

Applying Social Resilience Concepts and Indicators to Support Climate Adaptation in Tropical North Queensland, Australia: Benchmark Evidence Base

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Wet Tropics

For the purposes of this study, the Wet Tropics region covers the area covers the Wet Tropics NRM Region. The entire area lies within the Regional Development Australia Far North Queensland and Torres Strait (RDA FNQ&TS) region.

Attribute One: Economic viability

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
1.1 Diversity and quality of growth in economic activity.	<ul style="list-style-type: none"> Comparison of Gross Regional Product and Gross Value Add by industry. Economic growth rates with sectoral specific analysis. 	<ul style="list-style-type: none"> Between 2005-6 and 2011 the GRP per capita increased by 8.2% from \$62,984 to \$68,159 (CRC, 2012). Between 2011 and 2012 the GRP increased from \$7.060B in 2011 to \$7.296B in 2012 (CRC, 2012). In 2011 the Cairns regional GRP was estimated to be contributing 3.2% to Queensland's GSP (CRC, 2012). The fastest growing industries in the region between 2000-01 and 2005-06 were finance and insurance (8.0%), construction (6.3%) and property and business services (5.9%). Mining recorded the largest decline (-5.9%) and wholesale trade contracted (0.8%). Overall the main contributors to growth in the regional economy were the construction, property and business services industries, each of which added 0.4 percentage points to growth. Mining detracted 0.2 percentage points and all other industries had a neutral or marginal impact on real GRP growth in the region (OESR, 2008, p. 33). There is no indication that this has changed since 2008. The mining decline noted in 2005-06 continued as a result of the GFC and led to some loss of mining employment in the region (Cummings Economics, 2010a). The growth and stability of many of the region's industries (retail, construction, communications, 	<ul style="list-style-type: none"> The regional models of GRP are not sophisticated at this point in time. Even though there is a fair bit of stability in the regional servicing role that Cairns City provides within the region, the region remains primarily dependent on industries that earn income from outside the region. Regional service hub but development lagging in services (e.g., hospital/uni). Base industries for Cairns regional economy which earn income outside the region face economic pressure due to changing global and national markets and are subject to external economic conditions (e.g., exchange rates, GFC). For Cairns these include the tourism, marine, aviation, agriculture, government and defence sectors. There is a fair bit of variability from time to time in those industries. Sugar is stronger than it was 10 years ago while bananas, fishing and tourism are under pressure. Business confidence is down due to 	2	<p>2</p> <p>Despite shorter term post GFC recovery, economic fragility remains high due to lack of business confidence and potential sharp falls in the construction and public sectors.</p> <p>Rally in tourism due to new China flights and other factors (and education sector) may balance construction flag.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<p>transport, financial and business services, education and health services) is reliant on the growth and stability of industries based outside the region, particularly manufacturing and service industries (tourism, agriculture, mining, and fisheries, health services) (Cummings Economics, 2006).</p> <ul style="list-style-type: none"> • Expansions of mining operations surrounding Mt Carbine and Chillagoe are likely following strong worldwide mineral prices (Cummings Economics, 2007). • Cairns is the primary fly-in-fly-out centre for mining operations in Northern Queensland and provides support for mining in the surrounding regions – central, north-west Queensland, Northern Territory and Papua New Guinea (Cummings Economics, 2007). • The scale of mineral mining activity in the mining regions serviced by Cairns is equivalent to the mining activity of Western Australia (Cummings Economics, 2007). • Tourism is the largest employer of the region consisting of 30-40% of jobs and income in the region. Tourists spend approximately \$2B annually in the region (McDonald & Weston, 2004). • Farmers and the agriculture industry in the Wet Tropics annually produce approximately \$750M of livestock and crop products (McDonald & Weston, 2004). • The horticulture industry has grown considerably and its products (mostly tropical varieties of fruit) are shipped both domestically and internationally (McDonald & Weston, 2004). • There has been substantive growth in the University and TAFE sector in the Region in recent years (TTNQ & TQ, 2010). 	<p>lack of economic stimulus. Lack of business confidence negatively impacts on resilience.</p> <ul style="list-style-type: none"> • The biggest assets for the Wet Tropics economy remain natural assets for the base industries of agriculture and tourism that are highly vulnerable to climate change as demonstrated by the extensive environmental and economic impacts of successive Cyclone's and recovery is ongoing (Larry, Anthony and Yasi). • The tourism industry remains vulnerable to the impacts of the global financial crisis and repeated large weather events (e.g., cyclone Anthony and Yasi in summer). • Universities and the health system are not so reliant on natural assets. They are reliant on growth in the economy but there are fluctuations in this. • The growing education sector provides an opportunity to better educate the region's inhabitants on the impacts and causes of climate change. 		
1.2 Vulnerability of natural and energy	<ul style="list-style-type: none"> • Comparative measure of natural resource dependency. • Measures of energy 	<ul style="list-style-type: none"> • The economy of the Far North (based on current price estimates of GVA, i.e., not price adjusted) is more evenly spread among the 18 industries than is the case in other regions of Queensland. Transport and storage is the 	<ul style="list-style-type: none"> • The primary industry sector which has been providing stability to the regional economy has suffered further shocks due to environmental policy and 	2	<p>2 Post Yasi impacts have reduced natural resource resilience to future shocks in significant</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
resource base.	security and diversity. • Measures of food security and diversity.	<p>largest industry accounting for 8.9% of nominal GVA, retail trade 8.7%, construction 8.5%, property and business services 8.3%, and agriculture, forestry and fishing 7.8%. Construction recorded the highest change in share of nominal GVA with an increase of 2.0 percentage points from 2000-01 while accommodation, cafes and restaurants recorded the largest decline at 1.3 percentage points and agriculture, forestry and fishing recorded a 0.8 decline in GVA (OESR, 2008 p.32).</p> <ul style="list-style-type: none"> • Primary Industries Sector in the Far Northern Region is estimated to create 18,939 jobs or 14.6% of the overall employed workforce of the region and it is estimated that Gross Regional Value Added by the primary industries sector in the Far Northern region is \$10.4B or 16.8% of the Regional VA. Despite widespread public perceptions of primary industries declining, to the contrary, the primary industry sector has been recording overall long-term real growth above inflation (Cummings Economics, 2010b). • The region typically accounts for around 90% of the gross value of Australian banana production and around 20% of the gross value of Australian sugar cane production. The area also accounts for around 30% of the value of pawpaw production. Other agricultural production practiced in the region includes sugar, beef, dairy, wool and vegetables. The region was seriously affected by Cyclone Larry in 2006 and Cyclone Yasi in 2011 (ABARES, 2011). • Tourism: The value of Tourism to the region is estimated to be 19% of GRP (Cummings Economics, 2010b). The tourism sector is extremely dependent of the health of the natural assets (reef and rainforest). • The Wet Tropics World Heritage Area in the Wet Tropics generates approximately \$426M in tourist revenue annually and accounts for 22% of tourist expenditure in the region (Prideaux & Falco-Mammone, 2007). • Tourism in the Great Barrier Reef Catchment area is 	<p>several intense cyclones and have not returned to a normal healthy state.</p> <ul style="list-style-type: none"> • Energy security remains vulnerable. The regional economy is very dependent upon fossil fuels, which are not produced locally. • Carbon regulations may add some pressure on tourism and construction industries but also present regional opportunities. • Renewable energy sources and technologies are available (hydro, wind, wave and ethanol). • Food security is less vulnerable than when the first assessment undertaken (just post-Yasi/floods) but could be threatened by an increase in the severity and/or regularity of major weather events remains. More extreme events with flooding will make communities more vulnerable based on current transportation. • Tourism values in the natural resource base in the region are highly vulnerable to climate change impacts. • Water availability for agriculture and urban expansion is reaching allocation limits and will be a bigger issue. More prolonged dry spells under future climate means that water storage and security of water supplies will become more important in the region. • Progressive but slow soil health decline is continuing across the region. • Cyclones and flooding can impact unpredictably on fisheries and fisheries management. 		<p>areas, though has been some substantial work to sure up water and energy resources.</p>

