Submission Biodiversity in a changing climate

QMDC Submission to the Inquiry into Australia's biodiversity in a changing climate and nationally important ecosystems

Submission To:
The Parliament of Australia
House of Representatives Standing Committee on Climate Change,
Environment and the Arts
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1.0 Background

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

2.0 General comments

QMDC supports the need to address the key issues identified as per the Inquiry's Terms of Reference (TOR).

QMDC urges the Standing Committee to make recommendations that conserve biodiversity and ecosystems based on both regional as well as national aspirations and priorities.

The QMDB's NRM Plan, accredited by State and Federal Governments, documents both the key natural resource assets and values of the region and targets for their management.

It is QMDC's experience that national biodiversity strategies and policies lack specific regional information, expertise or a process of regional management which could better inform ecosystem vulnerability and innovative management options for conservation. QMDC therefore offers the following specific comments in relation to the QMDB region and the biodiversity aspirations and targets described in this region's NRM Plan to help fill the knowledge gap.

3.0 Terrestrial, marine and freshwater biodiversity

The Queensland Murray-Darling Basin is home to a wide diversity of plants and animals including over 3,300 plant species, 97 mammals, 340 birds, 156 reptiles, 50 frogs, 18 fish and 120 butterflies. The region is also made up of over 170 identified regional ecosystems or vegetation communities.

4.0 Connectivity between ecosystems and across landscapes that may contribute to biodiversity conservation

4.1 QMDC supports strategies and actions which maintain or improve priority landscape scale regional ecosystem connectivity so that ecological processes and ecosystem linkages are increased in extent and abundance at priority catchment scales.

Fragmentation has been identified in a number of studies as a critical factor in biodiversity decline within the Brigalow Belt.

The long term conservation of biodiversity and the wellbeing of the region's communities depend upon both the protection of natural assets and maintaining the integrity of the ecological processes that sustain them. A focus on process recognizes that ecosystems are temporally and spatially dynamic and that the components of ecosystems interact in complex and diverse ways that contribute to, and sustain biodiversity. Processes may also act as selective forces to which particular species are constantly adapting.

4.2 QMDC argues that overall proponents for development through their EIS and EA applications do not demonstrate scientific understanding of the importance of remnant vegetation and preventing further fragmentation or destruction of ecosystem corridors.

Destroying habitat before equivalent habitat has been restored increases 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.

4.3 QMDC believes that any *Terrestrial (and aquatic) ecological environmental plans* (EEPs) must demonstrate an understanding that modification or destruction of ecological processes are, in practice, often irreversible and an ecosystem will not necessarily rehabilitate to its prior function.

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.

4.4 QMDC submits that decision makers/regulators must ensure that all proposed developments respond adequately through EEPs or 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.

4.5 QMDC recognizes the value of the terrestrial and aquatic ecology studies that may have already been conducted in a proposed development area. QMDC submits however that further studies are required to ascertain which processes have the greatest influence in a project development area, their role, the spatial extent over which they operate, the kinds of threats that are limiting their function. This will assist the EEPs and other planning mechanisms to direct their management strategies where they will have the greatest impact.

4.6 QMDC submits that freshwater ecosystems and climate change scenarios need to be addressed in future water resource plans. Additionally infrastructure planning needs to address how they will protect freshwater species and not impede their movement if certain species need to be more mobile owing to shrinking or compromised habitats.

4.7 A fundamental tenet of regional ecosystems is recognition of the interaction between pattern and process. The identification and management of locations directly associated with a specific process is a practical way for the projects to protect regional ecological processes.

4.8 The *EPBC Act* species listing categories would suggest that a higher level of protection and or a higher offset requirement should be in place.

Protection mechanisms 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.

