



Queensland Murray-Darling Committee Inc.'s Submission on Climate Change: Adaptation for Queensland Issues Paper

27 October 2011

Submission to:

Adaptation consultation team
Office of Climate Change
GPO Box 2454
Brisbane Qld 4001

Submitting organisation:

Chief Executive Officer
Queensland Murray-Darling Committee Inc.
PO Box 6243
Toowoomba QLD 4350
Phone: 07 4637 6276
Fax: 07 4632 8062
geoffp@qmdc.org.au

This submission is presented by the Chief Executive Officer, Geoff Penton, on behalf of the Queensland Murray-Darling Committee Inc. (QMDC). QMDC is a regional natural resource management (NRM) organisation, which supports communities in the Queensland Murray-Darling Basin (QMDB), to sustainably manage their natural resources.

1.0 Background

QMDC supports current and future climate change responses (mitigation and adaptation) by individuals, industry and government that realise the synergies between responses at all these levels. This requires a whole of government approach to climate change within the QMDB. The Regional NRM Plan offers a mechanism to assist the alignment of legislation, policy, planning and science with a strategic approach to natural resource management and climate change adaptation in Queensland. Identifying priorities that target the most pertinent vulnerabilities for a region, will enable, community-wide building of resilience in the face of climate change and variability challenges.

The below diagram broadly illustrates the envisaged types of responses that could inform a coordinated, regional and stakeholder approach to climate change issues:

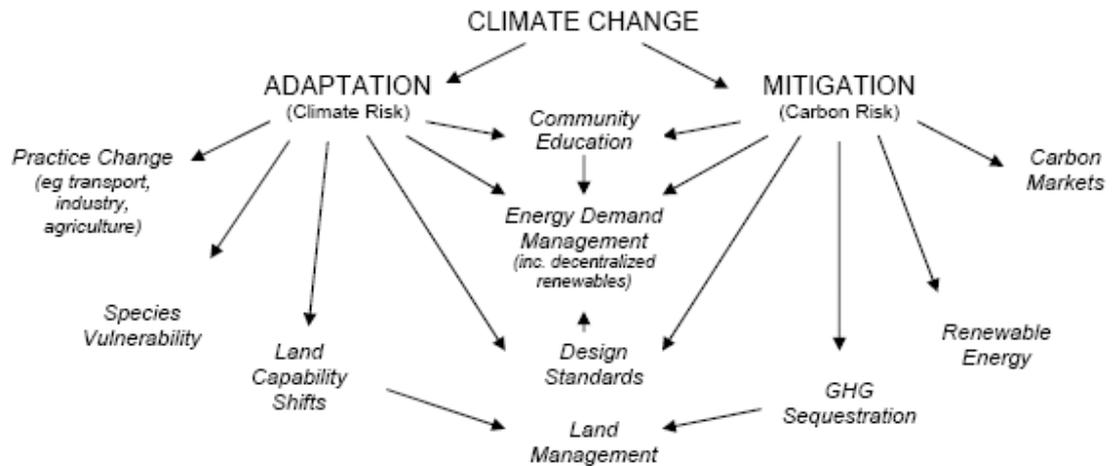
Climate Change Adaptation

Submission



Funded by:





2.0 Climate science

Have you considered how climate science can deliver more for you, and what new climate-science initiatives could be considered for Queensland?

1. Do you feel well informed about the risks that climate change poses to your community?

- There is a need for more relevant local information for NRM Managers in the QMDB. In fact QMDC has been involved in several climate science projects including:
 - Climate Witness;
 - Granite Belt Climate Refugia; and
 - Regional Climate Change Impact Assessment.
- Knowledge is currently dependent on interest in climate change issues and the degree of active involvement individuals or communities have with regard to the management of associated risks on business operations or natural resources. Some landholders in our region, for example, have noticed changes in e.g. first and last frost dates, rainfall patterns and have changed how they manage e.g. pruning of vines, and their overall farm business model.

2. Are there any specific areas of climate change science research that the Queensland Government should be undertaking or enhancing?

- Regional ecosystem impacts.
- Vulnerable freshwater and terrestrial species movement through landscapes if certain species need to be more mobile owing to shrinking or compromised habitats species impacts.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



It would be good to have a better knowledge on the implications for threatened species in our region and how climate change could modify their habitats. Will they shrink, or move up or down in altitude? What are the implications of hotter fires (fed by invasive plants) extending those habitats or wetter wet seasons spreading seeds?

