasses, silica sands, zinc, fuel, fertilisers. log products. minerals. livestock and general cargo. Cairns Seaport is a multi-purpose regional port that caters for a diverse range of customers from bulk

and general cargo, cruise shipping and reef passenger ferries. Cairns bulk cargo includes petroleum products, sugar, fertiliser and liquid petroleum gas. The Port is a supply and service centre mine operations. The Port is one of Australia's busiest cruising destinations with both major international cruise ships and several domestic cruise vessels operating out of Cairns.

## **Dredging volumes**

The 2015 *Synthesis Report on Effects of Dredging on the Great Barrier Reef* defines dredging as the excavation or removal of sediment and or rock from the sea floor.



Ports along the Great Barrier Reef have traditionally conducted capital and maintenance dredging. Capital dredging is carried out to open new shipping channels or to deepen or widen existing areas. Recently adopted policy approaches now mean that capital dredge spoil must now be disposed of on land. However, dredge material derived from maintenance dredging can still be dumped in Reef waters.

Maintenance dredging is implemented to maintain previously dredged areas at the required depth. Dredged areas are lower the surrounding seafloor and act as a sediment sink. For most ports sediment transport and sedimentation is primarily the result of waves and currents re-suspending seabed sediments. The configuration and orientation of each port relative to the natural sediment transport pathways plays a key role in the sedimentation which occurs in the artificially deepened areas.

Ports along the coastline have variable dredging requirements. Sedimentation at the ports of Gladstone, Townsville and Cairns is primarily caused by regular sediment transport from the resuspension of natural bed sediment by waves and currents and annual maintenance dredging is required. Regular maintenance dredging is required at Hay Point Port and Mackay Port. These areas experience relatively high rates of natural sediment transport but the dredged areas are not as effective sediment traps as the ports which require annual maintenance dredging. Regular sedimentation does occur but at a rate which typically only requires maintenance dredging every two to five years. Infrequent maintenance dredging is required at Port Alma and Abbot Point Port. The natural processes at Port Alma limit sedimentation. However, in all instances extreme events such as cyclones can dramatically increase the need for dredging.

The following table shows the ports requiring frequent and regular maintenance dredging between 2010 and 2014 and the volumes extracted – a total of 5 684 178 m<sup>3</sup>. As a point of comparison, the one-off dredging required for Abbot Point which is to be disposed of on land to avoid further impacts is 1.1 million m<sup>3</sup>.

Year	2010	2011	2012	2013	2014			
Frequent Maintenance Dredging (annual m3)								
Gladstone	0	309,000	150,000	0	555,107			
Townsville	133,100	814,435	502,940	386,610	521,770			
Cairns	314,657	439,443	246,727	421,491	574,447			
Regular Maintenance Dredging (every two to five years)								
Hay Point	216,070	0	0	0	0			
Mackay	0	0	0	98,381	0			

## Table 1 Ports Requiring Frequent and Regular Maintenance Dredging and Volume of Dredging 2010 to 2014.

Source: DTMR 2016

Dredged material is disposed offshore into the marine environment. Dredge material from Gladstone, Mackay and Townsville is disposed of within the port limits while dredge material from Hay Point and Cairns is disposed of within the Great Barrier Reef Marine Park.

The need for maintenance dredging and associated disposal in the marine environment is set to continue indefinitely. Reports commissioned by the DTMR (2016) showed that land based disposal is technically, environmentally and economically constrained. Key reasons that limit alternatives to marine dumping are the large quantities of material that will need to be regularly disposed of, the significantly higher cost of land based dispersal, the lack of suitable disposal sites and the unsuitability of the material for other uses.

## Environmental Impacts of Dredging and Dumping

The 2015 *Synthesis Report on Effects of Dredging on the Great Barrier Reef* found that the direct and indirect effects of dredging are severe within the dredging footprint and can be significant at local and regional scales. Other key findings include:

- Maintenance dredging campaigns are undertaken at regular intervals and create high concentrations of suspended sediments.
- This suspended sediment changes light quality and quantity causing turbidity, increases sedimentation, and potentially releases contaminants and nutrients occurring from natural or anthropogenic sources at the site.
- Maintenance dredging generally remove sediments with a higher proportion of finer particles
- Finer sediments are of particular concern because they are most readily resuspended and transported and may carry more chemicals, due to their high surface area to volume ratio.

