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Australian Government

**Great Barrier Reef
Marine Park Authority**

GREAT BARRIER REEF MARINE PARK AUTHORITY

**Submission to the House Standing Committee on
Climate Change, Water, Environment and the Arts**

**Inquiry into climate change and environmental impacts
on coastal communities**

Introduction:¹

The Great Barrier Reef is a priceless environmental icon and one of our richest areas of biological diversity. Comprising over 2900 individual reefs and stretching for over 2000km it is the largest World Heritage Area on the globe. It is home to about 1500 species of fish, 350 species of hard coral, more than 4000 species of mollusc, 500 species of algae, 6 of the world's 7 species of marine turtle, 24 species of seabird, more than 30 species of whale and dolphin and the dugong. It was inscribed on the World Heritage List in 1981 in recognition of its outstanding natural values:

- *An outstanding example representing the major stages in the earth's evolutionary history;*
- *An outstanding example representing significant ongoing ecological and biological processes;*
- *An example of superlative natural phenomena; and*
- *Containing important and significant habitats for in-situ conservation of biological diversity.*

Australia is fortunate that compared to reef systems elsewhere in the world the Great Barrier Reef is still in relatively good condition. This natural wonder is well recognised not only by residents of the coastal catchment, but by the millions of Australian and international visitors who travel to the Great Barrier Reef and support a \$6.1b tourism industry and an estimated 63,000 jobs.

Although tourism is a non-extractive industry, there remains a need to balance the 'presentation' of the Great Barrier Reef with its conservation by minimising the impact of visitor activities on the marine environment.

Commercial fishing activity undertaken in the Great Barrier Reef has a gross value of production of \$119m annually and employs an estimated 3,600 people. Additionally, recreational fishing and boating contribute \$640m annually to the region and comprise a major activity for residents and visitors. However, careful management is necessary to maintain sustainable levels of species.

Activities on the Great Barrier Reef frame the lifestyles and livelihoods of communities from Cape York to Bundaberg.

The Great Barrier Reef Marine Park Authority (GBRMPA) is responsible for managing the Great Barrier Reef Marine Park (the Marine Park) - almost 35million Ha of the marine environment. However, GBRMPA also recognises that it needs to influence actions that impact on the values of the Marine Park

¹ Figures in this section are from *Climate Change and the Great Barrier Reef – A Vulnerability Assessment* - 2007

where these actions originate in the adjacent catchment area. This adjacent catchment comprises 22% of Queensland's land area.

Existing policies and governance:

Management of the Australian coastline is undertaken within complex institutional arrangements. Coastal zone management and planning must reflect specific National, State and Local government legislation and regulation, international conventions and commitments, as well as meet the social and economic needs of communities living in the coastal zone.

Queensland and local governments are responsible for most planning and development within the coastal zone. Under the Offshore Constitutional Settlement, this management and administration extends to three nautical miles from the territorial sea baseline (low water mark). However, in Queensland's coastal waters, the Great Barrier Reef Marine Park (the Marine Park) is managed jointly by the Australian and Queensland Governments and the Australian government's jurisdiction begins at low water (hence limiting Qld jurisdiction to the intertidal waters, most islands and some bays and inlets).

Internationally, the Australian Government is party to a number of different conventions and agreements that seek to improve the quality of marine waters, by managing pollution originating from ship and land based sources, by promoting sustainable development and protecting important coastal resources (MARPOL and the London Convention; UNCLOS 1982; World Heritage Convention; Agenda 21 for ecological sustainable development; Global Programme of Action 1995; RAMSAR 1971, JAMBA 1974, CAMBA 1986) (Lazarow, Souter, Fearon and Dovers, 2006).

The Australian Government has a strong interest in ensuring effective management of land-based impacts from Queensland catchments on the Marine Park and the Great Barrier Reef World Heritage Area (GBRWHA). Under the United Nations convention Concerning the Protection of the World Cultural and Natural Heritage World Heritage (1972), Australia is committed to:

' . . . ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage . . . situated on its territory, belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and co-operation, in particular, financial, artistic, scientific and technical, which it may be able to obtain.'

A key partnership arrangement for the GBRMPA is the Australian and Queensland Government's Reef Water Quality Protection Plan (Reef Plan 2003) (and the recent enabling program the Reef Rescue Plan), which seeks to halt

and reverse the decline of catchment water quality entering the Great Barrier Reef. The Reef Plan identifies nine main strategies and 65 actions to achieve that goal, and identifies those responsible for delivering the actions, including Government Agencies, Natural Resource Management bodies, industry and science providers.

