



# Climate Change Management in SEQ | Phase 2

Background Study

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## Executive Summary

This report is phase two in a five phase project running over 13 weeks to design the *Climate Change Management Plan for SEQ 2013-2023*. This completes the background study on South East Queensland (SEQ) that provides input for the final phases, which will seek to provide solutions to specific issues and identify goals. These goals will lead towards achieving the vision of a sustainable SEQ that is resilient to climate change and prepared for its growing population, with a prosperous economy, united community and thriving environment.

This report identifies five key issue areas that are highly vulnerable to rapid population growth and climate change impacts and that apply to the area identified as the regional landscapes and rural production area (RLRPA). The RLRPA protects land with regional landscape, rural production and other non-urban values from urban or residential development.

A regional overview outlines important and unique environmental attributes that comprise SEQ, such as the Lockyer Valley, the eastern beaches and the Dividing Range. This report addresses specific issues, linkages, and attributes within the issue areas of agriculture, biodiversity, energy, transport and water management.

An analysis of the strengths, weaknesses, opportunities and threats pertaining to each issue area outlines that the major threats and weaknesses are associated with rapid population growth and the projected climate change impacts for SEQ, which include increased temperatures, increased evaporation, decreased precipitation, and more frequent severe weather events.

Furthermore, an analysis was undertaken in order to understand the current management frameworks that underpin growth and development within the region. An issue identified is the need for more policy that seeks to mitigate climate change, as current policy predominantly focuses on adaptation.

Finally, an analysis of stakeholders that are likely to shape future directions for SEQ across the five issue areas found that Government Departments, Government owned corporations and authorities, and non-government groups are the key stakeholders.

The findings of this report will become the framework for phases three, four and five, which will result in the development of the above mentioned *Climate Change Management Plan for SEQ 2013-2023*.





## Table of Contents

List of Figures .....	1
List of Tables .....	1
List of Abbreviations .....	1
1.0 Introduction.....	2
2.0 Strategic Vision.....	2
3.0 Regional Overview of SEQ.....	3
4.0 Key Issue Areas.....	4
4.1 Agriculture.....	6
4.2 Biodiversity.....	8
4.3 Energy .....	10
4.4 Transport.....	12
4.5 Water Management.....	14
5.0 Current Management Frameworks.....	16
6.0 Stakeholders.....	21
7.0 Conclusion .....	26
8.0 Glossary .....	27
9.0 Reference List.....	28
10.0 Appendices.....	<b>Error! Bookmark not defined.</b>







**List of Figures**

Figure 1: Major land uses in SEQ ..... 2

Figure 2: Location of SEQ..... 3

Figure 3: Key Issue Areas in SEQ..... 5

Figure 4: Agriculture Attributes, Linkages and Issues in SEQ..... 7

Figure 5: Biodiversity Attributes, Linkages and Issues in SEQ..... 9

Figure 6: Energy Attributes, Linkages and Issues in SEQ ..... 11

Figure 7: Transport Attributes, Linkages and Issues in SEQ..... 13

Figure 8: Water Management Attributes, Linkages and Issues in SEQ..... 15

Figure 9: Relationships between Current Management Frameworks..... 17

**List of Tables**

Table 1: Impacts of Climate Change and Population Growth on Key Issue Areas in SEQ ..... 4

Table 2: SWOT Analysis of Agriculture in SEQ ..... 6

Table 3: SWOT Analysis of Biodiversity in SEQ ..... 8

Table 4: SWOT Analysis of Energy in SEQ ..... 10

Table 5: SWOT Analysis of Transport in SEQ..... 12

Table 6: SWOT Analysis of Water Management in SEQ..... 14

Table 7: Analysis of Current Management Frameworks..... 18

Table 8: Stakeholder Analysis ..... 22

**List of Abbreviations**

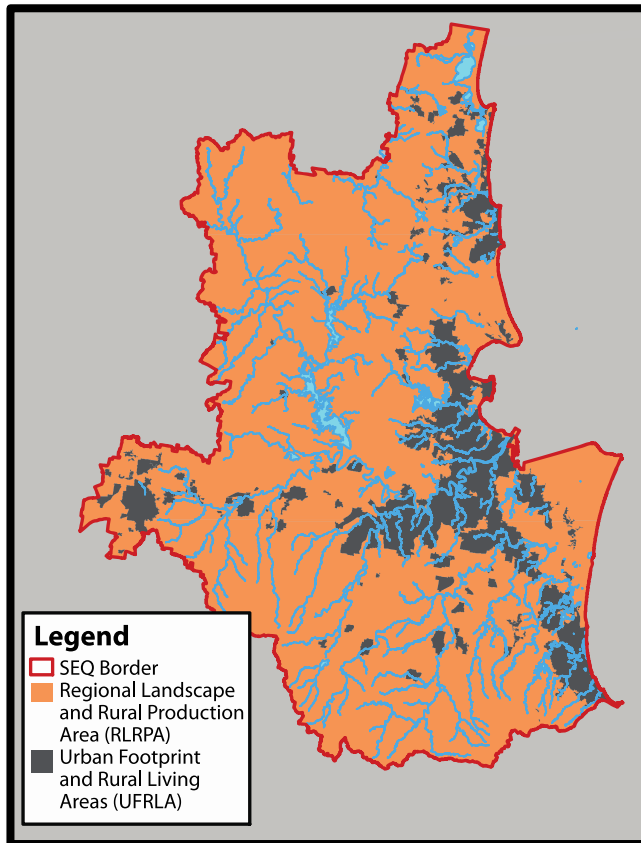
QLD	Queensland
SEQ	South East Queensland
RLRPA	Regional Landscape and Rural Production Area
UFRLA	Urban Footprint and Rural Living Area
GHGs	Green House Gasses



## 1.0 Introduction

This report is phase two of a five-phase project to design a climate change management plan for South East Queensland (SEQ) for 2013-2033 to be completed over a 13-week period. This is the second and final phase of the background study on SEQ that provides circumstantial information for the final phases, which will seek to provide solutions, identify goals, and eventually lead to the development of the *Climate Change Management Plan for SEQ 2013-2033*.

**Figure 1: Major land uses in SEQ**



The area in particular that is being looked at is the region described as the Regional Landscape and Rural Production Area, hereafter referred to as RLRPA. This area includes all land in SEQ that does not fall under Urban Footprint Area or the Rural Living Area (UFRLA) (see figure 1). The RLRPA ‘identifies land with regional landscape, rural production or other non-urban values. It protects this land from inappropriate development, particularly urban or rural residential development’ (Queensland Government 2009, p. 15).

Five issue areas that apply to the RLRPA in SEQ and that are most likely to be severely affected by climate change and population growth will be looked at in detail. This project will seek to focus on adaptation strategies across these issue areas, which are agriculture, biodiversity, energy, transport and

water management.

As part of this background study, the key stakeholders within the above mentioned key issue areas will be discussed and an analysis of the current management frameworks that apply to the region will be undertaken. This will provide a better understanding of the current forces influencing decision making in SEQ as well as those likely to shape the future direction of SEQ.

## 2.0 Strategic Vision

Our vision is for a sustainable South East Queensland that is resilient to climate change and prepared for its growing population, with a prosperous economy, united community and thriving environment. The South East Queensland vision relies on its successful agriculture industry, its unique biodiversity, its renewable energy supply, its well-connected transport system and the sustainable management of its water supply.

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“PROSPEROUS  
ECONOMY, UNITED  
COMMUNITY AND  
THRIVING  
ENVIRONMENT”

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### 3.0 Regional Overview of SEQ

SEQ is comprised of ten smaller areas (Sustainable Planning Agency 2013) united by their common location within Queensland. Together, they create a defining boundary (figure 2) containing a diverse array of environmental attributes that are distinctive to the region, due to its unique location. Along the eastern region of SEQ coastal beaches and islands create a unique balance between the city and intricate marine ecosystems. With easy accessibility and distinctive biodiversity, this area is important for tourism and contributes to SEQ's economy.

The southern region of SEQ lies in the foothills of the Great Dividing Range, surrounded by heritage-listed national parks (Scenic Rim Council 2012). Not only does it contain distinctive scenery; it is important for agriculture, horticulture and equine production (Scenic Rim Council 2012) which stimulates the economy.

In the western part of SEQ, agriculture is the primary business of the region (Lockyer Valley Regional Council 2013). The Lockyer Valley was rated among the top ten most fertile farming areas in the world (Lockyer Valley Regional Council: Community Recovery Plan 2011) and grows a diverse range of commercial fruit and vegetables (Lockyer Valley Regional Council 2013). This lead to this area being known as SEQ's 'Salad Bowl' (Lockyer Valley Regional Council: Community Recovery Plan 2011).

Finally, the northern regions of SEQ are predominantly valleys of lakes, containing major water resources for the SEQ region (Somerset Regional Council 2012). These include Atkinsons Dam, Wivenhoe Dam and Somerset Dam (Somerset Regional Council 2012). This environmental attribute is imperative to the fresh water supply to SEQ.

Overall, SEQ has many unique and diverse environmental attributes that underpin the region's economy and that provide valuable services to SEQ communities. However, with the predicted climate change impacts and an increasing population, the environmental attributes of SEQ could be threatened. The Department of Infrastructure and Planning (2009) predicts a possible growth of the population of SEQ to 4.4 million people in the next twenty years and Bell et al., (2010) predicts the population will increase by 80,000 people per year. The combination of this growth and the predicted temperature increases, evaporation increases, precipitation decreases, sea level rise and more intense extreme weather events (South East Queensland Water Strategy 2010) will lead to an increase in floods and droughts throughout the region of SEQ. Therefore, the impacts of these events require management plans to ensure these defining attributes remain.

Figure 2: Location of SEQ





### 4.0 Key Issue Areas

There are many areas that are important in SEQ and are relevant to the RLRPA. A matrix was used to determine the five that are to be affected the most by climate change and population growth across the three areas that underpin the vision for SEQ; the economy, the community and the environment (table 1).