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		<p>estimated to generate more the \$2.18M annually (Prideaux & Falco-Mammone, 2007).</p> <ul style="list-style-type: none"> Region has a high level of dependency on power generated from southern coal-fired power stations (despite a higher level of hydro-power than the Queensland average). Domestic prices remain lower due to Community Service Obligation subsidies, but industrial costs are vulnerable. Across the region, water resources are nearing their full allocation, and may be over-allocated in certain regions within the Tablelands. Most fisheries are now sustainably managed, with an unusually high level of resource protection, but industries are also vulnerable to cyclones. 	<ul style="list-style-type: none"> Areas of potential economic growth (e.g., organic markets, niche products) are natural resource based). 		
1.3 Inclusiveness and economic fairness/equity.	<ul style="list-style-type: none"> Individual income (analysed by age, education level, industry and occupation). Household income analysed by (family composition, tenure type and low income households). 	<ul style="list-style-type: none"> Some 30.9% of individuals earn less than \$400/week and 34.8% of individuals earn between \$400-\$999/week (OESR, 2012). Based on 2006 data, some 94.4% of businesses in the region are small businesses. Some 43% have a turnover range of less than \$100K, 37% turnover between \$100K-<\$500K, 9% turnover between \$500K-<\$1M, and 11% turnover >\$1M (OESR, 2012). Some professions in the Wet Tropics find it difficult to attract staff away from major metropolitan centres in part due to the limited range of community services in northern Queensland, i.e., art galleries, museums, sporting facilities, etc. (Cummings Economics, 2006). Economic recovery following the GFC and cyclone Yasi has been slow, however economic trends indicate that some industries in the region are experiencing positive growth, and expenditure and investment in the region is slowly increasing (CRC, 2012; Cummings Economics, 2010a). During the GFC in 2009 visitor numbers to the region declined by 8% and tourism expenditure by 10%, while the number of building approvals (and consequently 	<ul style="list-style-type: none"> Most of the population is on low income - 1/3 of the population earns less than \$400/week. Costs of living have risen. Itinerant work and availability of labour has been in short supply with impacts on small business. Employment is largely via small businesses with low turnover in vulnerable sectors (e.g., retail trade, accommodation and food services) and small business generally has a lower per capita income. Regional brain drain/drift away of high-skilled high-income professionals (e.g., GFC, post-cyclone) has reduced disposable income and expertise. Need to highlight the degree to which climate adaptation impacts on inclusiveness and equity. Significant decrease in smaller-medium enterprises and growth in 	2.5	<p>2.5</p> <p>Rating has stayed the same. Major employment impacts post GFC are now returning to a high point of risk due to reduced investment confidence and equity concerns have not improved since the last assessment.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<p>construction work) also declined significantly (Cummings Economics, 2010a).</p> <ul style="list-style-type: none"> • After Cyclone Yasi, insurance companies did not allow local people to carry out their own repairs unless certified. Repairs became more expensive and income left local communities as a result. • Although employment in the construction industry improved somewhat following Cyclone Yasi due to the influx of repair work necessary in the region, there was a decline in the number of agricultural jobs available in the region (Petrinec, 2011). • Data is not currently available which assesses individual income analysed by age, education level and industry, occupation or household income by family composition, tenure and low income. Further assessment required. • A survey of recreational fishers in the GBR identified modal household income to be between \$30,000 to \$59,000 per year (Sutton, 2008) which is comparable with the average annual income for Cairns residents of approximately \$55,000 (ABS, 2012). 	<p>larger enterprise, which have higher earning capacity and are more resilient post-disasters.</p> <ul style="list-style-type: none"> • Region has some vulnerable populations, particularly with high indigenous populations and rural poor. • Cairns population is vulnerable to a big cyclone. • Employment in industries such as construction are vulnerable to the impacts of both worldwide economic shifts and climatic events. • Post-cyclone compensation disparities for fishing compared with agriculture and vulnerabilities created by lack of seasonal work for locals and itinerants. • Increased insurance premiums may exacerbate financial strain and inequity on industry and residents and increase economic vulnerability, particularly for unit holders and renters which have equity implications. 		
1.4 Workforce participation and employment.	<ul style="list-style-type: none"> • Regional employment participation rates and trends and employment by industry. 	<ul style="list-style-type: none"> • Unemployment in Cairns regional local government area has improved since last assessment. It was 7.8% in March 2012 c.f. 5.5% in Queensland average. This compares with 10.1% in June 2010 compared with 5.7% in Queensland. In 2012 some 5.3% of Qld unemployment is in the Cairns Regional Local Government Area (LGA) (OESR, 2012). • Regional employment by industry data has not been updated from last assessment. As it stands: Retail trade (12.7%), Accommodation and Food Services (11.6), Construction (10%), Health Care and Social Assistance (9.4%) (OESR, 2012). • Some 99.4% of regional employment is via small 	<ul style="list-style-type: none"> • Primary industries employment strongly affected in 2011. Recovery has been slow in 2012. • The Region has had strong employment creation, but unemployment continues to run higher than the rest of the country. Indigenous unemployment contributes to some but not all of this. People chose to stay for lifestyle reasons. • Region also has a high proportion of self-employed people high who are affected by the economy. 	2	<p>2</p> <p>Rating stayed the same. Recovery post GFC to employment levels between 8 and 10% is still higher than the rest of Australia and because disasters have impacted on low skilled and casualised labour and self-employed which is the basis for the regional economy.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<p>business, this is unchanged since the last assessment.