The Coastal Catchments Initiative was a national program designed to improve and protect water quality. The Reef Plan has adopted the Coastal Catchments Initiative Water Quality Improvement Plan (WQIP) framework to deliver improved water quality outcomes for the Great Barrier Reef. The GBRMPA has been working closely with WQIP providers in the Great Barrier Reef catchment to develop *Water Quality Guidelines for the Great Barrier Reef*, to be used as an information source in the development of water quality objectives for WQIPs. The proposed approach (from GBRMPA, 2008) for the application of the guidelines is to:

- Monitor current conditions against the guidelines;
- Provide a scientific rationale in setting end of catchment load targets for the protection of Marine Park ecosystems modelled back to catchment-based actions; and
- Assist in the development of trigger values for management actions if guidelines are exceeded.

The *Water Quality Guidelines of the Great Barrier Reef*, and the setting of appropriate catchment environmental values and water quality objectives will play a critical role in protecting marine ecosystem health from coastal development.

The values of the GBRWHA are managed through the provisions of the *Environment Protection and Biodiversity Conservation Act (2000) (EPBC Act)*, which is the Australian Government's primary legislation for protecting matters of National Environmental Significance and the *GBRMP Act 1975*, which established the marine park and associated management regime for the GBR Region. The EPBC Act does not replace Local and State government assessment and approval processes. In Queensland, the environmental impact assessment and approval process for major projects was accredited through a bilateral agreement between the Commonwealth and Queensland Government, as applied through the *Queensland Integrated Planning Act 1997*, *State Development and Public Works Organisation Act 1971* and the *Environmental Protection Act 1994* and their related regulations.

A variety of State legislation and regulations apply to the coastal zone, however the Queensland Governments' *Integrated Planning Act 1997 (IPA)* and its associated Integrated Development Assessment System (IDAS) were designed to provide a one-stop-shop for managing most development activities under Queensland law. It is proposed that all Queensland law that requires permitting

for development activities will be eventually included under the IPA (eg. vegetation clearing that triggers the *Vegetation Management Act 1999* will be assessed through IDAS). The IPA, which is presently under review, also provides a coordination mechanism for integrating planning at local, regional and State levels. Regional strategic plans generally focus on economic growth, development and infrastructure planning. More recently these plans are being made statutory (eg. SEQ Regional Plan; FNQ 2025), to be implemented through mechanisms such as Local Government Planning Schemes. Planning schemes are managed by Local Government, and set a level of assessment for development in the local government area. The local government Planning Schemes are required to address the issues of land-use and development, infrastructure and valuable features, as well as identifying 'Desired Environment Outcomes (DEO)' for the range of land-use and development issues covered by the scheme.

- **There are 21 local government councils in the Great Barrier Reef catchment, which can lead to inconsistency in addressing land use and coastal development issues affecting the Great Barrier Reef.**

Another important law that relates to the management of coastal development in Queensland is the *Coastal Protection and Management Act 1995*, which is currently under review. The Act seeks to address the issue of attaining consistent management of Queensland's coastal resources, and provides for developing regional perspectives of management of development activity with the aim of achieving ecologically sustainable development.

A requirement of the Coastal Protection and Management Act is that the Queensland Environment Protection Agency (EPA) prepares statutory State Coastal Management Plans and regional coastal management plans for all coastal areas of the State. Eight of these regional plans will cover the Great Barrier Reef coast. The plans provide State interest policy for the conservation, protection and management of coastal resources and are in effect State Planning Policies that should be reflected in local government Planning Schemes.

Only three of these plans along the Great Barrier Reef coast are complete (Wet Tropics, Cardwell-Hinchinbrook, and Curtis Coast); a further three are in draft form (Mackay-Whitsunday, Wide Bay and the Dry Tropical Coast). These plans have the capacity to address a number of broad environmental concerns, especially with regard to cumulative impacts on the Great Barrier Reef of development activities outside the boundaries of the Marine Park. However, these plans have been put on hold pending the outcome of the legislative review.

Recommendations:

- The Australian Government should work with the Queensland and local governments in the Great Barrier Reef catchment to strengthen the

institutional arrangements that will lead to stronger protection of coastal habitat and water quality. Special attention should be given to effective implementation and performance evaluation of statutory (coastal) planning process that recognise and implement measures that preserve natural ecosystem functions, manage the coastal development and catchment impacts likely to affect the Great Barrier Reef.