- The changed behaviour of weed species under a range of climate change scenarios.
- Productive agricultural species selections to cope with a set of climate change scenarios e.g. cereal varieties that cope with hotter summers
- Infrastructure design and planning requires ongoing research to address:
 - Growth demand impacts e.g. hotter summers, more air-cons, higher electricity usage on grid/expense etc.
 - Depreciation schedules revised e.g. investment in roads, rail, health etc at risk to increased variability in climate.

3. What areas of climate science need better communication?

- Local expected impacts/not broad generalisations. Site specific where possible.
- Global context including mitigation actions and links with social constraints to action – hence need for adaptation.
- All aspects of climate science.

4. How can we make the modelling of Queensland's future climate more relevant for you?

- By implementing a regional strategic response. The key purpose of this kind of response would be to:
 - Co-ordinate and oversee the establishment of a regional stakeholders' group to inform regional climate change adaptation strategies, planning and policy with the overall aim of assisting rural communities to implement strategies to mitigate and adapt to climate change in the region across sectors.
 - Co-ordinate and direct research and development relevant to climate change adaptation and mitigation in the region at a regional and sectoral specific level e.g. National Climate Change Adaptation Research Priorities.
 - Assist in implementation of practice change to accelerate the adoption of current recommended practice across all sectors.
 - Facilitate participation in a Carbon Pollution Reduction Scheme and other related policy as relevant through fostering growth in offsets while reducing reliance on GHG emissions hungry technology across various sectors of the region.
 - Facilitate the most appropriate means of ensuring adequate participation and consultation with key stakeholders through use of innovative consultation processes.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



- By providing more info on likely el Nino and la Nina events.
- QMDC is committed to climate change programme and would very much welcome the opportunity to work with the State on a regional programme.

3.0 Human settlements

Have you considered any other issues for human settlements in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

1. How can we better empower local communities to plan for, live with and manage climate change risks to human settlements?

- 40 - 50% of electricity to be generated from renewable energy in 10 years and then increasing to 100%. There is the need for regional strategies and investment that promote renewable energy resources as both a regional and national first preference for energy supply. The government must prioritize the need to replace non-renewable energy resources such as coal with renewable resources.
- Green Building standards to be mandatory as part of development/building approval conditions (NABERS standards at a household level). These mandatory planning requirements to include:
 - Orientation (to minimise exposure to hot and or windy weather, keep development out of flood-prone areas etc);
 - Specific widths for eaves (more shade to keep walls cool);
 - Roof colours (dark colours, especially black should not be permitted);
 - Minimum insulation standards;
 - Solar hot water;
 - Grid interactive PV and/or wind setups; and
 - Rainwater tanks.
- Tax deductions/incentives/rebates coordinated on an electricity grid basis for retrofit on technologies to increase renewable energy use/reduce energy use/increase resilience to extremes in climate/weather.
- Better access to flood and 'hazard' mapping as per the proposed Temporary State Planning Policy 2/11.
- Suitable plantings to moderate extremes of hot and cold, and provide wind protection.
- As the biggest GHG emitting state in the country with the highest per capita emissions, Queensland will need to be responsible for the future resettlement of low lying coastal areas of Queensland where it is predicted that these areas could be inundated. Future settlement planning needs to address Queensland's obligation to assist.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



2. What more can be done to ensure climate resilience is a key feature of our urban fabric?

- Much of the above but also improve urban stormwater capture and reuse e.g. establish stormwater gardens.
- QMDC is concerned that a focus on the “urban fabric” minimises the need to also ensure climate resilience for Queensland’s many and diverse rural communities.

3. What are the risks and risk factors that influence the capacity for stakeholders to develop or take up adaptation mechanisms on the ground?

- Capital costs and depreciation/interest rate/ investment risk.
- Opportunity costs (‘alternative incomes’) for inaction are not perceived as high enough to warrant significant investment in some areas.
- Complacency about when in business life stakeholders may be exposed to risk. If average business owner is in management for 15 years, may perceive they can outlast the impacts...timeframes are difficult to grasp.
- Lack of demonstrated impact of actions e.g. random domestic solar grants do not necessarily result in a power station reducing GHG emissions. Need significantly improved coordinated and targeted incentive schemes.

4. What tools, strategies and mechanisms are needed to facilitate effective adaptation to climate change despite of and considering the uncertainties about the timing and extent of impacts?

- Recognition of landscape and supply chain impacts/externalities other than ‘climate change’ that can directly oppose positive action on climate adaptation and mitigation e.g. horticulture OH&S requirements in packaging products increases time to ‘cool down’ fruit to meet food safety specs thus increase refrigeration and electricity demands, especially during peaks on demand.
- Some parts of some regions demonstrate limited patterns around climate change. Just demonstrate extremes in variability which businesses are used to already so adaptation is a difficult concept to enable long term change in some industries.
- A well designed regional delivery programme in partnership with regional NRM organisations.