**Table 1: Impacts of Climate Change and Population Growth on Key Issue Areas in SEQ**

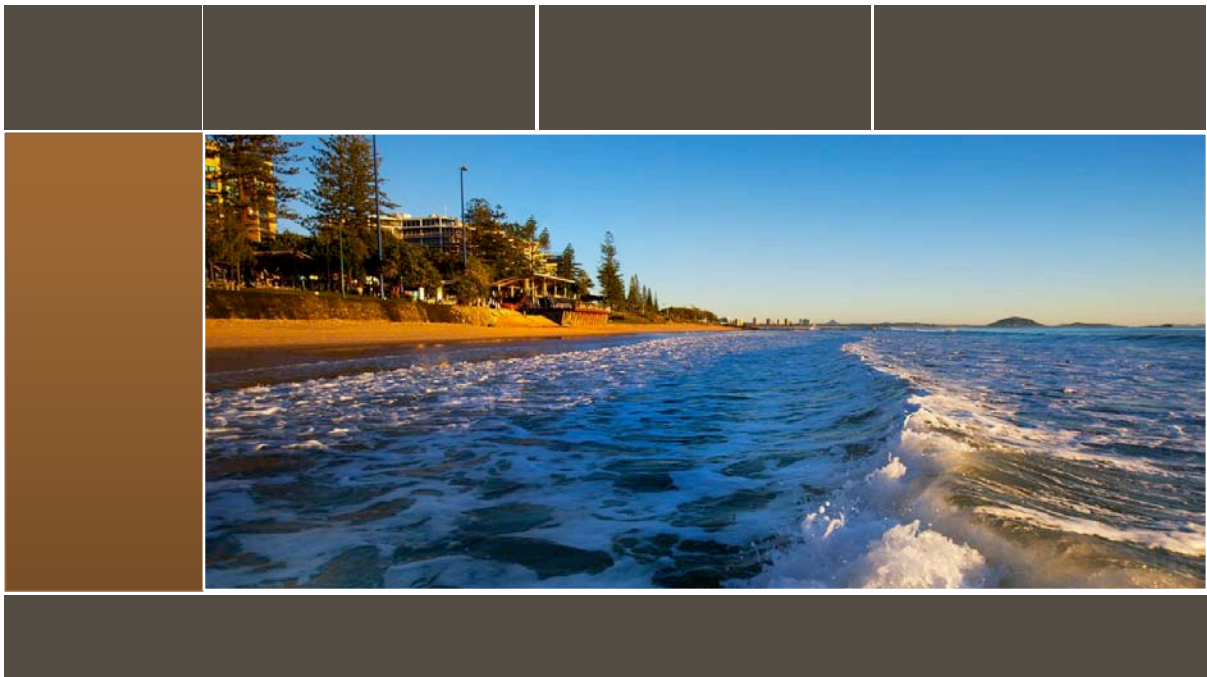
Issue Area	RLRPA	UFRLA	Economic Impacts	Social Impacts	Environmental Impacts
Agriculture	✓		<b>HIGH</b> <i>Major agriculture sector in which the economy is reliant on, vulnerable to impacts of climate change and changing land uses due to population growth.</i>	<b>HIGH</b> <i>The social implications for a badly managed Beef Industry range from lack of food to lost jobs.</i>	<b>HIGH</b> <i>Encroachment of agricultural land could see clearing of conserved environments for the beef industry.</i>
Biodiversity	✓		<b>HIGH</b> <i>Much of Queensland's economy relies heavily on its Biodiversity, including its tourism industry, which is a major employment source.</i>	<b>HIGH</b> <i>Will affect communities through decreased water quality, forests, food security and availability of materials that provide sustainable livelihoods/income.</i>	<b>HIGH</b> <i>Fundamental part of the environment and is highly susceptible to effects of climate change and population growth.</i>
Energy	✓	✓	<b>HIGH</b> <i>SEQ requires a sustainable energy supply to ensure long-term success of all operations, which drive economy.</i>	<b>HIGH</b> <i>Adopting renewable energies reduces non-monetary, negative impacts on society (depleted environment, pollution)</i>	<b>HIGH</b> <i>Energy within Australia is the largest contributor more than 86% of GHGs contributing to climate change.</i>
Transport	✓	✓	<b>HIGH</b> <i>Transport infrastructure (back bone of the region's economy) will not be sustainable with depletion of resources, climate change and population growth.</i>	<b>HIGH</b> <i>Transport system (supports flows of people and goods) is susceptible to changes from climate change and population growth, which would impact SEQ communities.</i>	<b>HIGH</b> <i>Need less polluting, more sustainable transport methods, or GHG concentrations will continue to rise, negatively impacting environment.</i>
Water Management	✓	✓	<b>HIGH</b> <i>SEQ requires a constant and lasting supply of water to sustain its growing population and climate change events are likely to pose a great threat to the supply of potable water.</i>	<b>HIGH</b> <i>Lack of water supply that does not meet increasing population demand</i>	<b>HIGH</b> <i>One management system, relying on predominately climatic water supplies, which will be effected by climate change.</i>
Tourism		✓	<b>HIGH</b>	<b>HIGH</b>	<b>LOW</b>
Water Quality	✓	✓	<b>LOW</b>	<b>HIGH</b>	<b>MODERATE</b>
Natural Environment	✓		<b>MODERATE</b>	<b>MODERATE</b>	<b>HIGH</b>
Regional Landscape	✓		<b>LOW</b>	<b>MODERATE</b>	<b>HIGH</b>
Natural Resources	✓		<b>HIGH</b>	<b>MODERATE</b>	<b>HIGH</b>
Employment		✓	<b>HIGH</b>	<b>HIGH</b>	<b>LOW</b>
Infrastructure		✓	<b>HIGH</b>	<b>MODERATE</b>	<b>LOW</b>
Land Use	✓	✓	<b>HIGH</b>	<b>MODERATE</b>	<b>HIGH</b>





Table 1 shows that the five issue areas likely to be of particular concern due to climate change and population growth are agriculture, biodiversity, energy, transport and water management (as seen in figure 3). The attributes, issues and flows within each of these issue areas are outlined and mapped in the following sections.

**Figure 3: Key Issue Areas in SEQ**







### 4.1 Agriculture

#### Agriculture

The success of the livestock beef industry in SEQ is reliant on quality farming practices, existing transport infrastructure and the sustainability of rural pastures and feedlots. Over 1.9 million hectares of land within SEQ is defined as rural production area (South East Water Catchments, 2013), with livestock beef production being the second largest agricultural sector (Australian Bureau of Agriculture and Research Economics, 2003) spreading throughout the SEQ region as shown in figure 4. With grazing and intensive feedlot farming the predominant farming methods of the SEQ beef industry climate change and population growth within the region are posing major economic, environmental and social issues (Soh et al., 2008).

Increases in average temperatures and extreme climatic weather events will directly affect the output of the beef industry through soil degradation, adverse impacts on plant growth and animal health, as shown in table 2 (Howden et al., 2009). The current state of the beef industry already has significant impacts upon climate change with the large carbon emissions produced by the cattle (Chang et al., 2004) and the pressures from large transporting and exporting freights by road and boat (Condon, 2012). The port of Brisbane has become Australia’s fastest growing exporting almost 700,000 tonnes of beef per annum (Condon, 2012), located on the banks of the Brisbane River (figure 4) this major linkage for the beef industry is in danger of becoming adversely affected by sea-level rise due to climate change.

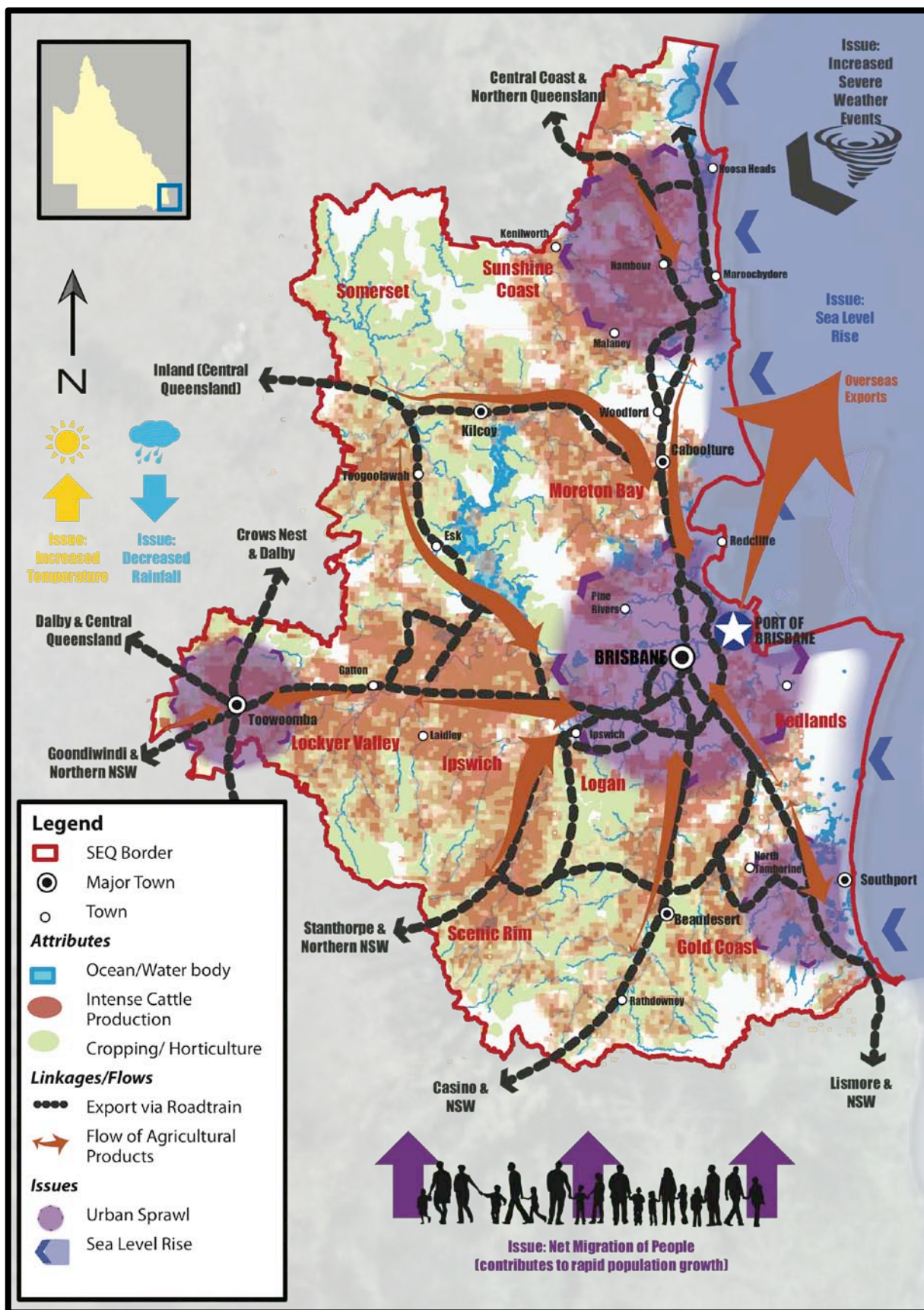
The increase in population within SEQ further instils pressures on the beef industry in the form of the increasing urban footprint, which is set to negatively impact the sector (Patternson et al., 2007). Reduced grazing capacities coupled with an increase in major drought periods among other forms of extreme climatic weather events is set to put immense strain on the viability of the SEQ’s beef cattle industry (Soh et al., 2008).

**Table 2: SWOT Analysis of Agriculture in SEQ**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Road transport infrastructure systems</li> <li>• Port Infrastructure facilities</li> <li>• Prime grazing land within the region</li> <li>• Development of feedlot stations as alternate beef production facility</li> <li>• Large employment sector in SEQ</li> </ul>	<ul style="list-style-type: none"> <li>• CO2 emissions from the beef cattle</li> <li>• Non sustainable farming practices</li> <li>• Reliance upon single transport option</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Developing sustainable farming practices for beef production</li> <li>• Alternative meat production for the market</li> <li>• Development of drought and flood resistant grazing crops</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced grazing capacities due to increased temperatures and increased extreme climatic events</li> <li>• Major drought periods.</li> <li>• Growing urban footprint threatening agricultural land</li> <li>• Land degradation</li> <li>• Reduced animal health</li> <li>• Increased pests risk</li> </ul>



Figure 4: Agriculture Attributes, Linkages and Issues in SEQ





### 4.2 Biodiversity



**Biodiversity**

One of the most important and complex issue areas in SEQ is biodiversity. It provides invaluable social, ecological, and economical benefits that help shape the region. However, these benefits are at risk as the area is under continuous pressures from the adverse effects of climate change, as well as increased land clearing to accommodate new urban developments as a result of rapid population growth. This results in the loss of key habitats and ecosystems within SEQ (Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2009).

The region is made up of key biodiversity hotspots such as the Border Ranges and the Gondwana Rainforests (see figure 5). Some of SEQ’s ecosystems include eucalypt communities on sedimentary rocks, microphyll rainforests, and sub-tropical rainforests and are home to many highly endemic species such as Stradbroke Island’s golden swamp wallaby and the Mt Beerwah mallee (DSEWPC 2009). The effects of climate change will have significant impacts on these unique ecosystems, through changes to temperature, rainfall and through more frequent and severe weather events, as seen in table 3.

SEQ is one of the fastest growing regions in Australia and koalas are a perfect example of how rapid population growth affects biodiversity and ecosystems within SEQ. State Planning Policy 2/10: Koala Conservation in South East Queensland (SPP 2/10) identifies the need and potential to preserve koala habitats within the urban footprint (Department of Infrastructure and Planning 2010). Habitat mapping and models are also being used to monitor and conserve the species to reduce any more declines in populations (DERM 2009). However, despite these measures, urban sprawl due to rapid population growth continues to encroach on important koala habitats.