</p> <ul style="list-style-type: none"> • During the peak of the GFC, unemployment rates in the region increased significantly from 5% (the state average) in January to 11-13% by September of 2009 (Cummings Economics, 2010a). • In August 2011 it was estimate that there were approximately 3,000 fly-in-fly-out workers based in Cairns (Dalton, 2011). • In 2013 BHP Billiton Mitsubishi announced that they will recruit a further 250 fly-in-fly-out workers from Cairns and its surrounds to work in new coal mines in the Bowen Basin (Kim, 2013). 	<ul style="list-style-type: none"> • Extreme events affect industries that have high workforces using low skilled and casualised labour. • Fairly predictable patterns of workforce and employment – seasonally based but opportunities limited in recent years. • Some temporary loss of skilled workers from the region through increased fly-in-fly-out employment in mines, however an increase of personal incomes for many families which is then spent in the region. • Primary industries have shown to be recovering faster to employment loss than tourism as a result of the combined impact of extreme events and the global financial crisis. • Expect that there will be a cyclical unemployment rate and some degree of redeployment of workforce in response to major events over time. • Has been reasonable impact of State government and other redundancies on regional workforce. • Population growing by about 4% pa going into GFC but the industry structure in the area shows high degree of vulnerability. 		
1.5 Economic confidence.	<ul style="list-style-type: none"> • Consumer confidence. • Investor confidence. • Small business confidence. 	<ul style="list-style-type: none"> • The 2011 Cairns Business Survey identifies decreasing business confidence and profitability between December 2010 and March 2011 as a result of natural disasters, particularly Cyclone Yasi (CRC, 2011). • The strength of the Australian dollar compared to international currencies has also meant a decrease in domestic visitors who can visit international 	<ul style="list-style-type: none"> • Both cyclones and the GFC affected consumer and small business confidence in 2011, some recovery has been evident in 2012. • While international confidence in visitation was reduced by natural disasters across Australia in 2011, 	2	<p>2</p> <p>Rating stays the same because while there has been some early signs of recovery in investor confidence, confidence generally remains low and a</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<p>destinations at a lower cost than previously (CRC, 2011).</p> <ul style="list-style-type: none"> • Government financial support for communities following Cyclone Larry in 2006 was strong, while due to other disasters across Queensland (predominantly the 2011 Brisbane floods) the government response and financial support for communities following Cyclone Yasi was less focused and provided less financial support. • Recovery funds following these cyclones were used in the region to improve the road networks and other community infrastructure (Elks, 2012). 	<p>some recovery evident in 2012 but further stimulus may be needed.</p> <ul style="list-style-type: none"> • Scope to grow confidence exists. • Two cyclones along the Cassowary Coast have affected confidence. • Early signs of confidence reemerging are evidenced by a limited number of businesses that are starting to re-invest, spread and innovate, however this is fragile and underlying confidence has not shifted. • There are opportunities to showcase the positive things people are doing and building their resilience to climate change and a more positive narrative across sectors and the region. • Impact of government support on recovery has been positive. 		<p>major dip in construction sector remains a real possibility.</p>
1.6 Vulnerability of Key Economic Infrastructure Assets.	<ul style="list-style-type: none"> • Data re whether climate change will stress key infrastructure assets of economic importance. 	<ul style="list-style-type: none"> • Key road transport assets are progressively improving but remain annually vulnerable to annualised flooding. • Cairns is the northern-most terminus of Qld's rail and road networks and the international airport is located on the shoreline of the CBD area (Cummings Economics, 2009). • Cairns is the leading aviation servicing centre for much of Northern Australia, Northern Queensland and the South-West Pacific providing training, repairs and maintenance, equipment sales, charters and other services (Cummings Economics, 2009). • Several key points of coastal, airport and port infrastructure remain seriously at risk from sea level rise and extreme events. • Airport vulnerability is impacted by road access (e.g., Kuranda Range Road). The rail system has not been significantly improved and Roads to recovery has invested \$600M, which has been of major benefit. 	<ul style="list-style-type: none"> • Annualised transport infrastructure vulnerability more vulnerable under more severe events. • Coastal airport, road and port infrastructure is vulnerable to inundation due to sea level rise or during storm, cyclone or flood events. • New realisation that farm assets and stock are very vulnerable to more intense cyclonic and flood events. • Natural Disaster Relief Arrangement (NDRRA) funding models not well suited to progressive betterment. • Potential for major port and airport disruption has not yet been realised. • Progressive improvement in road infrastructure has been emerging. • On farm infrastructure assets annually 	3	<p>3.5</p> <p>Economic assets are traditionally vulnerable though economy adapted to that. Increased economic activity and new threats mean community may struggle with new system shocks. Overall there has been a marginal improvement because of the steps forward in planning. This remains a watching brief to see if these steps forward materialise in the future.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<ul style="list-style-type: none"> • Cairns hospital remains vulnerable although planning has progressed and upgrades will improve both its patient capacity and ability to deliver health services. • The power system has not improved significantly although the region is closer to a strategic response. • The region is more adept at responding to disasters, even without changes to infrastructure, and is using existing systems more effectively. • Small business capacity has lifted in disaster planning and risk mitigation ownership has improved. 	vulnerable but could be better managed through real time data and information management systems.		
Resilience Rating				13.5	14
Maximum for this Attribute				30	30