- Climate change and its impacts on coastal development and the Great Barrier Reef is effectively recognised and incorporated across the policies in the Queensland state, regional and local government planning, including the need to allow for transitional coastal habitats and coastal buffers.

Environmental impacts of coastal population growth:

Development along the Queensland coast adjacent to the Great Barrier Reef is increasing, with a population of one million expected by 2026. This projected population increase is largely focussed around existing centres such as Cairns, Townsville and Mackay. This accelerated coastal development is placing significant pressure on existing local government infrastructure (eg. sewage treatment facilities) in most parts of the Great Barrier Reef catchment.

The coastal zone contains the majority of tourism infrastructure, ports and harbours, urban and resort development, mining operations, and industrial development. Concentrated development in sections close to the high value areas of the Marine Park can become a significant management issue.

Protection of the coastal zone in an ecologically functional and relatively natural state is critical to maintenance of World Heritage Area ecosystem functions such as breeding and nursery areas, floodwater buffers and sediment and nutrient sinks.

The cumulative impacts of coastal development may have a large direct impact on all these functions, as 35 major wet and dry tropical catchments drain into the Great Barrier Reef lagoon. The predominant impacts from coastal development in the Great Barrier Reef region can be broadly classified as those related to water quality, aesthetics and the loss of habitat. Poor water quality in particular is a serious threat to the long-term health of the Great Barrier Reef, with the best science telling us that water quality has declined significantly in the last 50 years.

- **Whilst agricultural runoff is primarily responsible for water quality decline, urban development has had, and continues to have potentially significant local impacts on Great Barrier Reef water quality and sensitive ecosystems;**
- **The 'sea-change' phenomena and the relative economic prosperity of Queensland is creating unprecedented pressures on Queensland**

- coastal areas leading to widespread development of coastal lands that are expected to continue in the mid to long term; and
- **Significant mining expansion in the Great Barrier Reef catchment is also having flow on effects in regard to large-scale port expansions and increased shipping activity.**

Recommendations:

- Buffers, coastal habitat corridors and high ecological value areas identified and included in Queensland and Commonwealth planning and management processes.
- Queensland and Commonwealth management outcomes should include limits on catchment development (based on resource condition targets and supported by end of catchment and inshore water quality monitoring), and limits or constraints on development in areas of critical connectivity, buffer or high ecological value to manage exponential development and population growth in coastal communities and catchments.

Coastal development impacts:

The way in which the land is used and managed affects the quality of water in rivers, estuaries and the Great Barrier Reef, particularly the inshore areas close to the coast. It has become increasingly clear that the near shore area in the Great Barrier Reef Region is under stress from human activity, associated with coastal developments and agricultural practices. The destruction of wetlands and the clearing of vegetation (including riparian zones) within catchments adjacent to the Great Barrier Reef have also contributed to a decline in water quality. In general marine ecosystems are adapted to tolerate variations in water quality, however when critical thresholds are exceeded they may be adversely impacted. Major water quality variables affecting marine ecosystem health include water temperature, salinity, nutrient and suspended sediment concentrations, as well as toxicants including pesticides.

Coastal development impacts are a combination of the release of degraded site water runoff including that created by the exposure of acid sulphate soils, and the disturbance or destruction of coastal habitats. As a consequence, coastal development planning and management issues considered to be a priority for protection of Marine Park values include:

- **Treatment of stormwater to minimise pollutant transfer;**
- **Minimise disturbance of potential acid sulphate soils and manage disturbed acid sulphate soils;**
- **Minimise soil erosion from development sites (through timing clearing to minimise risks from seasonal weather patterns and staging extent of disturbance to minimise risk at any specific time);**

- Minimise impacts on the surrounding environment from development activities;
- Retain local vegetation cover to the maximum extent possible;
- Protect wetlands (from direct and indirect impacts);
- Coastal planning takes into account long-term, cumulative development impacts;
- Minimise and manage impacts of wastewater runoff;
- Protect surface and ground waters especially from contaminants and hydrological change; and
- Manage coastal areas to maintain and protect their natural values.

These key considerations are expanded in the following table.