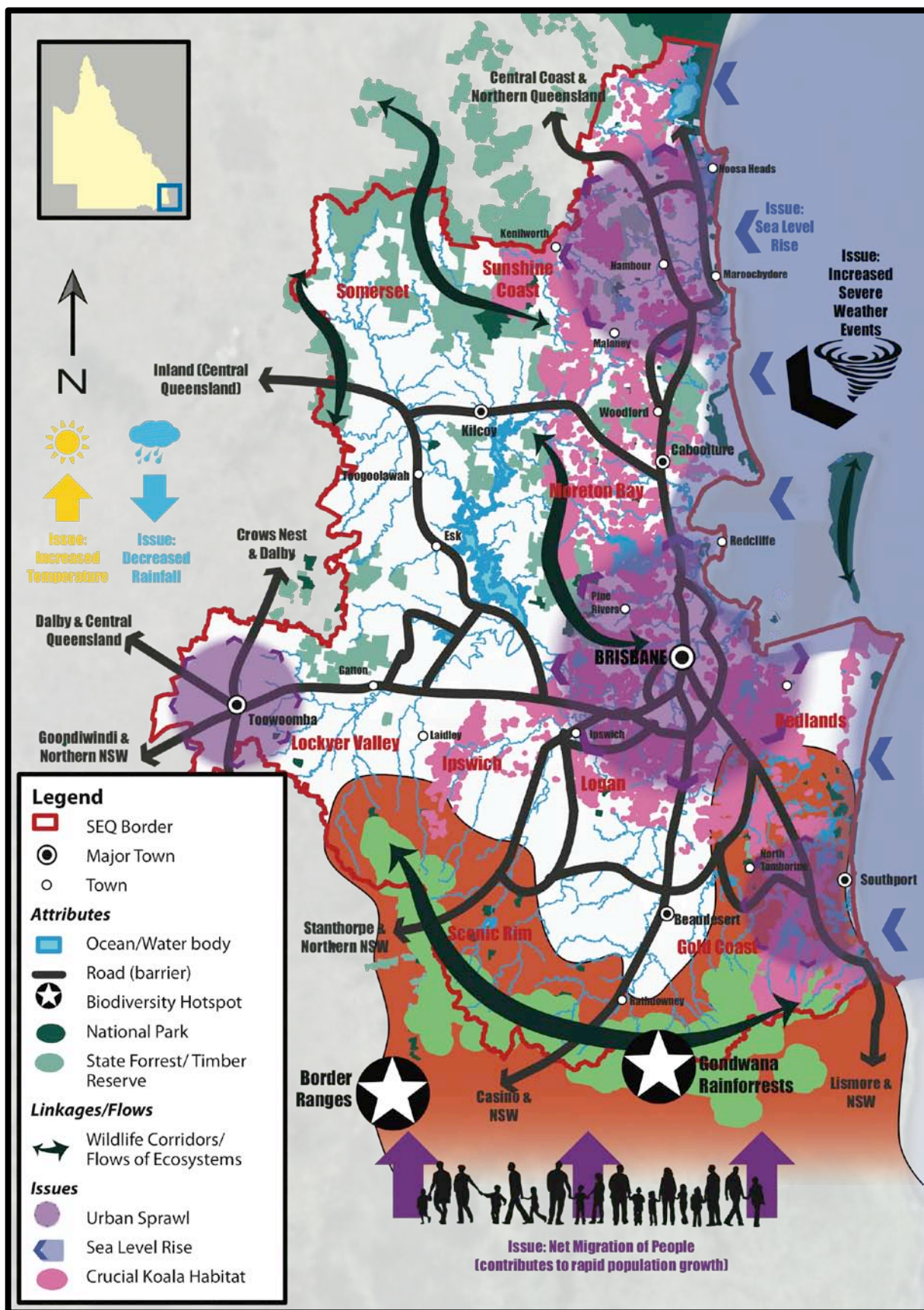
**Table 3: SWOT Analysis of Biodiversity in SEQ**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Significant biodiversity hotspots, Border Ranges north and south, and the Gondwana rainforests.</li> <li>• SEQ has one of the richest and diverse animal and plant species in Australia</li> <li>• Subtropical rainforests and coastal heathlands of significance, and world heritage listings.</li> <li>• State Planning Policy (SPP 2/10)-conservation strategies.</li> </ul>	<ul style="list-style-type: none"> <li>• The need for materials and products through the need for extraction of natural resources.</li> <li>• Population growth leading to urban sprawl and habitat loss.</li> <li>• Increased food production</li> <li>• Unsustainable use and management of natural resources.</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Maintain wildlife corridors to support connectivity and sustain biodiversity.</li> <li>• Biodiversity conservation strategy 2010-2030.</li> </ul>	<ul style="list-style-type: none"> <li>• Invasive species inhabiting new environments due to changing climatic conditions and impacting ecosystems</li> <li>• Impacts of climate change: rising temperatures, changes to rainfall patterns, flooding events.</li> <li>• Changed fire regimes</li> <li>• Habitat fragmentation</li> <li>• Urban sprawl encroaching on habitats</li> </ul>





Figure 5: Biodiversity Attributes, Linkages and Issues in SEQ





**Energy**

**4.3 Energy**

Energy is important within SEQ as the region represents more than 60% of the state’s energy demand (Powelink, 2009). The economy and the SEQ way of life are dependent on a ready supply of energy. As seen in figure 6, the majority of energy is supplied by coal-fired power stations to residential and commercial land uses within Brisbane, the Gold Coast and the Sunshine Coast (Energex 2012). There are also a number of renewable energy sources supplying SEQ, such as gas, hydroelectricity, and biomass plants (figure 6). With the onset of rapid population growth and climate change, the Energex grid (supplying SEQ) is at risk as increased demand is likely, increased temperatures and severe weather events are likely to damage infrastructure, and decreased precipitation is likely to create the need for water to be conserved, rather than being used in energy generation.

Table 4 highlights the above-mentioned issues as weaknesses and threats. An estimated temperature increase of 0.9°C by 2030 (CSIRO, 2007) will increase the demand for energy for cooling but reduces the grid’s ability to function. Power plants depend upon their ability to discharge heat for running; an increase in temperature and humidity will mean the plants will not be able to cope (Dedekorkut et al., 2010).

In June 2012 solar panels as part of the Queensland Solar Bonus Scheme (DEWS, 2012) exported 350MW of sustainable energy into the SEQ grid (Energex, 2012). In the short term this reduces the effectiveness of the grid to cope during peak demand periods, increasing electricity prices for the consumer (Energex, 2012). However, buildings equipped with solar hot water heaters and solar panels are expected to slow the demand for energy in the future, mitigating climate change.

To adapt to climate change the Renewable Energy Target Scheme (Department of Climate Change and Energy Efficiency, 2009) highlighted that, by 2020, electricity supply in Australia must be from 20% renewable resources. Currently approved, just over 20% is to be supplied by renewable energy sources limited by economic constraints in SEQ (DEWS, 2013 and Energex, 2012). As energy is the largest producer of green house gasses (GHGs) contributing to climate change, further mitigation measures displayed as opportunities (table 4), need to be analysed in the next phase of this project.

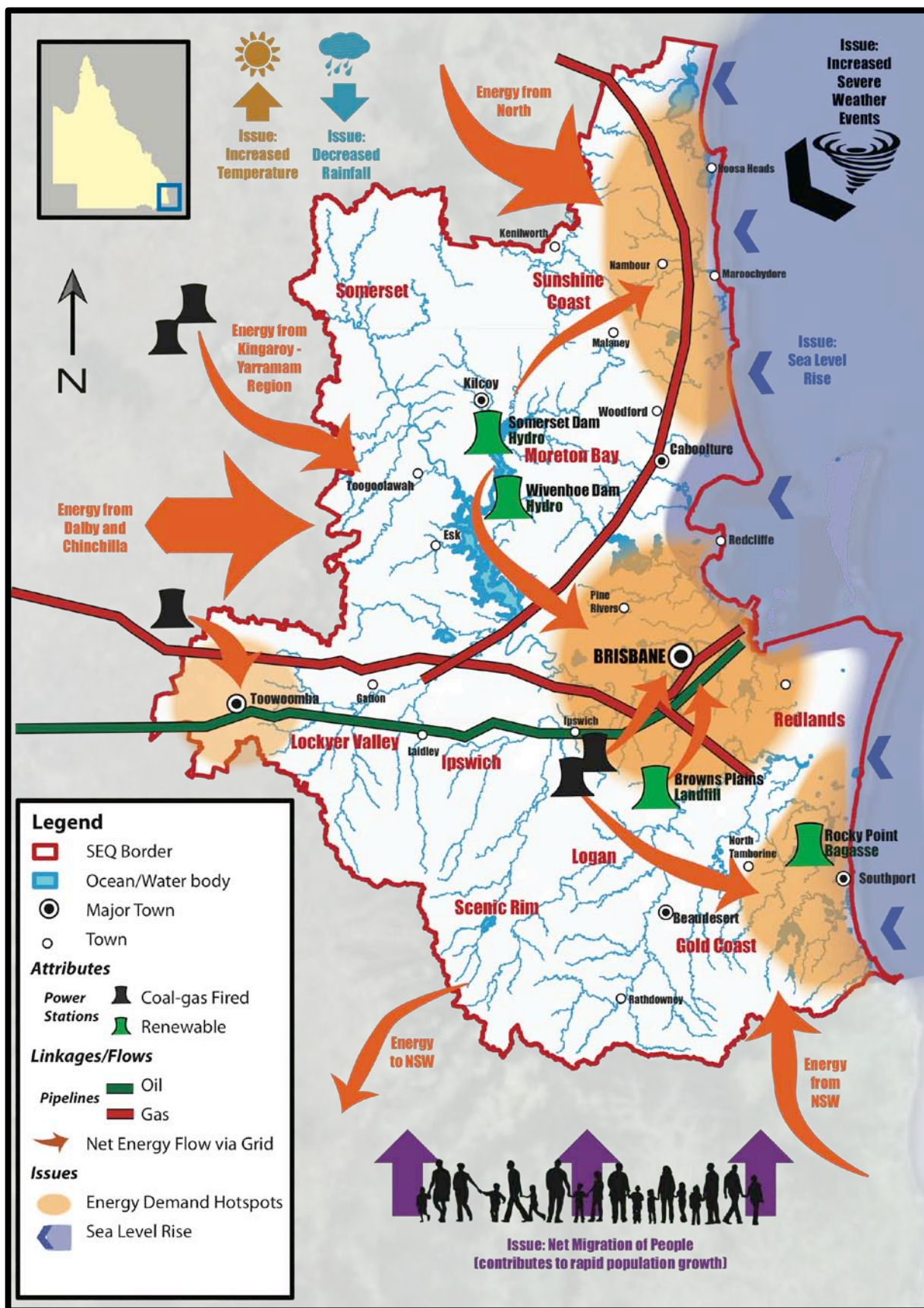
**Table 4: SWOT Analysis of Energy in SEQ**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Solar bonus scheme is reducing consumption</li> <li>• Policies are in place adapting to climate change, increasing the supply of renewable energy resources</li> <li>• Acknowledgement of the need to have a reliable network with the onset of extreme weather events</li> </ul>	<ul style="list-style-type: none"> <li>• Energy production is largest producer of GHGs</li> <li>• Economic constraints - reducing ability to have full supply of renewable energy resources</li> <li>• Majority of electricity is supplied by coal and gas power stations</li> <li>• Increasing population, increasing demand</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Development of technology to reduce the power usage of appliances</li> <li>• Sustainable building design techniques – reducing energy consumption</li> <li>• Renewable energy production e.g. Solar farms, biogas, wind and wave energy</li> <li>• ‘Off-the grid’ development practices</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased reliability of electricity in peak periods</li> <li>• Limited ability of the network to cope with faults during extreme weather events</li> <li>• Temperature and humidity increases reduce the ability of the grid and plants to function well</li> <li>• Change of government and policies and climate change adaptation and mitigation abandoned</li> <li>• Sea level rise encroaching on the energy grid</li> <li>• High temperatures increase demand for cooling</li> </ul>





Figure 6: Energy Attributes, Linkages and Issues in SEQ







**Transport**

**4.4 Transport**

The QLD Department of Transport notes that ‘as SEQ continues to grow, we need a transport system that will foster our economic prosperity, sustainability and quality of life into the future’ (2011, p. 1). Currently, SEQ consists of a network of main roads connecting significant urban areas (figure 7). These are important for maintaining economic and social flows through SEQ and beyond and are crucial as most of SEQ’s travel occurs in private vehicles (83%) (Department of Transport and Main Roads 2011, p. 4). SEQ also has three significant airports that accommodate national and international travel (figure 7). The Port of Brisbane also provides overseas connections and is an important trade terminal for the mining and agricultural industries (see 4.1 Agriculture). These international connections contribute to SEQ’s strong economy through trade and by facilitating one of SEQ’s most profitable industries; tourism (figure 7).

In SEQ the public transport network consists of a main train line from the Sunshine Coast to the Gold Coast, a network of smaller train routes and bus routes in urban areas. However, a major issue is that public transport only makes up 7% of travel in SEQ (Department of Transport and Main Roads 2011, p. 4). Fossil fuel depletion will result in the need for greater sustainable transport, as personal vehicle use will become less viable so, as outlined in table 5, there is an opportunity to increase public transport use.

SEQ’s transport network circulates economic and social flows, which underpin the region’s successful economy and contribute to its thriving communities. However, the Queensland Audit Office found that ‘unprecedented population growth in SEQ and economic prosperity across Queensland in recent years has meant increased demand on the transport network which is operating at or near its capacity’ (2008 p. 1). This is an issue for SEQ because this trend will endure as rapid population growth continues in the region. New infrastructure such as strategic road networks, sea and airport upgrades, greater public transport initiatives and more options for active transport (cycling/walking) will be needed urgently.