Attribute Two: Community knowledge, aspirations and capacity

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
2.1 Community awareness levels of climate change and natural resource sustainability.	<ul style="list-style-type: none"> State and trend in individual and sectoral understanding of NRM issues and current behavior (regular survey). 	<ul style="list-style-type: none"> Limited local benchmarking of community attitudes, understanding and behavior in relation to climate change in Tropical Queensland. Student benchmarking in 2007 shows low levels of knowledge about the greenhouse effect and climate change among high school students in a regional Queensland city (Boon, 2009). Some sectors have begun adaptation planning (Marine Tourism, Marine Aquarium, East Coast Trawl Fishery, Marine Tourism Contingency Planning), which suggests understanding within some sectors. Awareness levels of natural resource sustainability in the region have been benchmarked across rural sectors (Emtage, Herbon, & Harrison, 2007) and some categories of NRM practices benchmarked. This shows a growing positive understanding of NRM issues and NRM behaviour. A recent national study on farm decision-making and climate change found that there are different types of farmers and that they differ systematically with respect to factors related to the climate change adaptation. It identified three types of farmers: 'Cash poor long-term adaptors' (55% of our sample), 'Comfortable non-adaptors' (26%) and 'Transitioners' (19%) (Hogan, Berry & Bode, 2011). James Cook University (JCU) published the results of an extensive survey of people living adjacent to the Great Barrier Reef (GBR) regarding their awareness and understanding of climate change and its impacts. 65.2% of respondents believed that human activity is highly influential on the climate and 72.6% believed that action was necessary to reduce human 	<ul style="list-style-type: none"> Understanding about climate change and natural resource sustainability is highly varied/inconsistent and but appears to be still growing across the region. Understanding of NRM and climate change is greatest in the marine and rural sector involved in practice change programs. Frequency and intensity of resource use does not necessarily correlate to a higher understanding and appreciation for sustainability or support for action to manage resources sustainability. The majority of people in Queensland coastal communities and southern capital cities believe that climate change is an immediate threat requiring immediate action, but preparedness to act remains unclear. High school students and their teachers knowledge (including those citing science and environmental studies) of climate science insufficient for informed citizenship participation (Boon, 2009). Recent environmental variability provides an opportunity to build awareness levels about climate change and natural resource sustainability. Public perception within the region tends to be media driven. Is it possible that people may recognise that changes are happening, but not necessarily climate change. 	2	2 No change overall because the link between disasters / sustainability and climate change is still low even though there has been some small movement in preparedness. Data only circumstantial.