4.9 Recommendations

That the *EPBC* Act must be enforced so that:

- **the operations of a project will not be permitted to impact on high-conservation areas**
- **land is allocated by a project 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 project identifies the processes that are most important in sustaining the regional ecosystems or species in their development areas**
- **a project establishes a long term monitoring programme to measure environmental change and generate information on:**

  i. The direction and magnitude of change (taking into account natural fluctuation)

  ii. The rate of change

  iii. The pattern of the change response

5.0 How climate change impacts on biodiversity may flow on to affect human communities and the economy

5.1 QMDC asserts that economic theory must highlight the importance of ecosystems, equity and governance and have its roots in valuing natural and social capital in its economic analysis. Ecological economics that integrates natural and social capital into traditional economic theory will assist regional planning processes to develop a region's future direction and assess development projects in a more sustainable manner.

5.2 QMDC submits that nationally and regionally environmental audits which include the impacts of climate change are required to provide a comparative analysis of a 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 the financial burden this potentially places on future generations and the government.

Challenges associated with climate change and the coal and CSG mining industry for example, require more in depth economic analysis in relation to potential and long term impacts on natural resources, social infrastructure and local economies.

5.3 If pressures on local and regional infrastructure are clearly identified as a climate change issue, regions will need to define what is considered appropriate new infrastructure based on social needs and environmental factors such as water quality, risks of salinity, impediment to natural water flows, floodplain risks, threats to the region's biodiversity etc. Serious consideration must be given to the cumulative impact of the construction of new infrastructure or reconstruction of existing infrastructure especially in light of the impacts experienced in Queensland during recent 2010/2011 flood events.

5.4 Settlement plans, for example, should not permit the 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*. A regional planning assessment of growth in the Surat Basin must consider the cumulative impacts of small-patch clearing, where such clearing is currently permitted under state or federal legislation to avoid further fragmentation of the landscape. Offsets, at an absolute minimum, should achieve no net loss and should require the re-establishment of vegetation to an equivalent condition and not simply protect existing vegetation.

5.5 QMDC asserts the government should pay more serious attention to alternative economic projects including large scale infrastructure to satisfy international, national and regional or local biodiversity policy objectives. Economic support by both state and federal government to for example coal and CSG mining projects allows large scale development to proceed although the associated projects pose many risks to the region's natural resources. The projects must be scoped and considered against the need nationally and regionally to implement long term and effective conservation strategies for the benefit of future generations.

5.6 QMDC proposes that the methodology of the EIS should provide regional bodies and the communities they represent or service the opportunity to demonstrate leadership in sustainable natural resource management processes. The EIS must enforce a rigorous overarching legislative framework for development within the QMDB and Australia that acts to create resilience and thereby prevent any adverse impacts to the region's and state's natural resources, community, and economy in the short and long term caused by economic developments and activities.

Proponents of development need to include a description of how their projects have considered biodiversity strategies with reference to regional planning instruments such as Regional NRM Plans and Regional Growth Management Strategies. Such an addition to the EIS or EA process will align, for example, the *Vegetation Management, EPBC* and *EPA* Acts to more rigorous institutional and regional planning mechanisms, for example, threshold limits and standard conditions. This in turn will enable the identification both regionally and nationally if appropriate areas actually exist within a region for major new or expanding development projects.

Additionally a discussion on a project's **inconsistencies** with existing land uses and long-term policy frameworks addressing biodiversity for the area would help to clarify earlier in the legislative process whether the proposal conforms to national, state, regional and local plans for an area.

It is essential the EIS and EA processes sit within a legislative framework that clearly articulates the cumulative upper and lower threshold limits for changes to natural resource asset condition and function in defined zones and timeframes to protect the integrity, health and value of the asset, and productive capacity, of those zones. Exceeding such limits would not be permitted under any circumstance, and would be an offence to do so.

5.7 GHG emissions are relevant to this inquiry because, as the prolonged drought and recent floods have demonstrated, the QMDB is vulnerable to the impacts of climate change and urgent action is needed to mitigate both the effects and costs of climate related damage.

The impacts associated with climate change are also related to changes in climate variability. Changes in both the magnitude and frequency of rainfall currently have unknown impacts on the water cycle associated with the catchment areas CSG and coal mining projects will impact upon.

QMDC submits CSG and coal mining projects are not yet satisfactorily addressing what affect seasonal shifts in rainfall, temperature changes and evaporation will have on their development areas including infrastructure and operations.