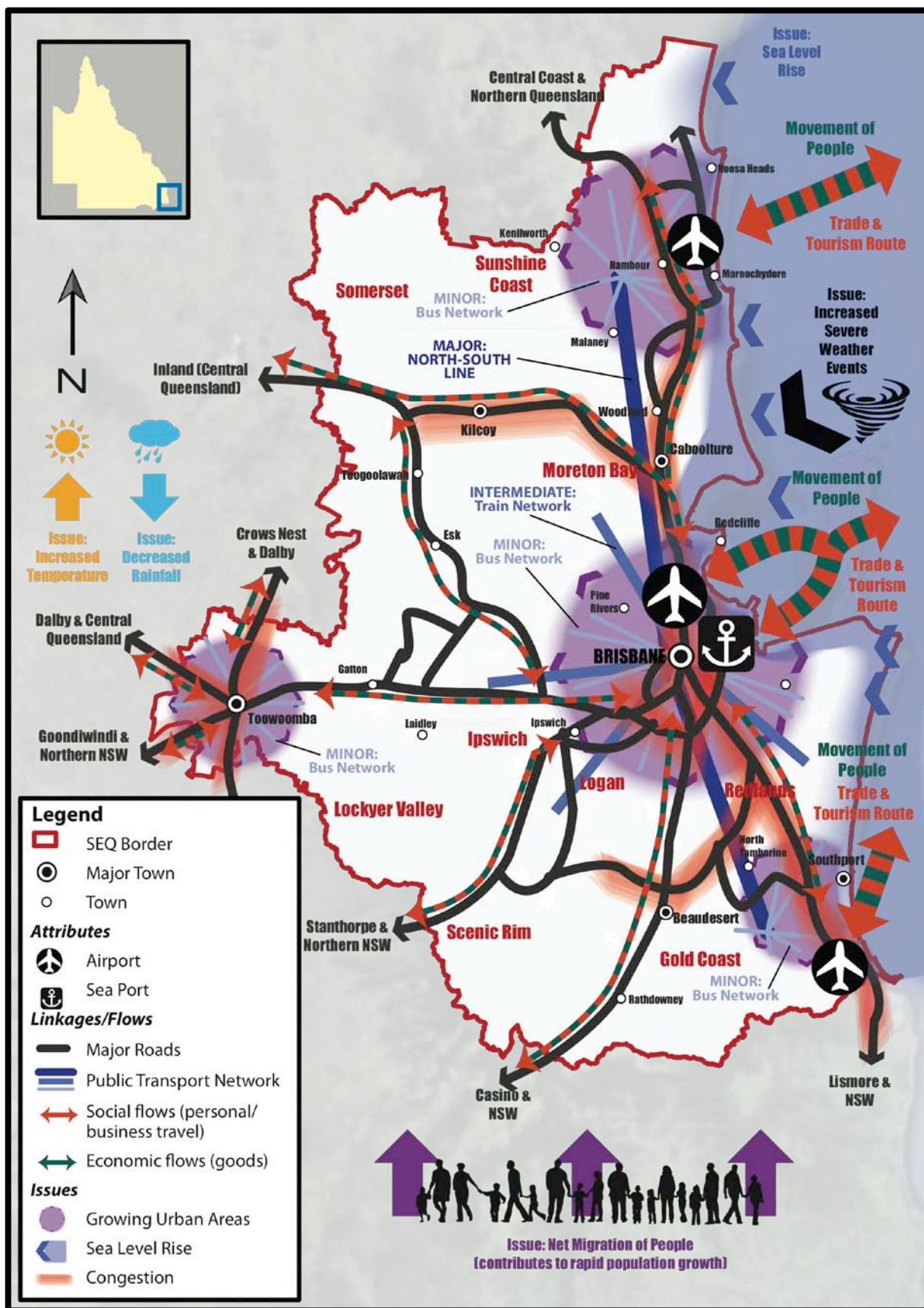
Finally, climate change is likely to cause more frequent and severe weather events and greater fluctuations in temperatures across SEQ. These changes could inundate transport routes, damage infrastructure and interrupt linkages that are important for SEQ’s social and economic health. SEQ needs to adopt climate change resilient infrastructure and transport systems to minimise these impacts.

**Table 5: SWOT Analysis of Transport in SEQ**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Incorporation of several types of transport systems that interconnect across SEQ.</li> <li>• Public transport is effective in certain areas of SEQ and makes up some of the total travel undertaken</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient and more sustainable transport systems such as public or active transport get little use.</li> <li>• Much of the networks of roads are low-lying and susceptible to flood inundation.</li> <li>• Roads are congested and at/near capacity</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• To increase use of more sustainable and effective transport systems as attitudes towards climate change shift.</li> <li>• To install well-considered, efficient public transport networks as population growth increases the need for transport</li> </ul>	<ul style="list-style-type: none"> <li>• Population growth could occur faster than transport infrastructure can be built.</li> <li>• Increased severe weather events due to climate change could damage transport infrastructure and interrupt social and economic flows.</li> <li>• Fluctuating temperatures could damage transport infrastructure.</li> </ul>



Figure 7: Transport Attributes, Linkages and Issues in SEQ





### 4.5 Water Management



Successful water management can only be obtained through equilibrium of effective infrastructure and sustainable balance between demand and supply.

Currently, 90% of SEQ drinking water is supplied through 26 dams, 47 weirs and 14 bores and aquifers, with 46 water treatment plants (South East Queensland Water Strategy, 2010). This reliance on a predominately climate dependent water supply will be a major issue for SEQ with the emergent climate change events and subsequently will not satisfy the demand of an increasing population (Baldwin & Uhlmann 2010). Climate change will affect the supply from the dams as it has been predicted by the South East Queensland Water Strategy (2010) to expect higher temperatures, which directly reduces inflows of dams through the increasing evaporation and decreasing precipitation.

This illustrates the emphasis placed on climate dependent water supplies, resulting in limited use of alternative water supplies. This is demonstrated in figure 8, which illustrates no stormwater integration, one recycled water plant and only a single desalination plant located in Tugun, which is inconveniently located within close proximity to the ocean. With increase in sea levels and increase storm surges (Soh et al., 2008), this plant will not withstand a climatic shift in the future, which will further reduce the supply for the increasing demand of a rising population.

This rising population is only being serviced by one water management system (water grid located in the map on figure 8) and with 20,000 SEQ residents in communities that have drinking water supplies not directly connected to the SEQ water grid (South East Queensland Water Strategy, 2010) an increase in population will place further strain on these communities (table 6). Accompanied by climate change, not only is there an increase in the predictions of droughts, but also the increase in sea levels and increase storm surges could lead to increased systematic rainfall patterns (Soh et al., 2008), leading to floods. With the water grid not supplying any water to these communities, (figure 8 demonstrates the regions not supplied by the water grid) if a flood were to occur, their drinking water supply would be cut off or contaminated and will not meet the demand.

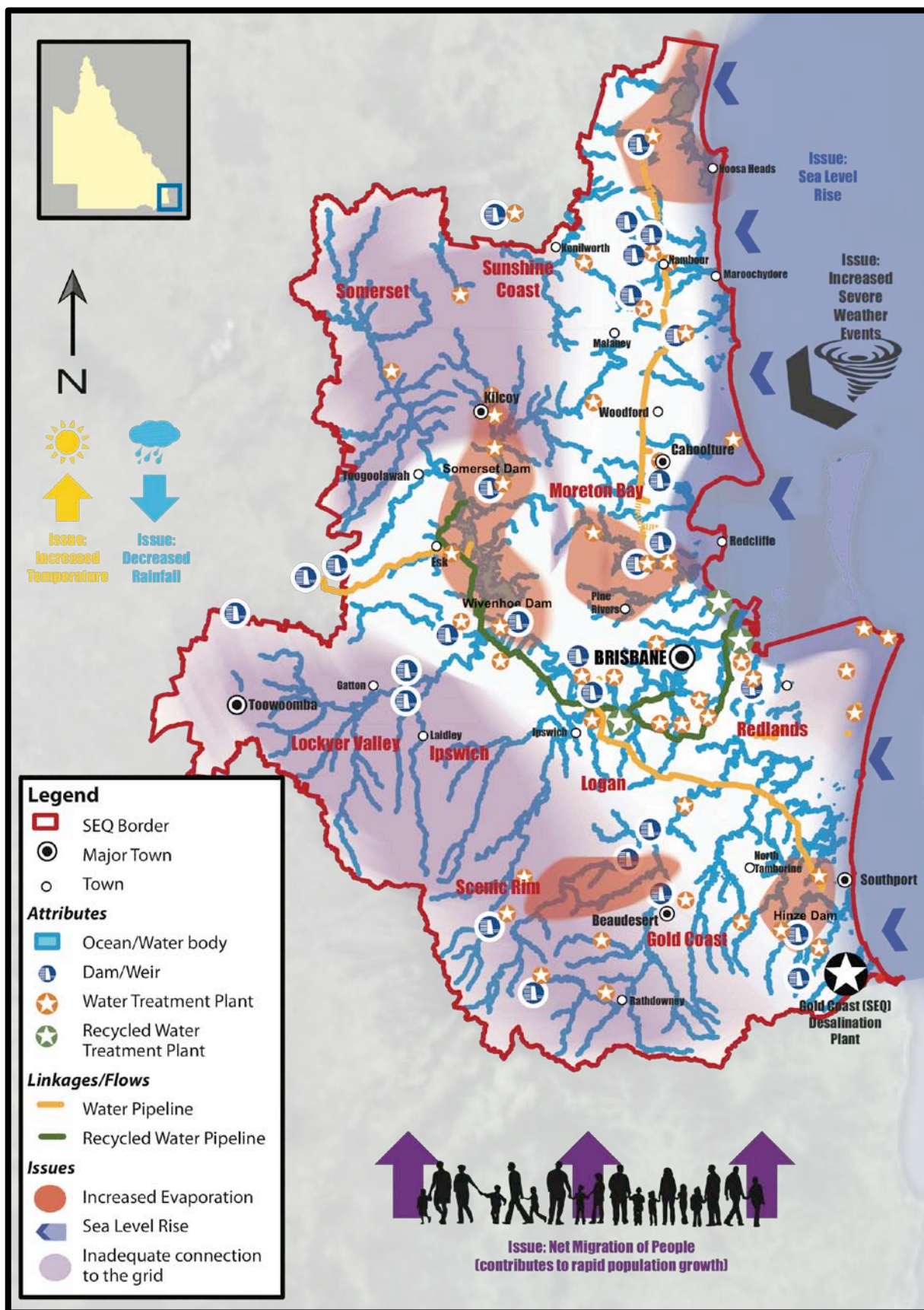
**Table 6: SWOT Analysis of Water Management in SEQ**

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Large percentage of SEQ in the form of rainforests to capture and filter rainwater.</li> <li>• Current hydrological resources work in SEQ.</li> <li>• Flooding is controlled by dams and floodgates.</li> <li>• Existence of past statistics to monitor patterns that could be a potential threat (flooding, droughts).</li> <li>• Majority of the population is connected to a water network.</li> </ul>	<ul style="list-style-type: none"> <li>• Strong seasonality in the annual rainfall volume can lead to decreased or limited supply of fresh water.</li> <li>• Insufficient water transport infrastructure during floods and droughts.</li> <li>• Increased consumption of water for irrigation due to an increase in demand of produce for a growing population.</li> <li>• Reliance on one water management system</li> <li>• Reliance on climate dependent water supply</li> <li>• Limited alternative water supplies</li> <li>• Desalination plant located very close to the ocean.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Create another water management system</li> <li>• Utilise existing water grid and extend across the entire SEQ region</li> <li>• Utilise alternative water supplies (recycled water, storm water integration)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced water flows, resulting in decreased rainfall due to climate change.</li> <li>• Major drought periods.</li> <li>• Increased water demand from an increasing population and rising temperatures.</li> </ul>





Figure 8: Water Management Attributes, Linkages and Issues in SEQ





## 5.0 Current Management Frameworks

Current management frameworks were assessed against their ability to accommodate for population growth and adapting/mitigating to climate change (table 7). The criteria are used to assess each framework in a non-biased opinion against the chosen issue areas. Pursuant to the assessment, a hierarchical figure represents the responsibility flow of plans to implement policies that are currently in affect (figure 9). Plans or guidelines may be discussed in the relevant preceding plan, but they are not shown because they are currently not in effect.

The assessment found that all plans and policies adhere to guidelines and rarely go beyond desired 'Federal and State' objectives. As discussed by Saratini (2009), plans that do not actively aim to mitigate climate change are merely adapting and inherently not solving the problem. With the exception of the SEQ Healthy Waterways Strategy but it is not currently in affect. The broader SEQ Regional Plan (2009-2031), is aimed at being more general in guiding the more specific planning schemes such as the Gold Coast Planning Scheme (2003).