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
2.2 Education/ knowledge levels and spread across the community.	<ul style="list-style-type: none"> Education distribution measures. 	<p>impacts on the climate. The survey indicates that there is a high degree of awareness of climate change within the community surrounding the GBR (Nilsson, Sutton, & Tobin, 2010).</p> <ul style="list-style-type: none"> Recent studies by the Great Barrier Reef Marine Park Authority (GBRMPA) with JCU and CSIRO with the fishing and tourism sectors have started to explore environmental and social impacts associated with recent extreme weather events and knowledge is improving (CSIRO, 2013). There is considerable variation in the recognition and acknowledgement of climate change across the spectrum of stakeholders in the GBR, both in the level of experiential and scientific knowledge about the marine ecosystem and climate change. Climate change in the GBR is not conceptualised as a series of independent events, but rather as a series of interdependent and causally connected events occurring within the environment. Nature deficit disorder broad problem across society. Student benchmarking in 2007 shows unacceptably low levels of knowledge about the greenhouse effect, greenhouse gases and climate change among high school students and pre-service teachers including those specialising in Studies of Society and the Environment (SOSE) in a regional Queensland city (Boon, 2009). 	<ul style="list-style-type: none"> Local institutions, e.g., Cairns and Far North Environment Centre (CAFNEC), greater access to sources of information (online, media, politics, and academia) improves awareness. Improvements in the resilience and preparedness of individual businesses. <ul style="list-style-type: none"> Education supports resilience and adaptation capacities by providing individuals with a range of knowledge and skills however rates of school based education also need to be considered in terms of capacity needs for resilience and adaptation in the face of climate change. High proportion of low income across the region indicates that post-school 	2	<p>2 No evidence available to support significant review of this rating.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
			<p>education more likely at certificate and diploma level rather than bachelor degrees or higher.</p> <ul style="list-style-type: none"> • School curriculums do not yet sufficiently take into account futuring/planning and relevant skills or climate change awareness. • Generally the region has a good education base in general with some skills deficits in terms of skills building for the future in the context of climate change. 		
2.3 Skill levels and spread across the community.	<ul style="list-style-type: none"> • Skills distribution measures. 	<ul style="list-style-type: none"> • There is limited data to assess this in terms of social resilience in the face of climate change. • Recent experiences for disaster recovery have provided additional response skills. • There is a need to re-skill and provide assistance to develop business plans to help the commercial fishing (and agricultural) industry cope with change and be resilient (Sutton., Lédée, Tobin, & De Freitas, 2010). 	<ul style="list-style-type: none"> • Re-skilling industries/labour forces to adapt to other business models or business enterprises or cope with changed resource conditions and support is emerging but vulnerable. • Small business skills improving in disaster planning. Individual and industry sills improved in adaptation and planning. 	2	2 No evidence available to support improved score against this rating.
2.4 Individual leadership and complex problems solving.	<ul style="list-style-type: none"> • Expert based indicator of regional leadership (champions). 	<ul style="list-style-type: none"> • There remains very limited data against which to make a more detailed assessment. 	<ul style="list-style-type: none"> • Indications are that leadership within a number of sectors continues to grow but collective regional leadership remains fragmented. • Cyclonic events have tended to showcase leadership potential. • Systems for responding to disasters are significantly improved and leaders are more supportive. Real world precedents have been of value. 	3	3 No evidence available to support improved score against this rating.
Resilience Rating				9	9
Maximum for this Attribute				20	20