Table One: Coastal development critical issues

Issues		Desired outcome
Clean stormwater	<ul style="list-style-type: none"> • Quality and quantity of stormwater leaving site. • Preventing discharge of sediments and contaminants. • Preventing erosion and sedimentation from increased peak flow and concentrated flows. 	Water run-off is treated on-site to prevent discharge of contaminants or sediment. Concentrated flows, erosion and changes in peak flow are prevented, and on-site reuse and infiltration are maximised.
Acid sulphate soils	<ul style="list-style-type: none"> • Minimal disturbance of acid sulphate soils. • If disturbance is necessary, appropriate treatment to prevent acidic run-off and leachate containing metal contaminants. 	Developments involving disturbance of potential acid sulphate soils in low-lying coastal areas are planned and managed to avoid potential adverse impacts, including effects on the ecology of wetlands, aquatic systems and the Marine Park. No acidic run-off or release of metal contaminants from the site.
Soil erosion	<ul style="list-style-type: none"> • Minimal erosion and instability. • Minimal pollution, sedimentation and turbidity. 	Layout and design minimises disturbance to landscapes prone to erosion, waterlogging, instability or which carry stormwater naturally. No increase in discharge of sediment or contaminants from the site.
Surrounding environment	<ul style="list-style-type: none"> • Awareness and protection of natural values of surrounding environment. • Recognition of Marine Park zoning and protection of associated natural / World Heritage values. 	The development is planned, designed and managed to minimise impacts on the surrounding and downstream environments, including the Marine Park.
Vegetation	<ul style="list-style-type: none"> • Riparian vegetation, mangroves and remnant vegetation in particular. • Maintenance/rehabilitation of stabilizing vegetation to minimise erosion, instability and stormwater run-off. • Minimising pollution, sedimentation and turbidity. • Habitat value and biodiversity. 	Retention of stabilizing vegetation along waterways, discharge points, ridgelines, lands subject to salinity and steep slopes. Vegetated set-backs from sensitive areas and the coast.

Issues		Desired outcome
Wetland protection	<ul style="list-style-type: none"> • Wetland protected – both on-site and downstream. • Maintenance of wetland function. • Habitat value and biodiversity maintained. 	Wetland areas are protected. The functions of wetlands in filtering nutrients, protecting the Marine Park, supporting biodiversity and providing nursery areas for fish are maintained.
Cumulative development	<ul style="list-style-type: none"> • Ensuring that the natural values of the Marine Park are protected from cumulative impacts. 	Cumulative impacts from nearby developments are considered to ensure protection (of the natural values) of the Marine Park.
Wastewater	<ul style="list-style-type: none"> • Quality of the surface and groundwater resources derived from the site maintained. • Prevention of indirect seepage into groundwater and subsequently into the Marine Park. • Minimisation of change to the hydrological regimes. 	The quality of treated wastewater and the slope, size, location and soil type of any land disposal area for treated effluent is appropriate to prevent nutrients from leaving the site.
Surface and groundwater	<ul style="list-style-type: none"> • Prevention of the discharge of sediments and contaminants to the Marine Park. • Maintenance of, or improved quality of the surface and groundwater resources derived from the site. • Minimal change in the hydrological regime. 	Surface and groundwater resources are protected from pollution by contaminants. Little or no change in hydrological flow within and across the development site.
Coastal protection	<ul style="list-style-type: none"> • Minimal erosion and instability. • Minimal pollution, sedimentation and turbidity. • Protection of natural coastal hydrology regimes. • Habitat value and biodiversity maintained. 	The coastal zone and its resources are protected, rehabilitated and managed for their natural values.

In addition to the issues above, coastal planning needs to consider future implications of climate change, such as sea level rise, increasing storm intensity and habitat migration. Integrated and effective planning and management of coastal zone development that considers future changes is required to ensure development is sustainable and does not impact adversely on the Great Barrier Reef.

Recommendation:

- Legislative and other mechanisms to address the impacts on the Great Barrier Reef ecosystems from coastal development should aim to meet the outcome of improved Great Barrier Reef ecosystem health and resilience using a whole of government approach to management, planning and compliance.

Climate change impacts on the Great Barrier Reef:

The IPCC projects significant loss of biodiversity by 2020 in some ecologically rich sites including the Great Barrier Reef and Wet Tropics. A comprehensive assessment of the vulnerability of the Great Barrier Reef to climate change, including the communities and industries that rely on the Great Barrier Reef, identified a range of current impacts and future vulnerabilities (Johnson and Marshall, 2007).