Monitoring and evaluation found that all 'plans and strategies' have a written process to monitor their effectiveness to achieve its desired outcomes. On the other hand 'Acts and schemes' do not have a written process in the document to review their effectiveness.

Another key finding was that nearly all plans were addressing key issue areas. The Tourism Groups Plan (2012-2016), did not address any issue area including climate change and population growth. It is a plan focusing on financial gains and not adapting or setting guidelines for climate change or growth that may occur in other forms (e.g. eco-tourism for biodiversity).

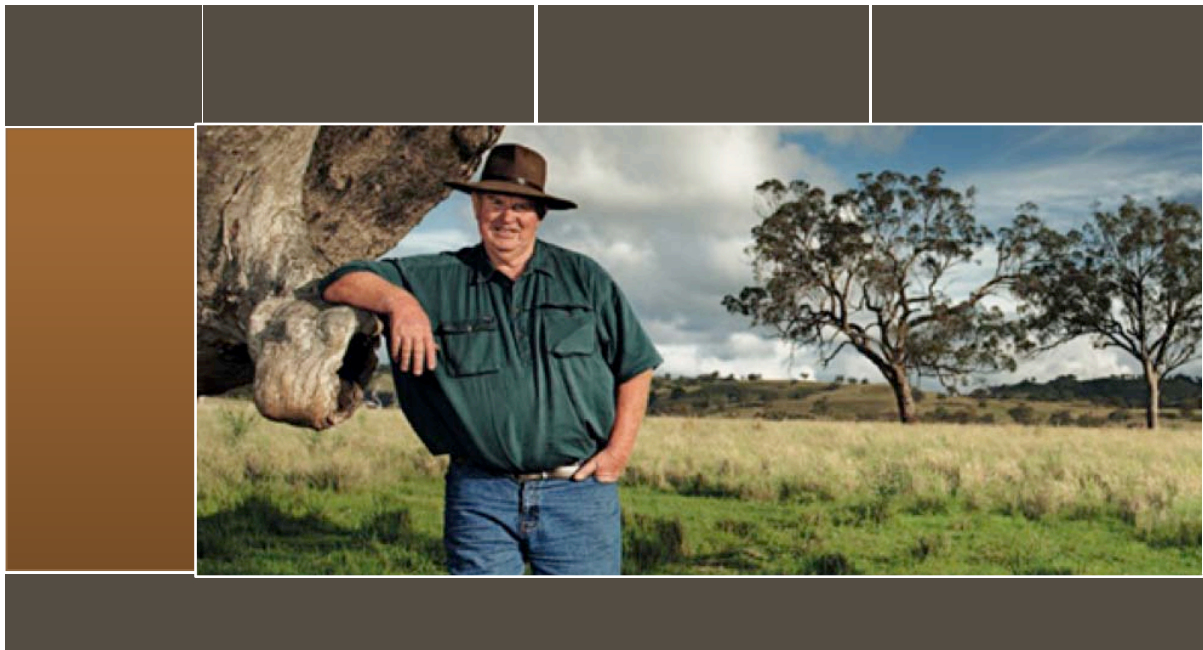
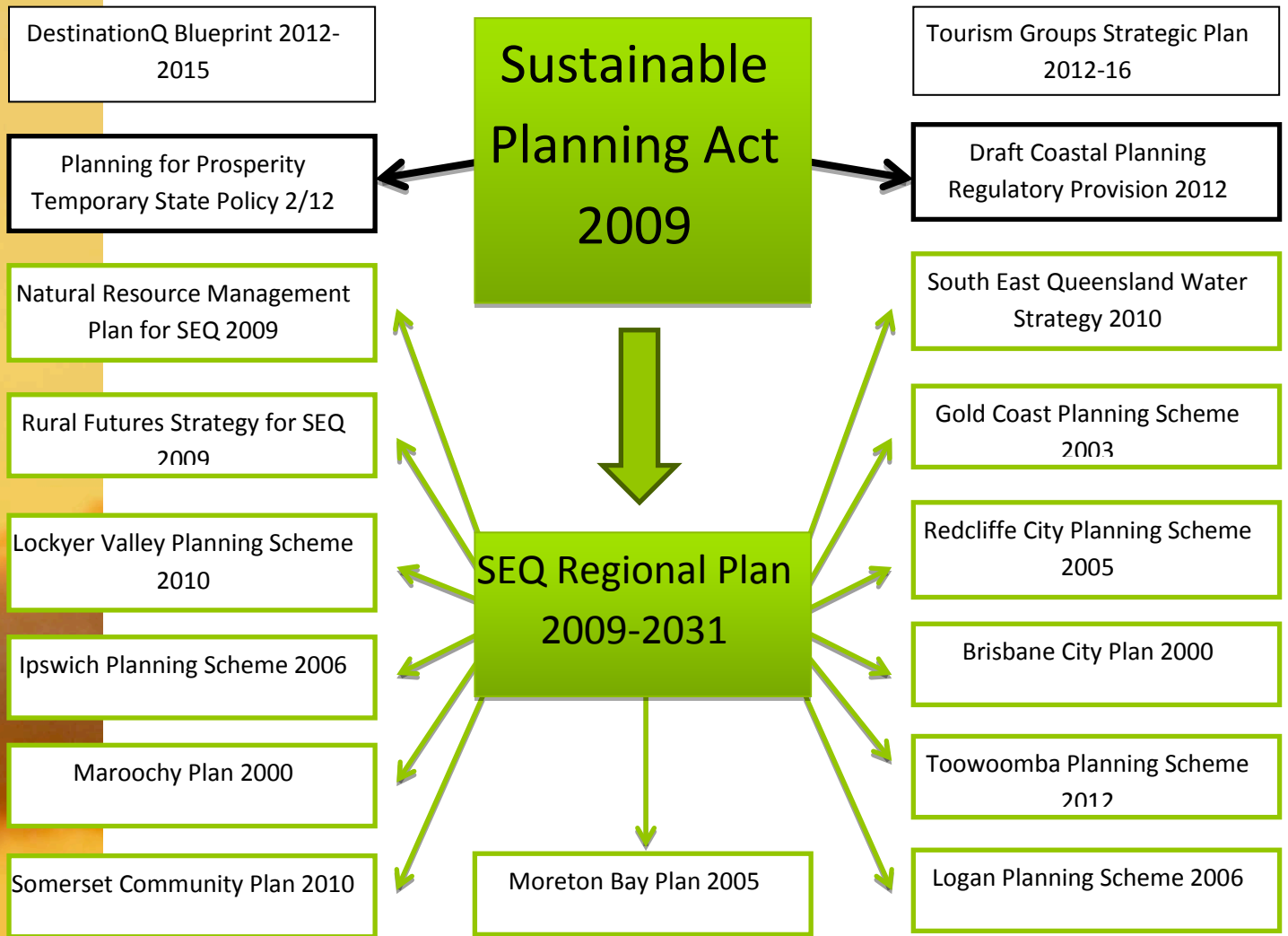
Effective management frameworks are crucial to mitigate the effects of climate change. The changing governments discourse on climate change will reduce the ability of these current frameworks to achieve their desired objectives in the future. The sooner plans, strategies and governments actively seek to mitigate climate change, the easier and cheaper it will be to deal with (Saratini, 2009).







**Figure 9: Relationships between Current Management Frameworks**





**Table 7: Analysis of Current Management Frameworks**

Relevant Plans/ Policies	In Effect Y/N?	Measurability of Targets	Responsibility of implementation?	Monitoring and Evaluation	Addresses Key Issue Areas							
					Climate Change		Population Growth	Agriculture	Biodiversity	Energy	Transport	Water
					Adaptation	Mitigation						
<b>FEDERAL</b>												
Adapting to Climate Change: Aust Govt Position Paper 2010	N	No measurable targets	State & Local Governments, and Businesses	Climate Futures report every 5 years	✓	✓		✓	✓	✓	✓	✓
National Climate Change Adaptation Framework 2007	N	Moderate	The Council of Australian Governments	Biennial reports	✓	✓	✓	✓	✓	✓	✓	✓
National Climate Change Adaption Research Plan 2009	N	Moderate	Key Stakeholders and State Government	No Process	✓	✓	✓	✓	✓		✓	✓
<b>STATE</b>												
Sustainably Planning Act 2009	Y	Specific	State and Local Governments	No Process			✓	✓	✓	✓	✓	✓
Planning for prosperity: Temp SPP 2/12	Y	Vague	Through Local Area Plans	No Process	✓	✓	✓	✓	✓	✓		✓
DestinationQ Blueprint 2012-2015	Y	Moderate	Through DestinationQ	Annual Forum of Industry Stakeholders	✓	✓	✓		✓		✓	✓
Draft Coastal Planning Regulatory Provision 2012	Y (until 08/10/13)	Specific (although not defined through numbers)	Through Local Government	Department of State Development Infrastructure and Planning	✓		✓		✓			✓
Queensland Coastal Plan. 2012:	N	Vague	Through Local Government	Department of State Development Infrastructure and Planning	✓	✓	✓		✓		✓	✓
Draft Queensland Drive Tourism Strategy.	N (Produced for consultation & discussion purposes)	Moderate	(Produced for consultation and discussion purposes only)	(Produced for consultation and discussion purposes only)	✓	✓	✓				✓	

Relevant Plans/ Policies	In Effect Y/N?	Measurability of Targets	Responsibility of implementation?	Monitoring and Evaluation	Addresses Key Issue Areas							
					Climate Change		Population Growth	Agriculture	Biodiversity	Energy	Transport	Water
					Adaptation	Mitigation						
<b>REGIONAL</b>												
SEQ Regional Plan 2009-2031	Y	Vague	Through local Area Plans and Planning Schemes	Formal review undertaken every five years	✓	✓	✓	✓	✓	✓	✓	
Rural Futures Strategy for SEQ 2009	Y	Moderate	Rural Futures Unit	Rural Futures Unit quarterly review	✓	✓	✓	✓	✓	✓	✓	
SEQ NRMP 2009 - 2031	Y	Specific measurable targets	It is desired to be a statutory document Natural Resource Management Committee in SEQ	Through a regular monitoring, evaluation, reporting and improvement (MERI) system	✓	✓	✓	✓	✓		✓	
SEQ Healthy Waterways Strategy 2007-2012	N	Specific measurable targets	SEQ Healthy Waterways partnership	Annual Reviews	✓	✓	✓	✓	✓		✓	
Integrated Regional Transport Plan for South East Queensland 1997	N	Specific	The Department of Transport and Main Roads	Annual Reviews	✓	✓	✓		✓		✓	
South East Queensland Water Strategy 2010	Y	Moderate	Engineers Australia	Quarterly Monitoring	✓	✓	✓	✓	✓	✓	✓	