5.8 Queensland has been identified as the fastest growing and most energy intensive state in Australia. Additionally more harmful greenhouse gases (GHG) are produced per person in Queensland than any other state with approximately 43 tonnes of greenhouse gas emissions per capita (2010). The activities required to fully support a CSG or coal mining project will require a large consumption of energy and will result in increased GHG emissions.

5.9 A full cost accounting must be done on the total sum of all GHG emissions produced by proposed projects and details on the cumulative impact of GHG of the whole mining industry must be considered. This should include a calculation to ascertain the total footprint created by diesel fuel usage for transport, drilling and other operations.

Proponents of development must have positive greenhouse strategies to deal with adverse weather conditions before construction activities commence and these should be articulated clearly within *Greenhouse Gas Management* and/or *Air Management Plans*. The government needs to identify areas where construction cannot proceed because of risks associated with climate change and variability.

The government must ensure the mining and energy industry addresses carbon emissions and carbon offsets based on, for example, CSG and coal mining life-cycle emissions (including direct, fugitive and downstream) when considering energy production and environmental sustainability.

An assessment of carbon emissions and the carbon offsets required need to ensure that interactions between terrestrial carbon disturbance and coal seam gas or coal production can be managed or mitigated for example by:

- reduction in the rate of deforestation and land degradation;
- development of carbon sequestration projects in forestry and agriculture;
- promoting energy efficiency;
- development of alternative and renewable energy sources;
- reduction in solid and liquid waste;
- shifting to low emission transportation modes;
- adopting optimal mining surface disturbance practices;
- soil and biomass storage, and
- advancing reclamation best practices.

Fugitive emissions form 34% of Australia's total carbon emissions. They are recognized as resulting from the following sources:

- Point Sources
- Equipment Leaks
- Open Vats and Mixing
- Storage Tanks
- Wastewater Treatment
- Emissions from Cooling Towers
- Maintenance Operations
- Vehicle Movement and Exhaust
- Liquid Spills
- Storage Piles
- Bulk Materials Handling and Unit Operations
- Loading and Unloading of Vehicles
- Painting
- Equipment Cleaning and Solvent Degreasing
- Surface Coating
- Abrasive Blasting
- Asphalt Paving
- Construction and Demolition
- Welding
- Open Area Wind Erosion

5.10 QMDC submits 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.

5.11 Recommendations

5.11.1 That regional air quality issues must be analysed in relation to the cumulative impact of:

- **all operations of the proposed development area**
- **all operations of the energy and mining industries; and**
- **all other regional industries such as agriculture, power plants, transport services etc.**

5.11.2 That control measures prescribed by EPBC conditions must include regular and ongoing real time, publically accessible monitoring data rather than merely promote monitoring on a complaint basis only.

Monitoring needs to outline what:

- **specific baseline air quality monitoring including fugitive emissions over the development area will be conducted**
- **regular and ongoing air quality monitoring throughout construction phase and during a project's operation will be conducted**
- **independent monitoring is proposed for all operations to ensure transparency and accountability to local and regional communities**
- **monitoring data will be made public and in what format so that Australian government conditions are consistent with the goals of the *Environmental Protection Air Policy 2008* and allow public access and independent review of local and regional conditions and trends**
- **will be done to ensure monitoring and management plans are consistent (including units of measure), within the defined asset, and across industry operations and how they will report against site, total and cumulative thresholds**
- **areas are there where infrastructure should not be constructed because of risks associated with risks to human health and in relation to climate change and variability.**

5.11.3 That development projects must identify how they plan to firstly prevent, and secondly mitigate through carbon offsets fugitive emissions from all of the abovenamed sources (see section 5.9) should they be a part of their operations.

6.0 Strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities

6.1 QMDC submits that strategies which identify strategic areas of regional research and legislative amendments or improvements to strengthen conditions placed on development will serve to promote resilience in ecosystems and human communities.

Research is needed to understand the adaptation strategies a region must implement to successfully combat the cumulative impacts and the type of impacts that contribute to cumulative impacts (SEE *Assessing the cumulative impacts of mining on regional communities: an exploratory study of coal mining in the Muswellbrook area of NSW* (2008) at pp xvi, xvii for discussion on definitional issues).