4.0 Infrastructure

Have you considered any other issues for infrastructure in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

- Energy supply infrastructure – the current rather centralised system means that very large numbers of people are affected if the central plant is damaged. By contrast, distributed generation by many thousands of small systems feeding into the grid could dramatically reduce the number of people affected by flooding in a key energy generating area. Although there are no royalties involved, the greenhouse benefits on renewables must be taken seriously.

1. How should the Queensland Government improve adaptation of infrastructure that is privately owned?

- Subsidies and incentives – most of them aren't rocket science but do cost so interest rate subsidies would be a small but important incentive.
- Important to get some regional coordination around delivery of incentive schemes for private infrastructure on a electricity grid basis.

2. Where do you see vital connections between infrastructure sectors and systems that could lead to cascade failures if impacted by the climate risks identified above?

- Energy transmission and electricity outages and failure of communications networks (internet, VOIP, phones that need a 240v power supply).
- Road infrastructure design and water management (culverts, bridges).
- Wider use of rail transport for moving people and produce.

3. Do you have any other suggestions or ideas for protecting critical infrastructure in Queensland?

- Invest in renewables and local generation.
- Not permitting the building of new critical infrastructure or levees on floodplains within established buffer zones.
- Enforcing the Floodplain Management Guidelines.
- Appropriate planning and design of infrastructure at the landscape and local level to identify and adequately protect all waterways, floodplain functioning and wetlands, considering values and function, taking into account:
 - In-stream flow regimes;
 - Surface water flow systems (eg potential contaminants such as salt, erosion, groundwater interface, barriers to movement of flow and in-stream species risks);
 - Ground water flow systems;

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



- Riparian function (e.g. ground cover, bank stability, habitat, connectivity); and
- Wetland and floodplain function.

5.0 Ecosystems

Have you considered any other issues for ecosystems in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

1. What key information gaps must be addressed to inform Queensland's response to climate change impacts on ecosystems and biodiversity?

- See above

2. Does the projected scale of climate change impacts on biodiversity warrant significant changes in biodiversity management, such as adopting a triage approach?

- Yes significant changes in management are needed e.g. a landscape wide, rural conservation programme that does not focus on state owned protected areas is needed to ensure a resilient biodiverse system.
- Current State and Federal government legislation is not preventing adverse impacts from the mining and energy industry on landscape functions of native vegetation coverage, ecosystem linkages, ecological processes and biodiversity condition in the QMDB. Both the State and Federal Government and its agencies must begin to assess, monitor and evaluate appropriately and not rely on industrial self-assessment or regulation through Environment Impact Statements (EIS), Environmental Authority (EA) applications, Operation Plans etc submitted by applicants.
- The *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)* must be enforced so that:
 - The operations of a development will not be permitted to impact on high-conservation areas.
 - Land is allocated by a development for habitat connectivity to allow species to move as climate zones change.
 - The construction of infrastructure not be approved until a detailed site investigation is carried out and an official map modification is approved as per the Queensland Herbarium process giving accurate details of the regional ecosystem and its biodiversity.
 - A development identifies the processes that are most important in sustaining the regional ecosystems or species in their development areas.
 - A development establishes a long term monitoring programme to measure environmental change and generate information on:
 - The direction and magnitude of change (taking into account natural fluctuation)
 - The rate of change
 - The pattern of the change response

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



- The prevention, management or mitigation of climate change impacts whether direct, indirect or offsite must be supported by enforcing existing or new legislation to adequately protect the natural assets, within determined threshold limits for the asset, defining the point at which the impact is no longer acceptable.
- It is paramount that the impact of climate change on biodiversity is considered in relation to both the cumulative impact of an industry as a whole and the impact of individual site activities. This would include consideration of:
 - Spatial extent impacts those which occur over an area, e.g. the area of vegetation that has been cleared for the mine site and its associated infrastructure, the amount of land disturbed and managed to post mine use?
 - Spatial intensity impacts where a location is impacted on by the activities of multiple sites e.g. where the emergency discharge of several upstream mine sites contributes to elevated levels of sedimentation in particular catchment areas?
 - Simple temporal impacts which have a specific time of commencement and a measured form over time e.g. the amount of land contaminated over time as a reflection of the stage of development of the mine life?
 - Offset temporal impacts which occur when multiple simple temporal impacts are superimposed upon one-another over time e.g. materials moving through rivers or the extraction of water for a mine being proportional to its coal production. Initially, a smaller volume of water is extracted; however this increases until the mine reaches peak production and plateaus out. As the mine progresses towards the end of its life extraction again declines. If a second mine starts mining half way through the life of the first mine and extracts water in the same manner, the cumulative impact will be the superposition of the two simple temporal impacts offset in time.
 - Linked triggered impacts which occur when one impact, either by its occurrence or by reaching a threshold level, triggers another impact that would not otherwise have occurred. The second impact is the triggered impact.
 - Linked associative impacts occur where multiple impacts occur as a result of a single event or change, e.g. as a result of opening a new mine, expanding a mine or changing operations.
- QMDC argues that owing to the complex nature of cumulative impacts, research must provide a clear direction on how climate change impacts should be defined and measured. Distinguishing between spatial, temporal and linked impacts recognises that there is no one way in which impacts are cumulative and that a more differentiated approach is needed for both the measurement and management of such impacts.
- Better management is required to prevent the destruction of habitat before equivalent habitat has been restored. EA's are increasing the risk of species extinction. Additionally, species need time to colonise a restored habitat, and too frequent a turnover of habitat may increase the risk of species extinction.