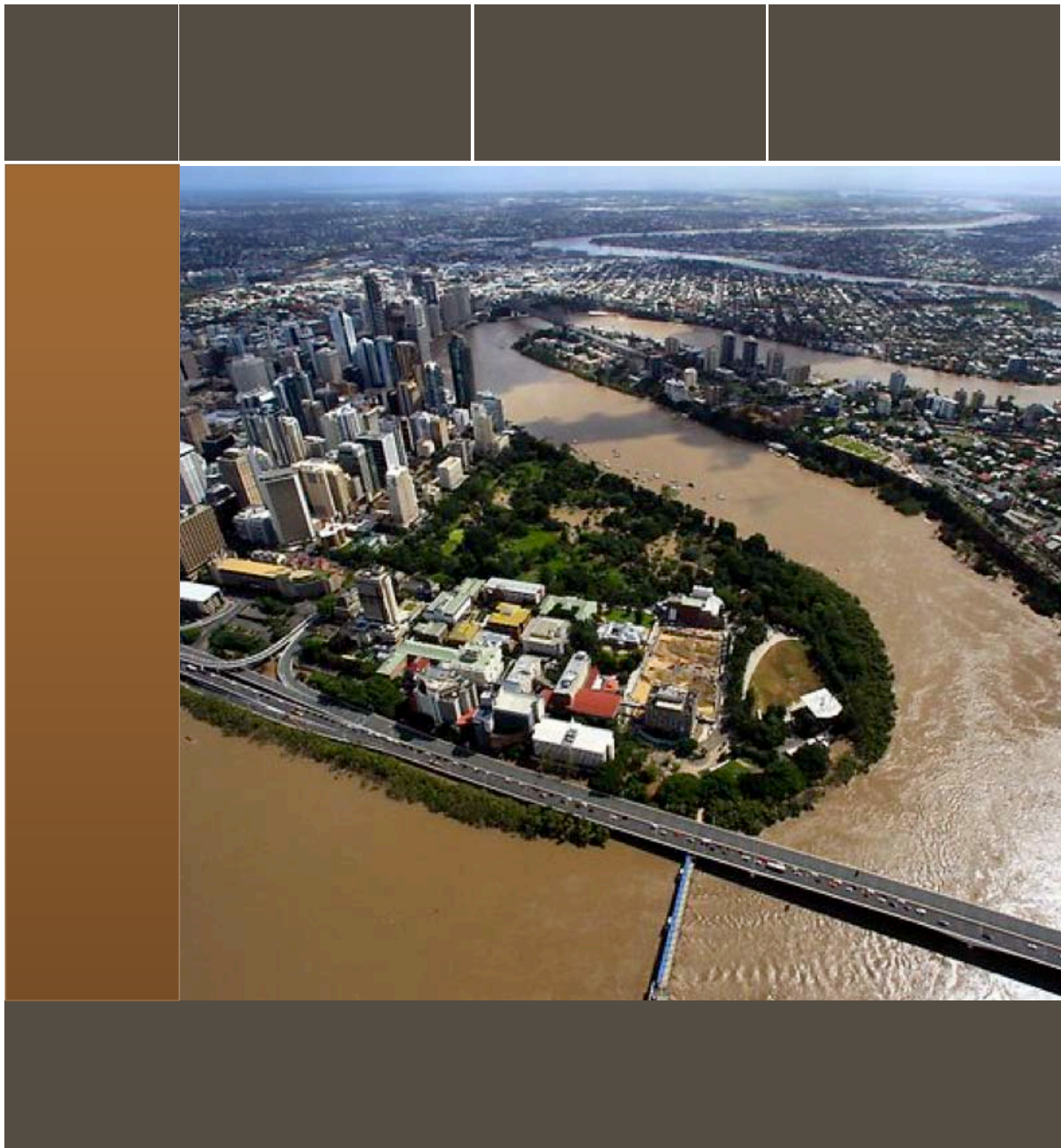
Relevant Plans/ Policies	In Effect Y/N?	Measurability of Targets	Responsibility of implementation?	Monitoring and Evaluation	Addresses Key Issue Areas							
					Climate Change		Population Growth	Agriculture	Biodiversity	Energy	Transport	Water
					Adaptation	Mitigation						
<b>LOCAL</b>												
Gold Coast Planning Scheme 2003	Y	Specific	Gold Coast City Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Draft GCC Transport Strategy 2031	N	Each target is easily measurable	Gold Coast City Council	Regular system measurements national census, traffic counts, and travel surveys	✓	✓	✓				✓	
Toowoomba Planning Scheme 2012	Y	Specific	Toowoomba Regional Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Lockyer Valley Planning Scheme 2010	Y	Specific	Lockyer Valley Regional Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Ipswich Planning Scheme 2006	Y	Specific	Ipswich City Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Logan Planning Scheme 2006	Y	Specific	Logan City Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Brisbane City Plan 2000	Y	Specific	Brisbane City Council		✓	✓	✓	✓	✓	✓	✓	✓
Moreton Bay Plan 2005	Y	Specific	Moreton Bay Regional Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Somerset Community Plan 2010	Y	Specific	Somerset Regional Council	Periodically (5 years)	✓	✓	✓	✓	✓	✓	✓	✓
Maroochy Plan 2000	Y	Specific	Maroochy City Council	No Process	✓	✓	✓	✓	✓	✓	✓	✓
Redcliffe City Planning Scheme 2005	Y	Specific	Redcliffe City Council	Annual Review	✓	✓	✓	✓	✓	✓	✓	✓





## 6.0 Stakeholders

The implications instigated by climate change and increased population in the SEQ region creates an array of stakeholders, each with their own interests. These interests will affect the decisions and actions of those with the authority to create and manage adaptation management policies with either positive or negative initiative. These key stakeholders were identified through their level of authority, influence and their availability of resources, which could all potentially impact a particular outcome. It was found through the analysis of the stakeholders (table 8) that the predominant stakeholder groups were Government Departments, Government owned corporations and authorities and non-government groups.





**Table 8: Stakeholder Analysis**

Stakeholder	Interest Areas					Interests	Responsibilities	Power	
	Agriculture	Biodiversity	Energy	Transport	Water			Level	Type
<b>GOVERNMENT DEPARTMENTS</b>									
QLD Department of Agriculture, Fisheries & Forestry	✓	✓				<ul style="list-style-type: none"> <li>Help agriculture prosper &amp; attract investment</li> <li>Identify investment &amp; job opportunities</li> <li>Protect strategic cropping land</li> </ul>	<ul style="list-style-type: none"> <li>Ensure food security</li> <li>Guide agricultural infrastructure planning</li> <li>Efficient, productive agricultural sector</li> </ul>	HIGH	Formal authority, association & procedural power
Australian Department of Agriculture, Fisheries & Forestry	✓	✓				<ul style="list-style-type: none"> <li>Direct extra resources to biosecurity</li> <li>Encourage industry to adopt new technology</li> </ul>	<ul style="list-style-type: none"> <li>Encourage &amp; support sustainable natural resource use</li> </ul>		
QLD Department of Energy & Water Supply						<ul style="list-style-type: none"> <li>Reduce cost of living pressures</li> <li>Innovative &amp; efficient energy &amp; water supply</li> <li>Safe, secure &amp; reliable energy &amp; water supply.</li> </ul>	<ul style="list-style-type: none"> <li>Queensland Government: Department of Energy &amp; Water Supply.</li> <li>Department's functions are delivered through two main service areas – Energy &amp; Water Supply &amp; Sewerage Services.</li> </ul>	HIGH	Formal authority, association & procedural power
Australian Department of Resources, Energy & Tourism			✓		✓				
QLD Department of Environment & Heritage Protection		✓				<ul style="list-style-type: none"> <li>Protect ecosystems, landscapes, waterways &amp; biodiversity.</li> <li>Climate change adaptation</li> <li>Manage environmental health</li> </ul>	<ul style="list-style-type: none"> <li>Administer environmental laws</li> <li>Regulate environment to support economy</li> <li>Enhance QLD's environmental health.</li> <li>Manage ecosystems, waste, &amp; environmental services</li> </ul>	MEDIUM	Formal authority, association & procedural power
QLD Department of National Parks, Recreation, Sport & Racing		✓				<ul style="list-style-type: none"> <li>Build economy through sustainable ecotourism ventures.</li> <li>Ensure national parks are protected, accessible &amp; valued.</li> </ul>	<ul style="list-style-type: none"> <li>Manage national parks &amp; their use.</li> <li>Encourage active lifestyles.</li> </ul>	MEDIUM	Formal authority, association & procedural power
QLD Department of Natural Resources & Mines			✓		✓	<ul style="list-style-type: none"> <li>Committed to the sustainable use of Queensland's natural resources: land, water &amp; minerals.</li> </ul>	<ul style="list-style-type: none"> <li>Queensland Government delivered through five services areas:               <ul style="list-style-type: none"> <li>Mining &amp; Petroleum</li> <li>Natural Resources Operations</li> <li>Land &amp; Indigenous Services</li> <li>Water &amp; Catchments</li> <li>Mine Safety &amp; Health</li> </ul> </li> </ul>	HIGH	Formal authority, association & procedural power
Australian Department of Resources, Energy & Tourism		✓	✓	✓	✓				



Stakeholder	Interest Areas					Interests	Responsibilities	Power	
	Agriculture	Biodiversity	Energy	Transport	Water			Level	Type
<b>GOVERNMENT DEPARTMENTS CONTINUED</b>									
QLD Department of State Development, Infrastructure & Planning	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> <li>Grow QLD economy</li> <li>Reform planning system</li> <li>Provide clarity in regards to land use</li> <li>Address Bruce Highway crisis</li> </ul>	<ul style="list-style-type: none"> <li>Meet commitments under QLD Government's Six Month Action Plan &amp; First 100 Days Action Plan</li> <li>Advise QLD government of long-term infrastructure plans, &amp; ongoing maintenance through 'Infrastructure Queensland'</li> </ul>	HIGH	Formal authority, association & procedural power
Australian Department of Infrastructure & Transport			✓	✓	✓	<ul style="list-style-type: none"> <li>Diversify &amp; add resilience to economy</li> <li>Champion interests of industry in QLD</li> <li>Fast track delivery of major projects</li> </ul>			
QLD Department of Transport & Main Roads			✓	✓		<ul style="list-style-type: none"> <li>Management movement of people &amp; goods safely, effectively &amp; efficiently</li> <li>Plan, manage &amp; deliver an integrated transport system</li> <li>Contribute to quality of life &amp; economy</li> </ul>	<ul style="list-style-type: none"> <li>Must adhere to relevant State legislation</li> <li>Manages integrated transport systems to achieve sustainable transport solutions for road, rail, air &amp; sea in Queensland</li> <li>Administers legislative acts</li> </ul>	MEDIUM	Formal authority, association & procedural power
Australian Department of Climate Change & Energy Efficiency			✓			<ul style="list-style-type: none"> <li>Improve understanding of climate change</li> <li>Ensure outcomes through legislation, programs &amp; services</li> <li>Engage with Australian public &amp; stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce greenhouse gas emissions</li> <li>Promote energy efficiency</li> <li>Adapt to climate change impacts</li> <li>Help to shape a global solution</li> </ul>	MEDIUM	Formal authority, association & procedural power
Australian Department of Sustainability, Environment, Water, Population & Communities			✓	✓	✓	<ul style="list-style-type: none"> <li>Protect the environment &amp; conserve biodiversity.</li> <li>Encourage sustainability at all levels &amp; in all areas.</li> <li>Utilise recent data &amp; projections to best guide the nation to be sustainable.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor air, land &amp; water quality/resources</li> <li>Conduct environmental research</li> <li>Produce population policy</li> <li>Coordinate sustainable communities policy</li> </ul>	MEDIUM	Formal authority, association & procedural power
Local Governments	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> <li>Committed to sustainable use of QLD's natural resources: land, water &amp; minerals.</li> </ul>	<ul style="list-style-type: none"> <li>QLD Government delivered through five services areas:               <ul style="list-style-type: none"> <li>Mining &amp; Petroleum</li> <li>Natural Resources Operations</li> <li>Land &amp; Indigenous Services</li> <li>Water &amp; Catchments Mine Safety &amp; Health</li> </ul> </li> </ul>	LOW	Formal authority & association power





Stakeholder	Interest Areas					Interests	Responsibilities	Power	
	Agriculture	Biodiversity	Energy	Transport	Water			Level	Type
<b>GOVERNMENT OWNED CORPORATIONS &amp; AUTHORITIES</b>									
SEQ Water (Merged with LinkWater, SEQ Water & SEQ Water Grid Manager)					✓	<ul style="list-style-type: none"> <li>Manage water storage, treatment &amp; desalination across SEQ</li> <li>Ensure safe, secure &amp; reliable water supply</li> <li>Provide irrigation services to rural communities in five water supply schemes</li> <li>Sell water products to councils, rural &amp; industry</li> </ul>	<ul style="list-style-type: none"> <li>Queensland Government statutory authority</li> <li>Providing flood mitigation services</li> <li>Must respond quickly &amp; efficiently to emergencies</li> </ul>	HIGH	Formal authority, association power, resource power
The Queensland Competition Authority			✓	✓	✓	<ul style="list-style-type: none"> <li>Allow government &amp; third parties to gain an independent appraisal</li> <li>Produce solutions for implementation that comply with the principles of the National Competition Policy.</li> </ul>	<ul style="list-style-type: none"> <li>Independent Statutory Authority: Created as a result of a series of Council of Australian Government agreements, which aimed to forge a national approach to the implementation of competition policy.</li> </ul>	LOW	Formal authority, expert power
SunWater Ltd			✓		✓	<ul style="list-style-type: none"> <li>Develop &amp; manage a regional network of water supply infrastructure across QLD</li> <li>Support customers across the mining, power generation, industrial, local government &amp; irrigated agriculture sectors.</li> </ul>	<ul style="list-style-type: none"> <li>Established as a statutory Government Owned Corporation</li> </ul>	LOW	Formal authority
<b>NON-GOVERNMENT GROUPS</b>									
QLD Conservation Council	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> <li>Support sustainable energy, transport, &amp; agricultural practices</li> <li>Support transformation to a green economy</li> <li>Oppose all major new dams</li> <li>Ecological sustainability</li> <li>Support a sustainable population</li> </ul>	<ul style="list-style-type: none"> <li>Queensland's representation for environmental protection.</li> <li>Non-government environment group</li> </ul>	LOW	Expert power, resource power, moral power
Energy & Water Ombudsman Queensland (Consumers & Industry)				✓	✓	<ul style="list-style-type: none"> <li>Providing an effective, efficient &amp; confidential service for residential &amp; small business energy customers across Queensland &amp; water customers in SEQ.</li> </ul>	<ul style="list-style-type: none"> <li>Free independent dispute resolution service if you are unable to resolve a complaint with your electricity, gas or water supplier.</li> </ul>	LOW	Expert Power, Resource Power