Studies have found that high sedimentation rates can kill exposed coral tissue within a period of a few days and at lower levels, sedimentation reduces photosynthetic yields in corals. Young corals are more sensitive to sediment and reef recovery after a disturbance event can be impacted. The below Table from the Synthesis Report shows the proximity of coral and seagrass to port dredging and dumping.

Location	Dredging history	Maintenance dredging	Amount of coral within:				Amount of seagrass within:			
			0–2 km	2–10 km	10–30 km	30–50 km	0–2 km	2–10 km	10–30 km	30–50 km
Cairns	~100 years	***	-	*	**	***	**	***	***	***
Townsville	131 years	***	***	***	**	**	**	***	***	***
Abbot Pt	30 years	*	-	*	**	***	**	**	***	***
Mackay	~75 years	*	*	-	**	**	*	**	***	***
Hay Pt	~43 years	**	-	*	**	***	**	**	**	***
Gladstone	~100 years	**	*	**	**	***	**	***	***	**

Table 4: Proximity of	coral reefs a	nd seagrass	meadows	to dredging	and dispos	al activities	associated v	with major ports
Amounts are shown re	lative to other	ports: - nil;	★ little; ★★	r moderate;	★★★ large	amounts. Ad	lapted from N	vlorton et al. <sup>22</sup> .

## Sources and Resuspension of Sedimentation

The 2015 synthesis report of the biophysical impacts of dredging on the Great Barrier Reef compared the input of sediment to the Great Barrier Reef World Heritage Area from terrestrial run-off to the predicted total future maintenance dredging volumes at the ports located within the reef. It found that the maintenance dredging was roughly equivalent to 5-10% of the catchment input. Whether sediment comes direct from the catchment or is re-suspended, the impact on Reef ecosystems is much the same.

Sedimentation impacts from catchments and maintenance dredging are both strongly influenced by climactic factors. During the wet season, cyclones and periods of high rainfall can result in large volumes of sediment being inputted via local river systems and their associated catchment areas. Once sediment settles out from these flood plumes, currents and waves will then act as the primary driver responsible for the movement of these sediments regionally throughout the innershelf. Maintenance dredging and dumping causes unnatural movement of sediment and impact on Reef ecosystems.

The degree to which river discharges directly influence sedimentation rates at each port depends on the location of the ports relative to the river and creek mouths and the sediment load of the associated system. According to the 2015 synthesis report benefits gained through a reduction in suspended sediment contributions from the catchments will be minimal or insignificant in comparison to the contributions driven by natural wave and current-induced resuspension of existing bed material. However, this does not counter the key driver for introducing offsets – to address the residual impact of dredging and dumping in Great Barrier Reef waters so it does not contribute to a further decline in marine ecosystem health.

## Maintenance Dredging Strategy

The Maintenance Dredging Strategy outlines the principles and actions to manage the impacts of dredging on the Great Barrier Reef. According to the Strategy, ports will develop Long-term Maintenance Dredging Management Plans that:

- contribute to maintaining and enhancing the Outstanding Universal Values of the Great Barrier Reef
- are based on the best available science
- utilise the principles of ecologically sustainable development
- ensure continued operation of the port
- are developed in consultation with key stakeholders
- take into account Reef 2050 Plan policy developments in relation to cumulative impacts, offsetting impacts, and providing net benefits.

Plans will be based on an understanding of sediment transport processes and environmental values. They will include an assessment of beneficial reuse options for dredge material management to determine if viable opportunities exist. Long-term Maintenance Dredging Management Plans are required to consider any Reef 2050 Plan policy developments in relation to cumulative impacts, offsetting impacts and providing net benefits. So offsetting impacts is consistent with the Queensland Government's Maintenance Dredging Strategy.

## Mitigating the Impacts of Maintenance Dredging

Avoidance of maintenance dredging is not possible in most instances and attempts have been made to minimise, rectify and reduce impacts from the activity.



**Mitigation Hierarchy** 

Significant residual impacts from maintenance dredging will remain while marine based dispersal, rather than beneficial reuse, remains the prominent disposal method. As such, and in line with the mitigation hierarchy and government policy, an offset approach and scheme should be implemented.

## Offset Opportunities

The opportunity to offset the impacts of maintenance dredge are mainly based on opportunities to reduce terrestrial sources of sediment from catchments. Impacts from dredging turbidity and sediment can be offset on the R eef through reducing sediment generated in catchments during rainfall events.