- Biodiversity management through *Terrestrial (and aquatic)* EEPs must be significantly improved. Decision makers/regulators must ensure that all proposed developments respond adequately through EEPs and other mechanisms to the complexities in the ways in which threats affect ecological processes and regional ecosystems. For example proponents of development need to address the following issues:
 - Impacts may occur far from the location of the initial threat or disturbance (particular hundreds of kilometres upstream of Ramsar sites).
 - Threats that affect one species may have cascading effects on other species.
 - Environmental responses to a threat are not necessarily directly proportional to the level of threat (ie a linear response). Non-linear responses mean there are critical thresholds where small increments of change can result in dramatic shifts in the state of the system.
 - There is often a time delay, from days to decades, between alteration to an ecological process and its full effects on biodiversity.
 - Threats may have a combined impact greater than their independent effects.
 - Complexities in interrelationships among species and chance environmental variation may mean that often there will be uncertainty about the effects of a particular threat on processes.
- The decline in populations of ‘at risk’ flora and fauna species must be prevented at a catchment and regional scale. It should not be assumed fauna, if found where vegetation is to be cleared, can be removed to another ecosystem, and that birds will simply fly away to somewhere else if disturbed by lighting, noise or dust.
- Other protection mechanisms and management strategies in the QMDB region could include:
 - Protecting floodplains adjacent to river channels to maintain lateral hydrological connectivity and the ecological benefits of periodic flooding.
 - Maintaining continuous vegetation along elevational gradients to enhance opportunities for altitudinal migration or range shifts in a changing climate.
 - Protecting key wetlands along the migration paths of waterbirds as critical stops for refuelling.
 - Maintaining riparian vegetation to promote interactions between terrestrial and freshwater systems.
 - Protecting “keystone” species and communities within small ephemeral streams and wetlands to aid the re-establishment of ecological process in restoration.
- The climate change impact across the QMDB to vegetation and biodiversity assets from individual site activities must be managed by:
 - Appropriate planning and design at a local and landscape level, to avoid unnecessary clearing causing fragmentation or loss of habitat.
 - Requirement to offset using native vegetation within the local area to cause no cumulative impact (or no net loss) in the QMDB.



- Individual site climate change impacts from mining and energy industry activities must be prevented by:
 - Not permitting clearing of Regional Ecosystems mapped as 'Endangered' or 'Of Concern' protected under the *Vegetation Management Act 1999*, or listed ecological communities under the *EPBC Act*.
 - Avoiding areas covered by voluntary Conservation Agreements or covenants.
 - Requiring rehabilitation to at least the site's pre-mining condition (including former value and extent), with native (endemic) vegetation. A rehabilitation plan must be established in a timely manner and state clear and acceptable short term and long term goals and plans, and include financial security.
- The establishment of endemic vegetation and enhancement of biodiversity values must be considered for the reclamation of land (recovery of waste land), or for plantation or agroforestry ventures, or offset requirements, where it is appropriate and adds value to landscape and ecological functioning.
- Vegetation plantings or offset regeneration must not impact on:
 - Existing land use, such as primary production, where it may cause local or cumulative impacts to the industry.
 - Soil, surface or ground water assets through the use of saline or excessive irrigation water.