Stakeholder	Interest Areas					Interests	Responsibilities	Power	
	Agriculture	Biodiversity	Energy	Transport	Water			Level	Type
<b>NON-GOVERNMENT GROUPS CONTINUED</b>									
<b>Agricultural Groups</b> <ul style="list-style-type: none"> <li>LandCare Australia</li> <li>AgForce</li> <li>Conservation Farmers Inc</li> <li>QLD Farmers Federation</li> <li>LiveCorp</li> <li>Meat &amp; Livestock Australia</li> <li>Consumers</li> </ul>	✓					<ul style="list-style-type: none"> <li>Preserve natural environment for extended ongoing use &amp; long-term benefits.</li> <li>Practice sustainable use of land to avoid degradation</li> <li>Prevent coal seam gas developments</li> <li>Ensure the continued supply of agricultural products</li> </ul>	<ul style="list-style-type: none"> <li>Responsibility is to the members of individual groups; to provide honesty and access to reliable information.</li> </ul>	LOW	Moral power, expert power, nuisance power
<b>Biodiversity Groups</b> <ul style="list-style-type: none"> <li>Wildlife Preservation Society of QLD</li> <li>Bush Heritage Australia</li> <li>SEQ Catchments</li> <li>General Public</li> </ul>		✓				<ul style="list-style-type: none"> <li>Protect biodiversity in SEQ</li> <li>Focus on vulnerable species</li> <li>Conserve SEQ's natural environment and its ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>Responsibility is to the members of individual groups; to provide honesty and access to reliable information.</li> </ul>	LOW	Moral power, expert power, nuisance power
<b>Energy Groups</b> <ul style="list-style-type: none"> <li>Clean Energy Council</li> <li>Sustainable Energy Association of Australia</li> <li>Australian Renewable Energy Agency</li> <li>Consumers</li> </ul>			✓			<ul style="list-style-type: none"> <li>Focus is on issues affecting energy networks.</li> <li>Issues affecting gas &amp; electricity distribution &amp; transmission networks</li> </ul>	<ul style="list-style-type: none"> <li>Resolve issues affecting energy within SEQ</li> <li>Representation of Energy Supply</li> </ul>	LOW	Expert power, resource power
<b>Transport Groups</b> <ul style="list-style-type: none"> <li>Queensland Transport &amp; Logistic Council</li> <li>Australian Transport Safety Bureau</li> <li>Consumers</li> </ul>				✓		<ul style="list-style-type: none"> <li>Support development of effective public transport and sustainable travel alternatives</li> <li>Increase safety</li> <li>Decrease congestion</li> <li>Support improved infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Responsibility is to the members of individual groups and the general public; to provide honesty and access to reliable information.</li> </ul>	LOW	Expert power, association power
<b>Water Management Groups</b> <ul style="list-style-type: none"> <li>SEQ Catchments</li> <li>Land &amp; Water Australia</li> <li>Consumers</li> </ul>					✓	<ul style="list-style-type: none"> <li>Invest in generating &amp; managing new knowledge, focussed on the sustainability of Australia's Water</li> <li>Increasing water supply &amp; harvesting</li> <li>Consumers</li> </ul>	<ul style="list-style-type: none"> <li>Consumers are an independent authority</li> </ul>	LOW	Expert power, resource power



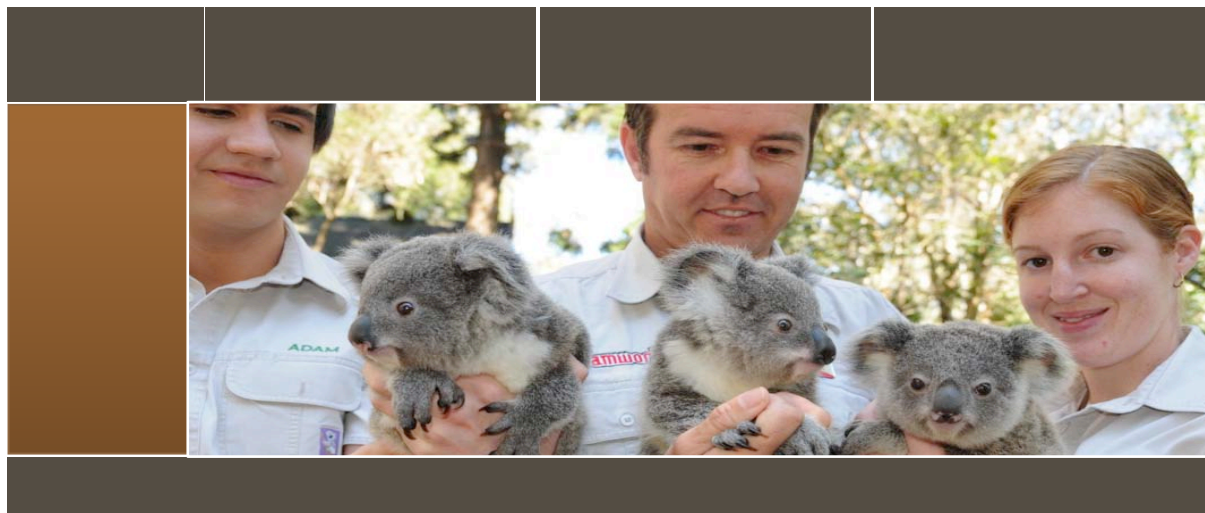
## 7.0 Conclusion

This report has been phase two, a background study of a five-phase project to design a climate change management plan for SEQ for 2013-2033 to be completed over a 13 week period. Five key issue areas, agriculture, biodiversity, energy, transport, and water management were assessed against their correlation with climate change and population growth.

The background study found that within each of these issue areas, specific attributes, linkages, and issues define SEQ. The success of the livestock industry supplying food to communities will be affected significantly due to climatic changes and population increases placing further demand on the industry. Encroachment and changing habitats are of strategic importance for Koalas in SEQ, the report addressed the issues that koalas are facing with increased land clearing for further urban developments. Addressed was also the significant values of plant and animal species that coincide only in SEQ and the affects that changing climates and increased populations will cause. Concerns for water supply include, increased population will place increased pressures on the water grids, which rely entirely on climate dependant water supplies. The majority of electricity supplies in SEQ come from non-renewable sources which is the major cause of climate change. The major transport issue for SEQ is the increase in population occurring at a rate that infrastructure will struggle to meet the demands.

In order to best understand the current management frameworks an assessment was undertaken. It found that current policies are only adapting to climate change and are not actively seeking to mitigate it. A backwards stance ensured a need for a better regional policy to address climate change and population growth. Additionally, a stakeholder analysis was conducted to determine the key groups likely to influence decision making in regards to a new regional policy. These groups act in their own interest which limits the effectiveness on creating a holistic agreement.

This report has provided an in-depth background study on SEQ in all above mentioned areas and will inform phase 3 of this project. This report has proven that climate change will only exacerbate the increasing pressures on SEQ. There is an inherent need to become more sustainable, to mitigate the effects of climate change and adapt to population growth.







## **8.0 Glossary**

***Current Management Frameworks***

The current policies and plans that shape the direction of South East Queensland.

***Green House Gasses (GHGs)***

Atmospheric gasses that contribute to the green house effect such as carbon dioxide or methane.

***Regional Landscape and Rural Production Area (RLRPA)***

Identifies land to be protected from inappropriate urban encroachments by residential and other development.

***Rural Living Area (RLA)***

Identifies both rural residential development under local government planning schemes and further of such possible developments as are permitted.

***Stakeholder***

A person, group or organisation that has a vested interest in something.

***Urban Footprint***

Identifies the land necessary for urban expansion and development and covers existing and greenfield areas.



## 9.0 Reference List

### General

- Baldwin, C & Vhlmann, V. 2010, *Accountability in Planning Sustainable Water Supplies in South East Queensland*, Australian Planner, vol. 47, no. 3, pp. 191-202.
- Bell, M., Charles, E., Edwards, T & Cooper J. 2010, *Demographic Futures for South East Queensland*, Australian Planner, vol. 47, no. 3, pp. 126-134.
- Commonwealth Scientific and Industrial Research Organisation and BoM 2007, *Climate Change in Australia: Technical Report 2007*, CSIRO, Melbourne, available online: [www.climatechangeinaustralia.gov.au](http://www.climatechangeinaustralia.gov.au).
- Dedekorkut, A., Mustelin J., Howes M., & Byrne J., 2010. *Tempering growth: planning for the challenges of climate change and growth management in SEQ*, Australian Planner, vol. 47, no. 3, pp. 203-215.
- Department of Climate Change and Energy Efficiency 2009, *Renewable Energy Target*, Department of Climate Change and Energy Efficiency, Commonwealth of Australia, available online: <http://www.climatechange.gov.au/government/initiatives/renewable-target/need-ret.aspx> (27/03/2013)>
- Department of Energy and Water Supply 2012, *Queensland Government Solar Bonus Scheme*, Queensland Government, Department of Energy and Water Supply, available online: <[http://www.cleanenergy.qld.gov.au/demand-side/solar-bonus-scheme.htm?utm\\_source=CLEANEENERGY&utm\\_medium=301&utm\\_campaign=redirecti](http://www.cleanenergy.qld.gov.au/demand-side/solar-bonus-scheme.htm?utm_source=CLEANEENERGY&utm_medium=301&utm_campaign=redirecti) on (27/03/2013)>
- Department of Energy and Water Supply 2012, *The 30 year electricity strategy directions paper*, Queensland Government, Department of Energy and Water supply, available online: <[http://www.dews.qld.gov.au/\\_data/assets/pdf\\_file/0019/31096/30yr-electricity-strategy-directions-paper.pdf](http://www.dews.qld.gov.au/_data/assets/pdf_file/0019/31096/30yr-electricity-strategy-directions-paper.pdf)>
- Department of Infrastructure and Planning (DIP) 2007, *South East Queensland Infrastructure Plan and Program*, Department of Infrastructure and Planning, Brisbane, available online: <<http://www.dip.qld.gov.au/resources/plan/SEQIPP/seqippfull-document.pdf>>
- Department of Infrastructure and Planning (DIP) 2009, *Delivering the Queensland Housing Affordability Strategy: Greenfield land supply in South East Queensland*. Brisbane: Queensland Government, available online: <[http://www.dsdiip.qld.gov.au/resources/publication/housing\\_affordability\\_strategy\\_updated210608.pdf](http://www.dsdiip.qld.gov.au/resources/publication/housing_affordability_strategy_updated210608.pdf)>
- Department of Transport and Main Roads 2011, *Connecting SEQ 2031 - An Integrated Regional Transport Plan for South East Queensland*, available online: <[http://www.tmr.qld.gov.au/~media/Projects/C/Connecting%20SEQ%202031/final/connecting\\_seq2031\\_complete.pdf](http://www.tmr.qld.gov.au/~media/Projects/C/Connecting%20SEQ%202031/final/connecting_seq2031_complete.pdf) (6 March 2013)>



Energex Limited 2012, *Energex Network Management Plan 2012/13 to 2016/17*, Energex Limited Australia, available online: <<http://www.energex.com.au/building-and-maintaining-the-network/network-management-plans>>

Lockyer Valley Regional Council 2011, *Lockyer Valley Community Recovery Plan*, available online: <<http://www.lockyervalley.qld.gov.au/images/PDF/community%20recovery%20plan.pdf>>

Lockyer Valley Regional Council 2013, *Plan, Build and Environment*, available online: <[www.lockyervalley.qld.gov.au](http://www.lockyervalley.qld.gov.au)>

Powerlink Queensland 2009, *A new 500kv transmission network*, available online: <[www.powerlink.com.au](http://www.powerlink.com.au)>

Queensland Government, 2009. *South East Queensland Regional Plan 2009-2031*, Office of Urban Management, Queensland Department of Local Government, Planning, Sports and Recreation.

Saratini S. 2009, *Constituting leadership via policy: Sweden as a pioneer of climate change mitigation*, Mitigation Adaptation Strategy Glob Change, Vol. 14, No. 1, pp. 635 – 653

Scenic Rim Regional Council 2012, *Region Information*, available online: <[www.scenicrim.qld.gov.au/](http://www.scenicrim.qld.gov.au/)>

Soh, Y., Roddick, F 7 Leeumen, J. 2008, *The Future of Water in Australia: The Potential Effects of Climate Change and Ozone Depletion on Australian Water Quality, Quantity and Treatability*, The Environmentalist, vol. 28, No. 2, pp. 158-165.