For dredging and spoil dumping activities, sediment measures of total suspended solids, turbidity and clarity are used to assess the degree of threat to biodiversity values on the reef. River discharge of suspended sediments also can lead to increases in these metrics in the coastal marine waters of the reef. The principal metric for suspended sediment load is total tonnes. Fine sediment such as that generated by maintenance dredging has more impact on the reef and should be the focus of the offsets provided.

The 2017 Scientific Consensus Statement outlines the extent and source of sediments entering the Great Barrier Reef lagoon from catchments. The Statement reports that catchment modelling indicates 9.9 million tonnes of fine sediment is delivered to the Great Barrier Reef per year. Compared to pre-European conditions annual river fine sediment loads to the Great Barrier Reef lagoon have increased 5-fold. The Consensus Statement shows that the Burdekin catchment contributes 40% of the anthropogenic total suspended sediments load to the Great Barrier Reef lagoon, with the Wet Tropics (15%), Fitzroy (18%) and Burnett Mary (15%) being the other major contributors.

Tracing studies indicate that sub-surface erosion (gully, streambank and deep rill erosion on hillslopes) is the primary source of sediment, contributing 90% to the end of catchment loads. Grazing lands are the dominant land-use contributing sediment. Approaches to reducing sediment exports focus on reducing both the exposure of the soil, gully or streambanks to erosive forces as well as slowing and reducing surface run-off.

Studies reported in the consensus statement found that in grazing lands methods for reducing run-off and sediment loss include reducing forage utilisation to increase ground cover and redistributing grazing pressure away from areas vulnerable to erosion such as gullies and streambanks have been successful. A range of remediation options for reducing soil loss from gully erosion such as check dams and controlling livestock access have been demonstrated to be effective ways to trap fine sediment, initiate revegetation of the gully bed and walls and reduce sediment yield.

While the offsetting approach through the catchment based activities will not reduce the need for maintenance dredging it will help maintain the critical values of Great Barrier Reef that sediment is impacting on.

## Costs and Benefits

The costs of achieving the water quality targets for the Great Barrier Reef report (2016) showed that there is significant difference in the abatement costs of land management and practice change compared to stream-bank and gully repair. Around 85% of total regional fine sediment targets (1.8 million tonnes) are modelled to be achieved through land management and repair activities at a total cost of around \$1.8 billion (average cost per tonne of \$1,000). The remaining 0.4 million tonnes of abatement comes mainly from a combination of stream-bank and gully repair at an estimated total cost of \$6 billion (average cost per tonne of \$16,000).

According to the Biodiversity Consultancy (2015) the cost of reducing loading of suspended sediment by one tonne across the different NRM regions range from \$40 to \$3,000 for similar practice change or on-ground works in rangeland grazing areas. Assuming there are sufficient low cost abatement opportunities and in an average year approximately 1.0 million tonnes of dredge spoil is disposed of in the marine environment, a sediment offset scheme based on a 1:1.5 ratio could generate at least \$ 60 million per year for sediment reducing activities in catchments (with 5000 ships visiting Reef ports this would equate to an average \$12000 per vessel).

Costs for the offsets program could be passed onto the industries and sectors that benefit from the maintenance dredging programs that retain port functionality – large shipping companies in the main. In comparison to the volume of economic activity reliant on the disposal of dredge spoil in the marine environment the additional costs of the program are minimal.

## Offset Delivery Mechanisms

Natural resource management organisations, private providers and individual landholders are already undertaking significant works to reduce sediment pollution emanating from catchments. Provided that additionality can be proven these organisations, companies or individuals would be ready providers of sediment offsets for purchase by port authorities. Support services including monitoring, modelling and reporting capabilities have been built across the region through previous investment in various reef packages.

The establishment of a Water Quality Bank (advanced offsets) could be used to have established projects in place which are then used to provide offsets. With the ongoing investment that would occur from maintenance dredging offsets a program of work could be specifically devised for investment. Mechanism such as Reef Credits could be used to link payments to sediment load reduction.

### Recommendation

It is recommended that a sediment offset scheme for the marine disposal of maintenance dredging be introduced and that Long Term Maintenance Dredging Plans be required to identify the offset needs with ports then being required in a transparent manner to demonstrate how the offset requirement has been met.

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