3. Should government be seeking to conserve existing ecosystems or manage for change?

- Both actions are necessary. QMDC is concerned that the plethora of documents produced to date to protect Queensland's biodiversity have not demonstrated the achievement of outcomes that advance regional or state wide biodiversity nor have they prevented further decline. The aim should be to reinstate endangered regional ecosystem areas to improve the status of regional ecosystems from endangered.
- The Queensland Government needs to seriously address the need for a whole of landscape and whole of Government approach to biodiversity conservation.
- Policy implementation and planning processes supporting a whole of Government approach if they are to successfully protect state and regional biodiversity must be influenced by representative organizations and stakeholders such as NRM organisations, catchment management associations, local government, Traditional Owners, Landcare, industry peak bodies and conservation groups as well as providing the expertise of ecologists, and research scientists. Participation of stakeholders is particularly important in decision-making involving the precautionary principle and management plans for change. In particular, less powerful groups and communities who may be negatively affected by decisions should be involved. Typically in our region, different groups have very different perceptions of the role of the precautionary principle and the level of environmental risk they are willing to take. Long-term, ecologically sustainable management requires consensus to be established between different groups with different perspectives.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



This process although it may take a long time, allows precautionary decisions to be based on community empowering processes that facilitate the participation of all stakeholders, and therefore reach more stable and sustainable solutions in the long-term. This participation process should also be reflected as a goal of government climate change management at both a regional and a national level, where all stakeholders should be involved.

- The invocation of the “precautionary principle” in policy has had little substantive impact on practical sustainable management of Queensland’s existing ecosystems or future management for change. The principle must be formulated as an obligation, and linked to specified process or outcome standards developed on a regional basis, with respect to, for instance, specific species, sites or landscapes, or protected areas.
- Applying the precautionary principle in QMDB will sometimes require strict prohibition of activities and development. This is particularly important in situations where urgent measures are required to avert imminent damage, where the potential damage is irreversible, where particularly vulnerable species or ecosystems are concerned, and where other measures are likely to be ineffective. This situation is often the result of a failure to apply more moderate precautionary measures at an early stage. QMDC recognizes that the precautionary principle should not be used only in a negative sense, to say “no” to all activities or development. In the context of management of natural resources, the precautionary principle can lead to effective management of potentially damaging activities, rather than complete prohibitions. The precautionary principle should guide a constructive search for alternatives, practical solutions and opportunities involving all stakeholders.

4. In what ways might current land use and biodiversity management practices be modified and enhanced to address the need for increasingly dynamic and adaptive management of natural systems in a changing climate?

- QMDC supports the promotion of “adaptive management” as one method of managing resources under uncertainty and inadequate or incomplete information, with careful monitoring and feedback. Adaptive management, however, will not be appropriate in every context, as some activities or decisions may lead immediately to serious and/or irreversible impacts. However, it is agreed that in most circumstances of biodiversity conservation and NRM, adaptive management is the most appropriate mechanism to implement the precautionary principle. One area where a region may need to adapt new management methods is fire management especially if fire loving invasive species become established.
- The inherent conflicts which arise with the decision-making hierarchy need greater attention. Having a hierarchy inevitably allows a way out for government, industries and the broader community to, either mitigate, or manage future harm and degradation to biodiversity and ecosystem services rather than prevent or reverse any further decline. Is this acceptable in light of the critical position in which Queensland’s biodiversity is placed?

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



- The legislation devised to protect biodiversity and associated ecosystem services, is frequently set aside for economic development deemed to be “significant” and/or of “public benefit”. As a consequence Australian and global economies do not value biodiversity and the role it plays in healthy and functioning ecosystems. Past and current investments aimed at conserving biodiversity, even where clear regional NRM Plan targets and aspirations exist, have not or are not successfully valuing the region’s or state’s biodiversity.
- QMDC recommends that:
 - The State Government resource an appropriately funded community program to build awareness of the value of biodiversity; and
 - The State Government upholds regional targets and aspiration for valuing biodiversity as articulated in regional NRM Plans.
- The expansion of protected areas in QMDB is needed alongside a strategic approach aimed at maximizing connectivity across the landscape, salinity control and/ or mitigation and protection of threatened species. Priority should be given to ensuring existing recovery plans can be fully implemented. QMDC supports an expansion of national parks and protected area estate providing that some sort of landscape scale is applied to this. This expansion however must be implemented as part of a climate change strategy that ends the current scatter gun approach to conservation and management.
- It is important that these areas are not just focused on protecting remnant vegetation but are also considering the value of areas of high value regrowth, areas of 20-40 year old regrowth and areas that are important links for wildlife corridors and landscape connectivity but need to be regenerated.
- Equally important is that these areas are managed appropriately with specific on-park management plans that are actually adhered to, and adequate resourcing is made readily available.

5. In light of inevitable species loss and ecosystem change, how might the Queensland Government prioritise the use of limited public resources and encourage private investment to protect the intrinsic and economic value of Queensland’s biodiversity?

- Strengthen regional NRM Plans. After extensive community (including industry) consultation this region’s NRM Plan identified the baseline of natural resource assets in the QMDB. The target intentions for vegetation and biodiversity, riverine, floodplains and wetlands are summarized below:

- Vegetation and Biodiversity Target Intentions

Priority landscape scale ecosystems are maintained or improved.