Clarity however is need to ensure the cumulative impacts referred to in any policy, strategy, plan or even TOR include the successive, incremental and combined impacts of a proposed development on regional communities, their economy and the environment that sustains them. The question this raises is what are the different types of impact that must be studied to gain a true and accurate picture of the impact a proposed project in its totality will have on a region or the nation's biodiversity and ecosystems?

Are they:

- *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 eg 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 eg 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 eg 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 cumulative impacts should be defined and measured. A simple typology used in the abovenamed 2008 study that distinguishes 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 (SEE p.17 of the abovenamed study).

This type of research is essential to assist industry and business to primarily avoid, and effectively manage or mitigate impacts on the region's natural biodiversity resources and ecosystem services.

Sustainable social and economic benefits are reliant on development in the QMDB which advances and supports a regional economy .There are many facets of this region's economy and social well-being that rely on a healthy natural environment and natural amenity for quality of life, for example agriculture and tourism.

6.2 QMDC argues that proponents of development are not able to guarantee their activities and infrastructure will avoid adverse impacts whether site specific or cumulative on the region's biodiversity and ecosystem services.

6.3 QMDC suggests there is the need for the development of a strategy that promotes renewable energy resources as both a regional and national first preference for energy supply where that development can provide a sustainable source of energy for the region and nation without causing adverse environmental effects (including climate change) to the region's biodiversity and ecosystems.

In context of this inquiry QMDC believes the government must prioritise the need to replace non-renewable energy resources such as coal with renewable resources. This will enhance not only this region's economy on a more sustainable level and serve to lessen or prevent the impact on the region's biodiversity currently occurring as a result of coal mining and CSG mining expansion and their greenhouse gas emissions.

6.4 QMDC asserts that in the QMDB, the key risks to natural resource assets caused by vegetation clearance or pollution or contamination of waterways for both currently operating and proposed economic development and associated infrastructure are:

- Adverse impacts to the extent, value and function of the region's biodiversity through further fragmentation;

- Adverse impact on water quality in the region's catchments such as the pollution/sedimentation of water ways (aquifers, rivers, creeks and wetlands);

- The erosion of floodplains and creek banks; slumping; diminished connectivity between river channels and off-stream wetlands; and the modification of river, stream and floodplains flows;

- Salinity contamination;

- Conflicting land use where, for example, coal or CSG mining activities and associated infrastructure may use or permanently alienate areas of biodiversity that are not able to be rehabilitated or offset to the reflect the original integrity of the area cleared causing ecosystems to be lost forever;

- Weed seed spread from machinery and other vehicles.

- Adverse impact on air quality caused by greenhouse gas emissions, dust, noise etc

- Contamination of soil, waterways, aquifers caused by for example coal and CSG operations and discharge

6.5 Recommendations

6.5.1 That environmental legislation to effectively deal with the challenges of protecting biodiversity in a changing climate must improve decision making frameworks so that decision makers and regulators are not only authorised but also adequately resourced to:

- **address through regulations or conditions site specific and cumulative impacts on biodiversity and ecosystem services;**

- **prevent impacts within determined thresholds; and**

- **identify minimisation and mitigation options.**

7.0 Mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate

7.1 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 conversation resulting in vulnerable areas being exploited?

7.2 This region's NRM Plan identifies the baseline of natural resource assets in the QMDB. The target intentions for vegetation and biodiversity, riverine, floodplains and wetlands are summarised 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*

7.3 QMDC submits that in its 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.

In QMDC's opinion 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 industry to improve the management and condition of the natural resources in the proposed development areas. The NRM Plan if integral to a project's environmental responsiveness will help to align the Environmental Management Plans (EMP) to regional resource condition and aspirational targets and support the actions of the regional communities' to reach those targets.

The NRM Plan because it integrates with other regional planning activities such as Water Resource Plans and other proposed regional planning instruments will enable proponents of development to invest in natural resource planning processes enabling more comprehensive NRM outcomes.