To date, sea surface temperatures in the Great Barrier Reef are 0.6 °C above pre-industrial levels (1850), and further increases in sea surface temperature of between 1.1°C and 1.2°C by 2050 are projected to result in more frequent coral bleaching and impacts on other parts of the ecosystem such as seabirds, fish and marine turtles.

Other projections show sea level rising between 13 and 68 cm by 2050, oceanic pH decreasing by 0.4 to 0.5 units by 2100, increasing storm intensity and changes to ocean circulation and rainfall patterns.

Most components of the Great Barrier Reef ecosystem will be affected by these current and future changes, as well as the communities and industries that rely on a healthy Great Barrier Reef ecosystems. Vulnerability to climate change can be exacerbated by the presence of other stresses – current stresses on coral reefs include marine pollution and chemical runoff from agriculture as well as habitat loss and fishing pressure.

The Great Barrier Reef coastal zone is most vulnerable to rising sea level, increasing storm intensity and changes to coastal habitats. Coastal habitats in the Great Barrier Reef are predicted to become inundated by rising sea levels with associated loss of critical habitat and hydrological changes. For some coastal habitats adaptation is possible so basic function can be maintained (eg landward migration of coastal wetlands and adjustment to hydrological changes). However, this can only occur if there are no manmade barriers to constrain this adaptation response.

Natural systems have limited capacity to adapt to climate change, however, Australia has substantial adaptive capacity due to a well-developed economy and scientific and technical capabilities - but there are considerable constraints to implementation and there will be major challenges.

Recommendations:

- Reduction of other stresses on the Great Barrier Reef ecosystem should be addressed as a matter of priority to promote the resilience of the system.
- Future policy and planning should recognise and accommodate adaptation needs of species and habitats of the Great Barrier Reef.

- Current Queensland and Commonwealth policies should consider the implications of all coastal development proposals of their potential impacts with respect to the loss of coastal habitats, and economic and social impacts on coastal communities, and the long-term impacts on marine based industries.

Climate change impacts on industries and communities:

The Great Barrier Reef and its catchment is an integrated social-ecological system that is in a constant state of change, and which has a significant and long history of interdependence and interaction.

Within the Great Barrier Reef, the marine tourism industry are particularly susceptible to the effects of climate change, namely loss of coral reef due to bleaching, and changes to abundance and location of fish, marine mammals and other iconic species. Increasing intensity of storms and cyclones will impact passenger and tourism operator safety, industry seasonality (and opportunities for Great Barrier Reef experiences), tourism infrastructure and associated tourism industry development.

The fishing industry is also heavily dependent on climatic conditions. Changes in ocean circulation, wave generation, cyclones and air and sea temperature may impact productivity with resultant effects for the fishing industry and aquaculture. In addition, declining water availability will greatly impact catchment industries such as agriculture, horticulture and mining, as well as urban centres.

Human health and coastal development are also vulnerable to climate change. Health risks related to climate change include heat-related stress, increases in water and vector borne diseases, and declining water availability. Towns and associated infrastructure will be affected by changes in demand for energy, changing land values and land use systems, changing livability and lifestyle, and by direct impacts on buildings and structures from extreme weather and coastal inundation.

Climate change may also impact cultural systems. Although the extent and impact of climate change on traditional use of marine and land resources is uncertain, a decline in the availability of traditional resources could disrupt customs and practices, leading to a loss of Indigenous Traditional Owner knowledge, skills and culture. Similarly, climate change may also impact recreational use opportunities in the Great Barrier Reef such as fishing and boating. This may lead to changes and possible reductions in traditional and indigenous identity and belonging, and impact quality of life for non-indigenous Australians through reduced cultural and recreational opportunities.

Recommendations:

- Current marine resource use and land use practices should consider current climate change impacts and the synergies with other pressures, to promote the resilience of the system.
- Future policy and planning should incorporate climate change implications, including adaptation needs of industries and communities in the Great Barrier Reef region.

Management of Coastal Development:

The GBRMPA goal in managing the Marine Park and GBRWHA is the long term protection, ecologically sustainable use, understanding and enjoyment of the Great Barrier Reef through the care and development of the Great Barrier Reef Marine Park.