Natural assets including native vegetation are managed or conserved to maintain ecological processes and ecosystem linkages, and increased in extent and abundance at priority catchment scales.



Increase in area of sustainably managed native vegetation for landscape and biodiversity outcomes through traditional and innovative economic uses.

Areas of identified high nature conservation significance are maintained in current condition and improved against the Common Nature Conservation Classification System.

Decline in populations of 'at risk' flora and fauna species are halted.

The biodiversity condition and ecological health of native vegetation in priority catchments are maintained or improved.

○ Riverine, Floodplains and Wetlands Target Intentions

Priority riverine, aquatic, wetland, floodplain and riparian ecosystems are maintained or improved relative to baseline conditions.

Flow regimes for health of wetland organisms are maintained or improved against baseline conditions.

Balance ensured between ecosystem health and water use by achieving priority water quality objectives.

The following key water quality indicators remain below baseline levels within specified conditions:

- *Salinity concentrations at end of valley locations*
 - *Total suspended sediment loads*
 - *Pesticide concentrations*
 - *Nutrient concentrations*
- Establish regional independent biodiversity scientific, NRM expert panels to produce annual progress reports and an independent audit, and to provide adaptive climate change management advice to landholders.
 - Adopt a whole of landscape resilience approach to biodiversity conservation and protection. There is the need to collate for landholders in each region a framework to implement coordinated and holistic planning and on ground action for a landscape approach to biodiversity including but not limited to the identification of the original diversity, the current assets, function connectivity, ecological variability, nutrients and soil health, feedback loops, threats to the assets, aspirational and resource condition targets etc. The independent regional panels should measure against these in the auditing process.
 - By providing better resourcing for Landcare Officers and local climate change management projects.



6. How might biodiversity outcomes of carbon sequestration projects be optimised?

- The Carbon Farming Initiative tries to answer that.
- The implementation of an environmental re-vegetation offset program to offset GHG emissions masks the fact that construction clearing may disturb terrestrial vegetation corridors, and cause scouring and erosion of river banks. The biodiversity condition and ecological health of native vegetation in priority catchments must be maintained or improved regardless of the need for GHG emission offsets.
- Avoid revegetation on strategic cropping land.
- Strategic revegetation or vegetation protection by stewardship payments.
- The design of accounting and payment frameworks for carbon is critical. It is essential that any agreed system is built on sound scientific principles and recognizes the different qualities inherent in fossil and bio-carbon sources. Payments on a 'per tonne of carbon' basis where variable natural or agricultural ecosystems are concerned are fraught with difficulty, both in terms of measuring carbon stored and in calculating its value. For similar reasons, there are concerns with models (such as the National Carbon Accounting System) reliant on multiple assumptions and variable inputs. They present a serious risk that a carbon market would pay on a modelled output rather than actual carbon storage results.
- The goal for managing biocarbon should be to maintain carbon stocks in the landscape in perpetuity, and where possible to increase them. This means protecting remaining biodiverse natural ecosystems to the greatest extent possible and improving carbon densities in agricultural landscapes.
- A pool of funds for additional restoration and management works; and for incentive payments for sustainable management of both natural ecosystems and agricultural land should also be established.
- Primary producers are already looking for ways in which they can be involved in carbon farming and/or carbon capture initiatives. Research is also underway to determine and document how land degradation can be reversed by capturing carbon in agricultural landscapes.
- Undertake the investment programme to achieve biodiversity outcomes through regional NRM groups who currently deliver a range of biodiversity programmes and will have the most up to date knowledge on who has received grants, what vegetation is already under different tenures or under various styles of agreements. Regional NRM groups also have significant biodiversity technical capacity.



7. What mechanisms might be employed to enhance or create markets for biodiversity, or to incentivise improved biodiversity management by private landholders?