Attribute Three: Community vitality

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
3.1 Demographic stability.	<ul style="list-style-type: none"> Basic demographic characteristics (e.g., population, age structure, migration and growth rates). 	<ul style="list-style-type: none"> Cairns population growth is strong relative to Queensland (second fastest growing Local Government Area or LGA in regional Queensland and number 8 LGA in Queensland). Population in Far North Queensland (FNQ) grew 2.8% between 2008-09 and 1.6% between 2010-11 compared to 1.7% across Queensland (OESR, 2012). No real change in demographic characteristics statistically. At the time of 2006 census, 22.3% were residing at a different address one year earlier (compared with 19.7% across Queensland) and 49.8 % were at a different address five years earlier (compared with 47.6% across Queensland) (OESR, 2012). There is no indication that this has changed since 2006. Some 20.2% born overseas, 9.2% indigenous, 23.6% in the most disadvantaged profile (OESR, 2012). High level of growth in the schools sector. Primary and secondary growth are indicators of urban and growth (demography is destiny). Resulting urban communities may be particularly vulnerable in the case of increased extreme events. High number of young families and young single people living alone compared to Queensland averages (OESR, 2012). Region is home to one of the largest Indigenous populations in Queensland. 	<ul style="list-style-type: none"> Despite stagnated economic growth, population growth is stable. Migration in and out is continuing. Greater portion of young children and adults at working age within the Cairns population and fewer older people than the State average. High regional (in and out) migration rates present local knowledge problems re climate change. Regional instability fuelled by fast growth (boom-bust cycle). Most vulnerable sector is terms of disaster response may be young people living on their own. Transient 'backpacker' population – workforce implications. Indigenous population growth emerging from Cape York migration has implication on services. Confidence in the region, particularly Cassowary Coast, has declined since Cyclone Yasi causing demographic instability as people are not returning. State/Local government at risk of inheriting assets at Port Hinchinbrook because of negative liability associated with declining property values, waste management issues. New state economic development legislation creates risks to set up negative legacies when viewed in the context of climate change. 	2	2 Stability in the region is very fragile however the red flag coming out of Cassowary Coast is not enough to pull the whole region down.