The GBRMPA achieves this through its administration of the *Great Barrier Reef Marine Park Act 1975* (the Marine Park Act) and associated regulations. A major tool of the Marine Park Act is the Marine Park Zoning Plan (2003). The Marine Park is zoned to protect the huge variety of plants and animals that support the identified bioregion and their associated ecosystem function that underpin the values of the Great Barrier Reef. The statutory Zoning Plan has provisions for 8 types of zones ranging from General Use (where all reasonable activities can occur), to restrictive Marine National Parks and Preservation Zones. For each zone there is an objective and a list of activities that occur in the zone with and without a permit.

Ecologically sustainable use of the Marine Park is derived from GBRMPA's ability to develop Plans of Management, policies and Site Management Areas for intensively used or vulnerable areas in the Marine Park. Plans of Management complement the Marine Park zoning by addressing specific management issues and setting carrying capacity levels for locations in the planning area. The objectives of the Plans of Management include the ecological sustainable use and management of Marine Park values, through recovery and continued protection and conservation, and enabling people using the Marine Park to participate in a range of commercial and recreational activities.

Sections of the GBRMP Act make provisions for assessment of development proposals and structures in the Marine Park. Permissions can also be granted for discharge of waste, removal of property, and the restoration of the environment. The GBRMPA have an Environmental Impact Assessment process that evaluates the possible risks and effects to the environment from proposed activities or development in the Marine Park. The level of assessment is based on whether the project is minor (Level 1, with standard assessment), low risk (Level 2 involving individual assessment), medium risk (Level 3 requiring a Public Environment Report consultation) or a high risk (Level 4 requiring an

Environmental Impact Statement). As part of the assessment, the GBRMPA considers the cumulative impacts associated with proposed developments in the Marine Park (Environmental Impact Management Policy, 2004).

Development proposals received by the GBRMPA may be located in the inshore areas of the Marine Park, and often adjoin to development components outside the Marine Park. The GBR Marine Park Act provides limited scope to manage activities outside the Marine Park, however some regulatory control exists in the Act that allows for 'regulating or prohibiting acts (whether in the Marine Park or elsewhere) that may pollute water in a manner harmful to animals and plants in the Marine Park'.

Ultimately, by its very nature, sustainable coastal development is an issue that falls within and across complex legal and jurisdictional environments involving all three levels of government, with strong business and community interests. The GBRMPA doesn't have the supporting legislation and regulation to manage the broad range of activities that occur on the adjacent land. The long term, cumulative impacts of incremental developments must be assessed within a whole of region planning context that considers the entire coastal development footprint. In addition, future climate change needs to be incorporated into a whole of region approach to not only influence coastal planning but to address emergency response and other key government responsibilities.

The GBRMPA facilitates the development of partnerships with industry, the community, local and state government and other Australian Government agencies to influence the management of catchment pressures on the Great Barrier Reef, which helps develop and maintain a culture of mutual obligation. A variety of strategies have been developed to facilitate this process, including a *Climate Change Action Plan* (see Table 2). The aim is to achieve a broad-based and widely-accepted understanding of the diverse values, pressures, natural attributes, ecologically sustainable uses and interconnectivity between land and marine based activities and their potential impacts on the ecological functions of the Great Barrier Reef.

Table 2: Other GBRMPA tools for managing coastal development in the Great Barrier Reef region are listed below.

Tools currently used by GBRMPA to manage the Great Barrier Reef coastal zone	
Integration	Marine Park Zoning Plans
	Plans of Management (POMS) for joint coordination of marine resources in areas of high use or high value areas including Whitsundays area, Cairns area, Hinchinbrook area.
	Reef Water Quality Protection Plan / Reef Rescue Plan and other regional planning (eg. FNQ 2025, Water Quality Improvement Plans, Natural Resource Management Plans (WQIPs)).
Climate Change	Climate Change Action Plan, incorporating key partnerships with other government agencies, regional groups, stakeholders and communities