- Stewardship programs.
- Economics – incentives need to be relative to what they would have received for agricultural products. Landholders need to retain a livelihood and standard of living to remain in the landscape.
- Local and regional planning processes and schemes are mechanisms proffered to promote sustainable use of natural resources. However QMDC questions the overall effectiveness of local and regional planning schemes to underpin investment – do they truly offer protection or are they becoming a mechanism which allows regional economic development to dominate over biodiversity conservation resulting in vulnerable areas being exploited?
- In this region the NRM Plan is not consistently referred to or considered by key stakeholder organisations or institutions when they are formulating new regional policies, strategies and plans. Greater regional and nationwide recognition of the role regional NRM Plans can play will help to promote conservation strategies that address challenges caused by a changing climate and which serve to identify and protect both regional and national significant ecosystems.
- The NRM Plan is a framework that can assist landholders and industry to improve the management and condition of the natural resources within a climate change framework by:
 - Assisting the alignment of Environmental Management Plans (EMP) to regional resource condition and aspirational targets and support the actions of the regional communities' to reach those targets.
 - Integrating with other regional planning activities such as Water Resource Plans and other proposed regional planning instruments enabling more comprehensive NRM outcomes.
 - Including NRM organizations as key regional stakeholders to provide valuable experience and technical expertise including sub-catchment planning.
- Vegetation planning is a major component of sub-catchment planning. This means planning is done across a group of properties, providing opportunities to better manage this native vegetation, connect up important areas of vegetation and tackle common problems across the landscape. The first step in developing a vegetation plan is to look at what's currently known about the biodiversity and production values of the area. This involves:
 - Mapping Regional Ecosystems;
 - Land resource mapping at a property scale;
 - Identifying high value biodiversity areas;
 - Assessing vegetation linkages across the landscape;
 - Reviewing the list of endangered, vulnerable and rare species for an area;

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



- Assessing the condition and trend of remnant and non-remnant vegetation; and
- Property visits to ground truth the information collected.
- QMDC is helping to preserve biodiversity by working with land managers, research organisations, local government and industry to strike a balance between production and nature conservation. The organisation supports a team of vegetation and biodiversity technical staff, a climate change officer and a local government technical officer, demonstrating a commitment to the protection of our natural and community assets. QMDC adopts a coordinated and sub-catchment approach to vegetation management to ensure effective and successful management measures are implemented.
- Well managed native vegetation can provide a combination of production and conservation benefits. QMDC is working with landholders and industry groups to develop and implement vegetation plans that meet both these goals. Information gathered by QMDC's Vegetation & Biodiversity Officers is provided to sub-catchment groups in order to develop group and individual vegetation management plans. These plans may look at linking up corridors of vegetation, such as along creek lines, revegetating or fencing off important areas, managing fire or weed and pest control.
- QMDC recognizes the voluntary efforts of individual landholders in managing their land for conservation purposes. Greater outcomes would be achieved if payments for the provision of ecosystem services were made available.
- Increase investment in pest control.

6.0 Water management

Have you considered any other issues for water resourcing and management (including water infrastructure) in the context of climate change adaptation and what new initiatives could be considered for Queensland?

1. Are you aware of initiatives in relation to water sources in Queensland which should be highlighted?

- Climate risk assessment project reviewed water availability under climate change scenarios. This work was then repeated by CSIRO as part of the Murray Darling Basin water planning process.

2. How can we achieve better integration across sectors and/or across institutions on water management?

- Given the historic organisational divisions, a strategy could be to pool the funds then provide them to QMDC to roll out in a collaborative way so that fiscal resources do not get chewed up by administration and procedure in state government or hijacked for a membership development programme by industry.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



3. Is diversification of water supply resources the key to successful adaptation and, if so, what are the key resources and what new initiatives are required? Are you aware of initiatives in relation to water sources outside Queensland or internationally which should be highlighted?

- No. Significant investment in water use efficiency to achieve win-win outcomes.

4. What are the barriers to increasing use of recycled water?

- A key limitation in the use of recycled effluent water is the political will at the state and local government level due to often poorly informed community views.
- Lack of understanding of bioaccumulation of some contaminants e.g. viruses.
- Lack of dual infrastructure if it is needed.
- DERM has to this date not released relevant information or facilitated robust community and stakeholder consultation on indirect and direct augmentation of coal seam gas recycled water into water sources. Without access to and discussion on scientific and social research both international and local the proposed amendments are unable to provide QMDC assurance that public health will be protected. The amendments to the *Water Supply (Safety and Reliability) Act 2008* (Water Supply Act) must provide rigorous requirements under the existing recycled water regulatory framework for the use of coal seam gas water impacting on town drinking water supply sources.
- Disposal should consider this region's NRM Plan (the Plan) whilst taking into consideration not only the individual impacts of each proposal but also the cumulative impacts of the whole CSG industry and other water users. The Plan states that by 2020, the following key water quality indicators should remain below baseline levels:
 - Salinity concentrations at end of valley locations for specified median and peak EC unit levels and average salt loads;
 - Total suspended sediment loads for specified average and peak levels at locations;
 - Pesticide concentrations for specified levels at set locations; and
 - Nutrient concentrations for specified levels at set locations.
- Where the CSG companies make CSG recycled water available for 'beneficial use', the water must be:
 - Subject to risk assessments based on the immediate, future or cumulative impact which may result from its use, taking into account potential contaminants including salt, surface and ground water interaction, changes to overland flow, and new and existing infrastructure.