QMDC and other NRM organizations are key regional stakeholders and if involved and considered in the proposed projects and field planning will be able to provide valuable experience and technical expertise.

QMDC submits that industries and their planning processes have traditionally neglected to fully consider and take into account the strategic direction NRM Plans offer industry in their project and field planning. Due consideration would provide companies with the opportunity to develop their proposed projects in a manner that supports the coordinated delivery of natural resource management in Queensland.

7.4 Recommendations:

7.4.1 That decision makers/regulators require the prevention of adverse impacts from all industry and business on landscape functions of native vegetation coverage, ecosystem linkages, ecological processes and biodiversity condition in Australia.

7.4.2 That the cumulative impact across Australia to vegetation and biodiversity assets from individual site activities are managed by:

a. Appropriate planning and design at a local and landscape level, to avoid unnecessary clearing causing fragmentation or loss of habitat.

b. Requiring offsets using native vegetation within a local area or region to cause no cumulative impact (or no net loss) in that area or region.

7.4.3 That individual site impacts from industry activities are prevented by:

a. 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 *Environmental Protection and Biodiversity Conservation Act 1999*.

b. Avoiding areas covered by voluntary Conservation Agreements or covenants.

c. Requiring rehabilitation to at least, for example, a 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 adequate financial security.

7.4.4 That the establishment of endemic vegetation and enhancement of biodiversity values are 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.

7.4.5 That vegetation plantings or offset regeneration must not impact on:

a. Existing land use, such as primary production, where it may cause local or cumulative impacts to the industry.

b. Soil, surface or ground water assets through the use of saline or excessive irrigation water.

7.4.6 That adverse impacts caused by development activities to the riverine, aquatic, wetland, floodplain and riparian assets and function in both regionally and nationally important ecosystems are prevented.

7.4.7 That the cumulative impact across Australia to riverine, aquatic, wetland, floodplain and riparian assets from individual site activities is managed by:

a. Appropriate planning and design of activities 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**
- **Riparian function (eg ground cover, bank stability, habitat, connectivity)**
- **Wetland and floodplain function**

b. Restricting activities within water quality baseline indicators to be set appropriate to sub-catchment levels, and local and regional threshold limits (when determined).

7.4.8 That direct and indirect adverse impacts from development activities are prevented by:

a. Excluding industry activities from within a defined buffer zone for waterways appropriate to stream order and defined buffer zones upstream from and including wetland; specifically 500m for stream orders 5,6 &7; 100m for stream orders 2, 3 & 4.

b. Ensuring that legislative protection is afforded to Ramsar listed wetlands and feeder streams for 100 kilometres or a safe distance depending on activity upstream.

c. Not permitting diversions of number 4, 5, 6, and 7 Stream Order waterways.

d. Not permitting and actively preventing off-site movement of soil, salt contaminants and weeds to riverine, aquatic, wetland, floodplain and riparian areas, either directly or through landscape processes.

e. Not permitting any adverse impact to surface water flow systems within the floodplains including interaction with ground water flow systems.

7.4.9 That direct disturbance to riverine, floodplain or wetland environments, and impacts from hydrological changes downstream caused by infrastructure from development activities are minimised by:

a. Appropriate planning and design for Stream Order waterways 1, 2 and 3, considering values and function and 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**
- **Riparian function (eg ground cover, bank stability, habitat, connectivity)**
- **Wetland and floodplain function**

b. Requiring rehabilitation of the site at least to its pre-mining condition (including former value and function).

8.0 An assessment of whether current governance arrangements are well placed to deal with the challenges of conserving biodiversity in a changing climate

Consistency and alignment between state and Australian government legislative governance arrangements is needed, so that there is better coordination and for example the option for proponents of development to defer to the Commonwealth Government in accordance with the *Environmental Protection and Biodiversity Conservation Act 1999* does not undermine the integrity of the *Environmental Protection Act 1994* and its governance responsibilities.

QMDC submits that a large amount of reserve lands which house high quality biodiversity is under the control of local government. Often the protection of the biodiversity of these reserves is low on local government priority list in comparison to the continuation of their use under grazing leases or as stock routes. QMDC recognises the need to have these areas better managed in accordance with regional and national biodiversity priorities.