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
3.2 Wellbeing/ happiness within the general community.	<ul style="list-style-type: none"> Happiness, wellbeing or genuine progress indexes. Dissatisfaction ratings. 	<ul style="list-style-type: none"> Larson (2009) investigated satisfaction with the various factors of wellbeing, and then combined satisfaction levels with the self-reported importance of each factor to individual well-being. This work was undertaken in the Wet Tropics and identifies the factors that individuals identify as being important for wellbeing, it does not come up with an overall rating of happiness, wellbeing or dissatisfaction. People living in remote areas of Queensland reported higher satisfaction with life, particularly with safety and feeling part of the community, and were more willing to help each other, compared with urban and rural areas (Queensland Health, 2004a cited in Kreger & Hunter, 2005). Region has significant problems associated with mental health and insufficient services. 	<ul style="list-style-type: none"> Uncertainty about future development. Broad indicators suggest generally high levels of happiness/ wellbeing within the region, though key populations are facing mental health stresses. Extreme weather and declining economic confidence may have an impact on how this would currently be rated if additional events occur in successive years. Post-cyclone syndrome has negatively affected wellbeing and satisfaction in the Cassowary Coast area. Community planning process has identified that communities have a reasonable degree of happiness. Recognition of the Tablelands as being a less affected by cyclones than other areas as part of its distinct advantage. Wet Tropics is a stable multicultural region blending Indigenous, European and Asian heritage. 	3	<p>3</p> <p>No evidence available to support significant review of this rating, though there has been some key steps in coordination of mental health.</p>
3.3 General community health and disparities.	<ul style="list-style-type: none"> Specific general health indicators. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> Some 23.6% of the Cairns Regional is in the most disadvantaged profile (OESR, 2012). People in rural areas are more likely to die from lung cancer, stroke, suicide, injury, poisoning, road traffic injury, diabetes and asthma. In remote areas, there were higher death and hospitalisation rates due to hazardous and harmful consumption of alcohol and tobacco smoking as (Queensland Health, 2004a cited in Kreger & Hunter, 2005). 'Suicide in Queensland 1999-2001' provided an indicator of the extent of variance in mental health status between in metropolitan, rural and remote areas. Mortality rates for males in remote areas (42.3 per 100 000) were significantly higher than the 	<ul style="list-style-type: none"> People who get cancer in regional centres go undetected for longer, don't have access to medical help, recover less and die more often. Rural areas have higher rates of morbidity and mortality. Evidence that socioeconomic disadvantage is a key driver of regional health disparities (Beard et al. 2009). The rate of suicide in rural Australia indicates a high prevalence of mental health issues (Fragar et al., 2010). Rural workers have relatively high levels of psychological distress. Early 	3	<p>3</p> <p>No evidence available to support significant review of this rating.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<p>male rates for metropolitan areas and Queensland as a whole. Regional rates for males and all persons were significantly higher (De Leo & Heller 2004, Kreger & Hunter, 2005).</p> <ul style="list-style-type: none"> Relationship between levels of mental health and well-being of rural residents found the highest levels of distress and functional impairment in those permanently unable to work and the unemployed (Fragar et al., 2010). Rural unemployed suffer considerable psychological distress and 'disability', yet they are not the target of specific mental health promotion and prevention programs (Fragar et al., 2010). Indigenous residents of rural/remote Australia experience mental health issues associated with social disadvantage (Hunter, 2007). 	<p>intervention and vocational rehabilitation programs should be developed in rural communities to serve this hard-to-reach, but needy, rural population (Fragar et al., 2010).</p> <ul style="list-style-type: none"> Significant services impact on Cairns Hospital as main service area for Far North Queensland & Torres Strait (FNQ&TS) communities. Plus improvements required Mareeba, Atherton and Innisfail capacity. 		
3.4 Community services, infrastructure, access, and disparities.	<ul style="list-style-type: none"> Generalisable and comparable service benchmarks. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> A \$400M upgrade of the Cairns Base Hospital is currently underway to increase the patient capacity and ability to deliver health services (Cummings Economics, 2010a). Both the public Cairns Hospital and Cairns Private Hospital is located on the foreshore in the Cairns CBD and is susceptible to flooding and major weather events. During Cyclone Yasi the hospitals were evacuated and patients flown to hospitals in Brisbane (Walker & Parnell, 2011). Data shows numbers of aged care, child care, hospital services relative to numbers across Queensland. Data about services is not benchmarked across the community. Spatial analysis of key infrastructure weaknesses and further expert assessment needed. Regional Development Australia (RDA) Human Services Sector workshop shows significant services gaps and service fragmentation. 	<ul style="list-style-type: none"> Access to services OK but generally weaker than metropolitan areas, but service coordination post extreme events has improved. Continuing strong disparities within rural and remote parts of the region, and recent contractions in State and other services within the region. Key linkage infrastructure continues to threaten short term food security post extreme events. Some anecdotal data improvements via RDA Human Services Sector Workshop. Post-Larry and post-Yasi community sector has improved but not consistent across sectors. Services are more effective because coordination has been improved in response to climate events. However effectiveness is not reflective of 	3	<p>3 No evidence available to support significant review of this rating.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
3.5 Housing, accommodation and accessibility.	<ul style="list-style-type: none"> Levels of rental dependency. Levels of mortgage stress. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> Buildings more expensive because they have to be cyclone rated and goods need to be transported. Public transport availability poor. Land availability for housing poor and issue within the region in general. Cyclone Yasi destroyed more than 150 homes and left more than 650 uninhabitable which meant many people lived in evacuation centres or other government-funded accommodation (ABC, 2011). In 2011 following Cyclone Yasi house sale prices in north Queensland dropped by nearly 3% (Lynch, 2011). 	<p>capacity and it remains poor.</p> <ul style="list-style-type: none"> Housing stock is becoming less vulnerable. Larry and Yasi are the strongest cyclones to affect the region and while there was no loss of life, the region is still suffering post-event property damage. Modern building standards will help to minimise property damage in the future. Access to services OK but generally weaker than metropolitan areas. Strong disparities within rural and remote parts of the region. Some recent improvements in planning and program reform with regard to homelessness in region. Rental demand strong and increasing and will become more of a concern due to the lack of housing market supply over the past 5 years. Continued development along the coast at risk to more severe and frequent weather events. Stability of housing stock has increased while insurance affordability has decreased. Property values decreased due to insurance impacts. Rents have increased. Because of insurance spike, accessibility is declining and hurting the market with increased impact on units that are owned and rented. Mix of improved/declining factors resulting in a stable rating. 	3	<p>3</p> <p>No evidence available to support significant review of this rating.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
3.6 Community safety and risk.	<ul style="list-style-type: none"> • Criminality/ reporting indicators. • Spatially identified flood, cyclone, drought and other natural risk ratios. 	<ul style="list-style-type: none"> • Flood mapping and response communication generally strong. • Political commitment to hazard risk reduction and strong legislative framework now weaker. • Anecdotal evidence of difficulty of urban communities knowing what to do in the case of extreme events (less contact with variability in climate and weather). • Crime rates are substantially higher than state average (OESR, 2003). • The rate of fraud-based crimes increased by 31%, robbery offences increased by 13% and armed robbery offences decreased by 18% in Northern Queensland between 2009 and 2010 (Field, 2010). • In 2012 Suncorp (a major insurer in Far North Qld) stated that they would continue to insure residents provided cyclone mitigation measures were in place. This is despite insurance premiums rising by 75% from the pre-Yasi figures in some areas (Dixon, 2012). • Between 2005-2006 and 2011-2012 insurance premiums for strata-title residences in Far North Queensland increased up to 350%. This was in part a response to the number of claims made following Cyclones Larry and Yasi, it is also exacerbated by the lack of competition in the insurance industry in the region (Hayes, 2011). 	<ul style="list-style-type: none"> • Systems for cyclone and flood response and evacuation are well developed and proving effective. • Youth crime significantly high in the region especially within Indigenous population; compared to the rest of the state and high rates of re-offence – recent introduction of youth-bootcamps, increased policing and other measures. • Disaster response mechanisms have improved. • National Disability Incentive Scheme (NDIS) may in longer term deliver some improved outcomes. • Integrated land use planning decreased. Canal developments and community risks for poor development planning and infrastructure services (property values, local government). • Costs of insurance have increased significantly leading to insurance risks (e.g., less cover being taken out/none at all). If a disaster does it the region, it will reduce the capacity of people to be self-sufficient adding to greater cost for government. 	3	2.5 Insurance risks are the main reason why this rating has declined. Also declining political support for better coastal risk reduction strategies and increased insurance premiums. These changes should be monitored as a significant concern for future ratings. Increased family support seen as the key mechanism to address.
Resilience Rating				17	16.5
Maximum for this Attribute				30	30