Somerset Regional Council 2012, *Regional Information*, available online: <<http://www.somerset.qld.gov.au/boating-and-fishing>>

South East Queensland Water Strategy, 2010, *Queensland Water Commission State of Queensland*, available online: <[www.qwc.qld.gov.au](http://www.qwc.qld.gov.au)>

The State of Queensland Audit Office 2009, Report to Parliament No. 3 for 2009

Transport Network Management and Urban Congestion in South East Queensland, available online: <[http://www.qao.qld.gov.au/files/file/Reports/2009\\_Report\\_No.3.pdf](http://www.qao.qld.gov.au/files/file/Reports/2009_Report_No.3.pdf) (6 March 2013)>

### **Current Management Frameworks Table**

Brisbane City Council 2000, *City Plan 2000*, available online: <<http://www.brisbane.qld.gov.au/planning-building/planning-guidelines-and-tools/city-plan-zones-codes/city-plan-2000-document/index.htm>>

Gold Coast City Council 2012, *Draft Gold Coast City Transport Strategy, 2012- 2031*, available online: <<http://www.goldcoast.qld.gov.au/documents/bf/draft-transport-strategy-2031.pdf>>





Ipswich City Council 2006, *Ipswich Planning Scheme 2006*, available online:

<[http://www.ipswich.qld.gov.au/about\\_council/corporate\\_publications/ipswich\\_planning\\_scheme/](http://www.ipswich.qld.gov.au/about_council/corporate_publications/ipswich_planning_scheme/)>

Lockyer Valley Regional Council 2013, *Lockyer Valley Planning Scheme*, available online:

<<http://www.lockyervalley.qld.gov.au/plan-build/planning/planning-schemes>>

Logan City Council, *Logan Planning Scheme 2006*, available online: <

<http://www.logan.qld.gov.au/planning-and-building/planning/current-planning-schemes/logan-planning-scheme>>

Moreton Bay Regional Council 2013, *Redcliffe City Planning Scheme 2005*, available online:

<<http://www.moretonbay.qld.gov.au/subsite.aspx?id=10431>>

Queensland Government, 2009. *South East Queensland Regional Plan 2009-2031*, Office of Urban Management, Queensland Department of Local Government, Planning, Sports and Recreation.

Somerset Regional Council, *Somerset Community Plan 2010*, available online:

<<http://www.somerset.qld.gov.au/community-plan>>

Sunshine Coast Council 2012, *Maroochy Plan 2000*, available online:

<<http://www.sunshinecoast.qld.gov.au/>>

Toowoomba regional council, *Toowoomba Regional Planning Scheme 2012*, available online:

<<http://www.toowoombarc.qld.gov.au>>

### **Stakeholder Analysis Table**

*AgForce Queensland* 2013, available online: < <http://www.agforceqld.org.au/>>

Australian Government 2010, *Department of Climate Change and Energy Efficiency*, available online: < <http://www.climatechange.gov.au/>>

Australian Government 2012, Department of Agriculture, Fisheries and Forestry, available online: < <http://www.daff.gov.au/>>

Australian Government 2012, Department of Infrastructure and Transport, available online: < <http://www.infrastructure.gov.au/>>

Australian Government 2012, Department of Resources, Energy and Tourism, available online: < <http://www.ret.gov.au/Pages/default.aspx>>

Australian Government 2013, *Department of Resources, Energy and Tourism*, available online: < <http://www.ret.gov.au/Pages/default.aspx>>

Australian Government 2013, *Department of Sustainability, Environment, Water, Population and Communities*, available online: <<http://www.environment.gov.au/>>

*Australian Renewable Energy Agency* 2012, available online: < <http://www.arena.gov.au/>>

*Australian Transport Safety Bureau* 2012, available online: < <http://www.atsb.gov.au/>>



- Bush Heritage Australia* 2010, available online: < <http://www.bushheritage.org.au/>>
- Clean Energy Council* 2013, available online: < <http://www.cleanenergycouncil.org.au/>>
- Conservation Farmers Inc.* 2012, available online: < <http://www.cfi.org.au/>>
- Energy and Water Ombudsman: Queensland* 2013, available online: <<http://www.ewoq.com.au/>>
- Land and Water Australia* 2011, available online: < <http://lwa.gov.au/>>
- Land Care Australia* 2012, available online: <<http://www.landcareonline.com.au/>>
- LiveCorp* 2013, available online: < <http://www.livecorp.com.au/>>
- Meat and Livestock Australia* 2010, available online: < <http://www.mla.com.au/Home>>
- Queensland Conservation Council* 2011, available online: < <http://www.qccqld.org.au/>>
- Queensland Farmers Federation* 2012, available online: < <http://www.qff.org.au/>>
- Queensland Government 2012, *Department of Agriculture, Fisheries and Forestry*, available online: < <http://www.daff.qld.gov.au/home.htm>>
- Queensland Government 2012, *Department of Energy and Water Supply*, available online: < <http://www.dews.qld.gov.au/>>
- Queensland Government 2012, *Department of National Parks, Recreation, Sport and Racing*, available online: < <http://www.nprsr.qld.gov.au/>>
- Queensland Government 2012, *Department of Transport and Main Roads*, available online: <<http://www.tmr.qld.gov.au/>>
- Queensland Government 2013, *Department of Environment and Heritage Protection*, available online: < <http://www.ehp.qld.gov.au/>>
- Queensland Government 2013, *Department of Natural Resources and Mines*, available online: < <http://www.dnrm.qld.gov.au/>>
- Queensland Government 2013, *Department of State Development of Infrastructure and Planning*, available online: < <http://www.ds dip.qld.gov.au/>>
- Queensland Transport and Logistics Council* 2011, available online: < <http://www.qtlc.com.au/>>
- SEQ Catchments* 2012, available online: < <http://www.seqcatchments.com.au/>>
- SEQ Water: Water for Life* 2013, available online: < <http://www.seqwater.com.au/>>
- Sustainable Energy Association of Australia* 2012, available online: <<http://www.sea aus.com.au/>>
- Wildlife Preservation Society of Queensland* 2012, available online: < <http://www.wildlife.org.au/>>



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<b>Cover page</b>	<i>Sunshine Coast</i> (image), 2010, Available: <a href="http://www.noholidaynolife.com/wp-content/uploads/2010/02/sunshine-coast.jpg">http://www.noholidaynolife.com/wp-content/uploads/2010/02/sunshine-coast.jpg</a> (13 March 2013).
<b>SPA logo</b>	Source: Strickland 2013
<b>All pages - left panel</b>	<i>Sunshine Coast Glasshouse Mountains</i> (image), 2009, Available: <a href="http://globalvillagecaloundra.files.wordpress.com/2009/10/sunshine-coast-glasshouse-mountains.jpg">http://globalvillagecaloundra.files.wordpress.com/2009/10/sunshine-coast-glasshouse-mountains.jpg</a> (17 March 2013).
<b>Executive Summary</b>	<i>RO With Bob</i> (image), n.d., Available: <a href="http://www.watersecure.com.au/pub/images/stories/photos/desal_photos/ro_with_bob_1.jpg">http://www.watersecure.com.au/pub/images/stories/photos/desal_photos/ro_with_bob_1.jpg</a> (15 March 2013).
	<i>Police in Flood</i> (image) n.d., Available: <a href="http://www.google.com.au/imgres?q=brisbane+flood...">http://www.google.com.au/imgres?q=brisbane+flood...</a> (13 March 2013).
	<i>Irrigation</i> (image), n.d., Available: <a href="http://t0.gstatic.com/images?q=tbn:ANd9GcSj6roCz-d7wkdEIQbtav-KTefy4FuFc79C_V6brbQH4-baDc9RBA">http://t0.gstatic.com/images?q=tbn:ANd9GcSj6roCz-d7wkdEIQbtav-KTefy4FuFc79C_V6brbQH4-baDc9RBA</a> (13 March 2013).
	<i>Train Hero</i> (image), 2010, Available: <a href="http://www.mygc.com.au/images/articles/2010/01/04/Train_hero.jpg">http://www.mygc.com.au/images/articles/2010/01/04/Train_hero.jpg</a> (14 March 2013).
	<i>Pea Pods</i> (image), n.d., Available: <a href="https://lnp.org.au/wp-content/uploads/media/k2/items/cache/2cf20e200ca2c770a044a65b100b0636_L.jpg">https://lnp.org.au/wp-content/uploads/media/k2/items/cache/2cf20e200ca2c770a044a65b100b0636_L.jpg</a> (13 March 2013).
	<i>Transport</i> (image) n.d., Available: <a href="http://www.loganbiz.com.au/uploads/images/topbanner/transport.jpg">http://www.loganbiz.com.au/uploads/images/topbanner/transport.jpg</a> (15 March 2013).
	<i>Wheat Field</i> (image), n.d., Available: <a href="https://lnp.org.au/wp-content/uploads/media/k2/items/cache/9df43eaf2ccf22c628758e233881ef55_L.jpg">https://lnp.org.au/wp-content/uploads/media/k2/items/cache/9df43eaf2ccf22c628758e233881ef55_L.jpg</a> (12 March 2013).
<b>Table of Contents</b>	<i>Gold Coast Rapid Transit Project</i> (image), n.d., Available: <a href="http://www.manidisroberts.com.au/system/files/images/projects/Gold+Coast+Rapid+Transit+Project.jpg">http://www.manidisroberts.com.au/system/files/images/projects/Gold+Coast+Rapid+Transit+Project.jpg</a> (13 March 2013).
<b>Page 5</b>	Strickland, J. 2013, <i>Stradbroke Wallaby</i> (image), Available: <a href="http://www.facebook.com/photo.php?fbid=524137130963100&amp;set=pb.440912305952250.-2207520000.1363957570&amp;type=3&amp;theater">http://www.facebook.com/photo.php?fbid=524137130963100&amp;set=pb.440912305952250.-2207520000.1363957570&amp;type=3&amp;theater</a> (16 March 2013).
	Lyndon Mechielsen 2010, <i>Economic Downturn Bypasses Sugar Cane Farms</i> (image), Available: <a href="http://www.theaustralian.com.au/archive/business-old/economic-downturn-bypasses-sugar-cane-farms/story-e6frg95o-1225884945319">http://www.theaustralian.com.au/archive/business-old/economic-downturn-bypasses-sugar-cane-farms/story-e6frg95o-1225884945319</a> (14 March 2013).





**Page 5  
(continued)**

*Apprentice Daniel Kingston* (image), 2011, Available:  
<http://www.energyskillsqld.com.au/wp-content/uploads/ESI-2011-Apprentice-Daniel-Kingston.jpg> (14 March 2013).

*Coal Rail Infrastructure* (image) 2012, Available: <http://ranbury.com.au/wp-content/uploads/2012/11/CoalRailInfrastructure2-525x208.jpg> (16 March 2013).

*Wivenhoe Release* (image), 2010, Available:  
[http://media2.apnonline.com.au/img/media/images/2010/12/15/gs-wivenhoe-release15\\_t460.jpg](http://media2.apnonline.com.au/img/media/images/2010/12/15/gs-wivenhoe-release15_t460.jpg) (16 March 2013).

*Background Beach* (image), n.d., Available:  
[http://deals.visitsunshinecoast.com.au/sites/all/themes/scd2/images/bckgrnd\\_heart.jpg](http://deals.visitsunshinecoast.com.au/sites/all/themes/scd2/images/bckgrnd_heart.jpg) (13 March 2013).

**Page 16**

*Agriculture Queensland* (image), n.d., Available: <http://naedf.com/wp-content/gallery/main/agriculture-queensland.jpg> (14 March 2013).

**Page 17**

*Farmer Against Tree* (image) n.d., Available:  
[http://sustainability.xstratacoal.com/XstrataXWPBranding/Images/Report/XS\\_TAP\\_PCE6\\_W\\_A4\\_opt.jpeg](http://sustainability.xstratacoal.com/XstrataXWPBranding/Images/Report/XS_TAP_PCE6_W_A4_opt.jpeg) (14 March 2013).

**Page 21**

*Brisbane Flood Aerial* (image), 2011, Available:  
<http://resources1.news.com.au/images/2011/01/13/1225987/167917-brisbane-flood-aerials.jpg> (15 March 2013).

**Page 26**

*Koala Land Snap* (image), n.d., Available: [http://koalaland.com.au/wp-content/uploads/323294\\_242956202406417\\_189018017800236\\_591453\\_1181915\\_o.jpg](http://koalaland.com.au/wp-content/uploads/323294_242956202406417_189018017800236_591453_1181915_o.jpg) (12 March 2013).