9.0 Mechanisms to enhance community engagement

Community engagement, disclosure of information and public consultation must meet community expectations for a more enduring and direct role in the planning, decision-making and implementation of natural resource policies and activities as they relate to development projects.

Legislative and planning processes need improving to ensure timely and adequate notification of proposed developments, particularly to individual landholders, local governments and communities where the development and associated developments have the potential to impact on the biodiversity of the region.

QMDC submits that public engagement that is timely, meaningful and relevant and conducted appropriately for each stakeholder will encourage and facilitate active public consultation. This also includes public notification and consultation for any proposed changes to Environmental Management policies or authorities.. Resourcing a regional Advisory Committee to advise the Australian government on proposed projects and their EIS's would advance the public consultation process. This Committee would need to be appointed by the region's communities to represent key regional stakeholders including local landholders.

QMDC submits that key financial investment is needed to facilitate private landholder education and engagement activities to increase knowledge on biodiversity assets and how these assets can co-exist with agriculture production. Where coexistence is not possible landholders should be provided with educational opportunities on options available to them to change or improve practices so as to enable coexistence.

Landcare groups are an essential mechanism to enhance community engagement and have a proven track record in their successes to engage landholders, schools and other community groups in activities involving biodiversity education, protection and restoration.

10.0 Suggested case studies of 'nationally important ecosystems'

10.1 Particular areas will become more important as regional climate shifts limit the extent for species existence. Identification of these key areas is likely to include mid-latitudes where tropical meets sub-tropical and sub-tropical meets temperate. QMDC asserts that the identification of these areas should inform priority investment with the aim of increasing regional knowledge and advancing conservation strategies that will aid the protection or restoration of ecosystems that are both regionally and nationally important.

10.2 QMDC submits that a significant bond or proportion of royalties taken form the energy and mining industry should be set aside to safeguard against risk associated with the short and long term impacts on all natural resources. All rehabilitation/remediation plans must identify a full cost account for returning the natural resource to a state better than it was.

10.3 QMDC has previously undertaken "*Climate witness projects*" which involved interviewing landholders and obtaining their long term observations on climate change patterns or variability. These observations were compared to related weather statistics and information to ascertain whether any long term trends were emerging. Results from this comparative analysis indicated there was a reduction in the number of frosts in the Granite Belt region. Although the initial research was focused on agriculture it triggered a warning signal that the area's biodiversity may be under serious threat because of the changing climate.

In response QMDC commissioned Paul Donatiu to conduct climate refugia research in the New England Tableland. The New England Tableland (NET) bioregion comprises the Queensland sections of the New Stanthorpe Plateau and Tenterfield Plateau and Nandewar subregions. The NET is considered "botanically significant due to its high plant species diversity and high level of endemism". The NET region is characterised by numerous landscape features which are believed "to act as climate refuges for some rare and threatened species, endemic species and ecosystems". The report states that "the interaction between a complex topography, geology, altitude and the pronounced moisture gradient from southeast to northwest has resulted in a wide diversity of habitats".

10.4 QMDC's next most vulnerable community is semi evergreen vine thickets (EPBC listed community). These thickets are historical remnants of rain forests that have been resilient, surviving the continent drying up throughout the last several thousand years. If climate change trends accelerate it could put these vines at increased risk.

10.5 Phase one of weed and pest management studies undertaken by QMDC have modelled the distribution of weds and pests under different climate and land system scenarios. Results based on rabbit studies have shown that rabbits regardless of climate will only burrow in certain soil types. QMDC would like to progress Phase two of these studies to ascertain the impacts on biodiversity in relation to a number of weeds and pests of concern in the region.

10.6 Recommendations

10.6.1 That the New England Tableland be considered for a case study as a nationally important ecosystem.

10.6.2 That semi evergreen vine thickets and their habitats be considered for a case study as a nationally important ecosystem.

10.6.3 That research into weed and pest spread in QMDB be considered as important research to ascertain the impacts weed and pest spread is having on vulnerable ecosystems in the region.