- When water is released into streams or weirs, those streams or weirs are subject to chemical and biological monitoring to assess impacts; and all monitoring data be made available to the public within one month of collection.

5. What information do you need about how water can be used and managed sustainably?

- We need greater investment in river health, water quality and real time public access to monitoring.

7.0 Primary industries

Have you considered any other issues for primary industries in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

- Incentives are needed for both soil conservation work and to encourage really good levels of soil cover to protect soils from harder rainfall and bigger droplet sizes – and hail.
- Prevent impacts of invasive species by ensuring stringent measures to prevent new potentially invasive species in the first place.
- Would be useful to have a better understanding of how climate change and invasive weeds and pests might interact in our land types and climates.

1. What would be the most effective and relevant way to present information on the risks and impacts of climate change to your sector and/or region?

- Via QMDC, Landcare groups and landholders who have made changes to the way their businesses are structured. QMDC has a track record of delivering climate change workshops to over 300 landholders in the last 2 years.

2. Who would you trust and be willing to work with to assess the risks and identify opportunities for your business under changed climate conditions?

- DEEDI Climate Centre, USQ, and Carbon House.

3. What type of support do you, your sector or industry need from the Queensland Government to help take action to ensure your business is able to respond (adapt) to changing climate conditions?

- Significant investment in on ground climate adaptation works and resource a QMDC extension/technical service.
- Agreement to be part of a regional climate change steering group that would produce a regional climate change plan and guide its implementation.

Produced by: Kathie Fletcher, Rhonda Toms-Morgan, Geoff Penton, 27 October 2011
For further information, contact QMDC on (07) 4637 6200 or visit www.qmdc.org.au

While every care is taken to ensure the accuracy of this information, QMDC accepts no liability for any external decisions or actions taken on the basis of this document.



4. What would be the best approach to providing such support services, i.e. publicly, private or industry based, joint public-industry, or some other model?

- QMDC and other regional NRM groups have broad representation across industries, conservation, Traditional Owners, Landcare and a level of existing capacity that could be built upon rather than starting a new programme or service.

5. What would you need to make deeper structural changes in how you undertake your business in the event existing types of agricultural production could not continue?

6. What may make such structural change difficult for you, or your sector?

8.0 Emergency management

Have you considered any other issues for emergency management in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

- Emergency management needs to be considered equally for times of drought as well as during floods.
- Counselling services to help people cope with trauma in the aftermath.

1. To what extent are adaptive and continuous improvement processes in existing emergency management systems sufficient to accommodate increasing risk and uncertainty from a changing climate?

- Emergency responses should work with community based organisations like QMDC that are well connected and have local staff in order to facilitate responses to meet community needs. Organisations like QMDC and our network of local Landcare partners are in a position to be very responsive.

2. How do agencies and systems prepare for the possibility of simultaneous and serial emergency events in Queensland, Australia and the region as a result of climate change, including for recovery efforts following the emergency phase?

- As above

3. What are the opportunities and responsibilities for the private sector, civil society and community members to take account of risk and uncertainty from a changing climate in their preparedness and response for emergencies?

- As above



4. To what extent are institutional and governance arrangements for emergency management covering local, regional, and state levels sufficient to accommodate increasing risk and uncertainty from a changing climate?

- Poorly and QMDC would welcome the opportunity to engage in further strategic planning.

9.0 Human health

Have you considered any other issues relating to health in the context of climate change adaptation, and what new initiatives could be considered for Queensland?

1. What more can be done to reduce preventable disease, morbidity, and mortality in the event of extreme weather events for our most vulnerable members of the community?

- Need some thinking around school sports activities. It is ridiculous to make kids stand /run around outside in the hottest part of the day. Sport should happen in the morning when UV is lower and its cooler.
- Building codes could do a lot to make houses more comfortable without air con etc – insulation standards, appropriate orientation, eave depth etc.
- Nationally and regionally environmental audits which include the impacts of climate change are required to provide a comparative analysis of current industrial operations and infrastructure and any proposed development project's estimated contributions to the national economy in comparison to its contribution to greenhouse gas emissions, vegetation and biodiversity loss, ecosystem impact and human health and the financial burden this potentially places on future generations and the government.

2. How can we improve our current practices to ensure the vulnerable are better protected during heatwaves?

3. What do Aboriginal and Torres Strait Islander people feel is needed to improve individual and community health and well-being in the face of climate change impacts?

4. In what ways can we minimise the spread of disease in the event of climate change?

5. How can we improve our health care system and health protection services to better prepare for the impacts of climate change?