Tools currently used by GBRMPA to manage the Great Barrier Reef coastal zone	
Invasive flora and fauna species	Provide advice on the retention of land-based biodiversity and encouraging the development of integrated pest management programs to reduce the use of chemicals that might end up entering the Marine Park.
State planning policies	Provide advice into key strategic plans eg FNQ 2025
	Provision of advice on State and Regional Coastal Management Planning.
Capacity Building	Reef Guardian Program
	Partnerships with key agencies to develop and promulgate consistent information on development management through tools like the WetlandInfo web portal of the proposed CoastalInfo web portal
	Establish links with local councils and NRM Groups through the Reef Guardian Council Programme
	Communication strategies
Policies	Development of policies to provide direction on the management of specific Great Barrier Reef issues. Examples: Cruise Shipping; Dredging and Spoil Disposal; Environmental Impact Management; Sewage Discharges From Marine Outfalls; Structures in the Marine Park.
Monitoring, Evaluation and Reporting	Establish benchmarking of best management practices for improved coastal management through the Reef Guardian Council Program, WQIPs and Tourism High Value Operators.
	Providing best practice advice on coastal development
	Environmental Site Supervision for major projects in the Marine Park
	Auditing
	Establishing Great Barrier Reef specific Water Quality Guidelines to guide the setting of water quality targets.
	Monitoring and reporting on the health of the ecosystem
	Establishing effective monitoring programs to provide information for developers, Outlook Reporting, State of the Reef and Annual Reporting.
Compliance	The Emerald Agreement (Mark II)
	Cross agency and Day-to-Day management partnerships

Recommendations:

- Agreements between Commonwealth and State Government agencies need to be developed to promote a whole of government approach to compliance that achieves sustainable management outcomes for adaptation to climate change impacts on coastal communities, and management of coastal development in and adjacent to the Great Barrier Reef that protects the health and resilience of Great Barrier Reef ecosystem.

Mitigation:

The direct impacts of climate change on Australian coastal communities are driven by global-scale changes in the Earth's atmosphere, climate and oceanography. Climate change is clearly a global issue but Australia can, and should contribute to the solution, including through encouraging broad-scale global action. The scale of this crisis means that some change is inevitable. Coral reefs, including the Great Barrier Reef, have been specifically identified by the IPCC as areas where impacts will occur. Government organisations and their partners have the opportunity to demonstrate a commitment to reducing their own climate footprint in support of more global mitigation efforts. Initiatives to reduce greenhouse gas emissions by Great Barrier Reef-dependent industries such as tourism are already underway, and these can inspire others to reduce their climate footprint.

Recommendations:

- Governments should initiate climate neutral strategies for their own operations to demonstrate a commitment to addressing the climate change issue.
- Governments should facilitate reef-dependent industries and industries in the Great Barrier Reef catchment to initiate mitigation strategies.

Building Resilience – environmental, social, & economic:

The Great Barrier Reef is a priceless natural asset for Queensland coastal communities and industries – fundamental to their economic, social and environmental needs. A cross-jurisdictional and cross-agency forward thinking approach to mitigate the threats to the Great Barrier Reef, and the coastal communities reliant on the Marine Park, is essential.

Despite being one of the healthiest tropical marine ecosystems in the world, the Great Barrier Reef is under pressure from a variety of human activities. These interact with climate change, often to exacerbate its effects. Key issues in this regard include catchment uses that result in degraded water quality, coastal development and other activities that constrain future adaptation of species and habitats (e.g. coastal development acts as a barrier to future landward migration of mangroves as sea level rises). These local pressures act to reduce the resilience of the ecosystem, undermining its ability to cope with climate change.

Recommendations:

Management effort needs to:

- **Reduce stress from poor water quality;**
- **Protect key functional groups;**
- **Protect refugia;**

- **Restore resilience of vulnerable species and habitats; and**
- **Facilitate social and economic resilience.**

Conclusion:

The Great Barrier Reef is intrinsically linked not only to Queensland coastal communities, but also to the Australian and wider global community. By protecting the environmental values of the Great Barrier Reef we are also protecting the lifestyles and livelihoods of the communities who live on its coastline and supporting the intrinsic value of the Great Barrier Reef to a global community.

Management of coastal development needs to be sustainable and incorporate future climate change projections, particularly for sea level rise and increasing storm intensity, and provide protection for critical coastal habitats. In addition, provision of coastal buffers is essential to protect coastal communities and allow for adaptation of coastal habitats to climate change, such as landward migration of the coast and the maintenance of coastal wetlands.

For Australia to be able to address local pressures to the Great Barrier Reef - where communities, industry, the Queensland and Australian Governments, have the capacity to implement improvements - we will need to utilise best available information; behavioural change; improved management practices; technological advancements; and integrated and effective policies for coastal zone management. This includes an effective enforcement program for government legislation and policy across all jurisdictions through developing an effective whole of government compliance program. Such a program does not presently exist in Queensland. These actions will assist in providing the Great Barrier Reef with a greater level of resilience to deal with the pressures of climate change.