Attribute Four: Governance

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
4.1 Connectivity within and among key decision making institutions and sectors.	Expert based indicator of institutional connectivity.	<ul style="list-style-type: none"> • Radical improvements in connectivity within sectors and between sectors appear to have grown. • RDA Roadmap and links with other RDA Regions appears to be providing greater connectivity within and across regions. Cooperation and connectedness continues to improve within the region. • Some inherent internal connectivity issues within key industry sectors continue (e.g., agriculture). • Good connectivity and organisation around economic issues and around natural resource management issues but there remains very poor connectivity and high fragmentation in leadership around the social sector (human services). • Effective risk management strategies in place, hazard planning embedded in community/development plans. 	<ul style="list-style-type: none"> • General cross regional, inter-sub-regional and internal cohesion and connectivity has improved. • Sector connectivity strongest in natural resources, then economic, followed by human services sectors. 	3	3.5 Rating has improved through demonstrable increase in connectivity beyond and in the sub-region.
4.2 Adaptive management capacity of key decision making institutions and sectors.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Limited consideration of climate change within the economic and social sector. • Consideration of climate change is improving in the infrastructure and Natural Resources Management (NRM) and RDA sector. • RDA has taken a broadly integrative focus in climate change planning, increasing regional capacity. • High turnover of staff has reduced the adaptive capacity of decision-making institutions. Knowledge and experience in the region needs to be re-acquired. 	<ul style="list-style-type: none"> • Improvements in place in that NRM sector in explicitly building capacity (via Stream 1 and 2 funding). 	3	3.5 Rating has improved through demonstrable increase in planning capacity and improvements within the NRM sector in the sub-region.
4.3 Adaptive use and management of integrated knowledge sets.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Economic and social data weak and not able to adequately track short term changes. • The region is still some way off having long term condition and trend assessment in monitoring of natural resources and the integration of social and economic (including governance) data is embryonic. 	<ul style="list-style-type: none"> • Lack of access to timely and relevant regional data a major constraint and loss of Office of Economic and Statistical Research (OESR) Office from Cairns will weaken data availability. • Council Economic Development Units 	2	1.5 This rating has declined because of reductions in social and economic data availability and integration and rating

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	2011 Value (1-5)	Proposed New Value and Logic
		<ul style="list-style-type: none"> Limited use of effective decision support tools to integrate data into decision making and adaptive management processes. Few strong institutional owners/ integrators for knowledge management, but some leadership (e.g., Herbert River Information Centre, RRRC, etc.). 	<p>are disintegrated.</p> <ul style="list-style-type: none"> Funding through Reef and Rainforest Research Centre (RRRC) has shifted away from regional design and implementation to centralised control and links to regional outcomes not clear. Region lacks clear decision support systems. Region does not have a solid economic model and lot of the economic data is unreliable. On natural resource front, change of investment model from Marine and Tropical Research Facility (MTSRF) to National Environmental Research Program (NERP) has weakened integrated knowledge management and brokerage. Funded Stream 2 Projects for NRM planning likely to improve NRM knowledge integration but will be a time-lag before they come into play. Loss of skills and resources are not available to make decisions. 		needs to be closely monitored into the future.
Resilience Rating				8	8
Maximum for this Attribute				15	16

Summary conclusions:

Overall the Cairns region has experienced a slight improvement in economic viability over the 12 months since the last assessment. This is the combined effect of a number of positive and negative factors. Positive factors include the reduced unemployment rate and progress in infrastructure planning around the energy network, airports and hospital. Other factors that have had a neutral or negative impact relate to:

- The structure of the regional economy: There has been no real change to or improvement in the structure of Wet Tropics regional economy. The economy remains vulnerable to the impacts of global economic drivers and disasters on the base industries of tourism and agriculture. The regional servicing role of Cairns City provides some economic stability but is also subject to fluctuations in regional economic growth.
- Economic confidence: Economic confidence is highly fragile across the region and for sectors especially following Cyclone Yasi in 2011. Early signs of recovery are evident and there are opportunities to showcase and grow economic confidence, especially in post-disaster communities.
- Economic equity: Has not improved since the last assessment. Highly skilled professionals have left the region and unskilled/casualised labour in the region has been negatively impacted on by the Global Financial Crisis (GFC) and Cyclones Larry and Yasi. This has implications for regional capacity for preparedness/response.

Overall the region experienced a slight improvement in community capacity to mitigate and adapt to climate change. The capacity for disaster awareness and preparedness has increased at an individual enterprise level in post-cyclone communities. Government leadership and support for disaster recovery has also been positive with recovery services operating at a higher level of coordination and efficiency.

Overall, the region experienced a decline in the health and vitality of the community asset because of the declining capacity for community risk management. The increased cost of private property insurance is rapidly becoming a growing issue for the future capacity of the region to prepare and respond to climate change. People in the region, particularly those who are economically vulnerable, are responding by reducing or forgoing private insurance. This devalues regional economic assets, reduces the capacity of the region to be self-sufficient, and increases the reliance on government and not for profit/philanthropic support. Opportunities to improve the accuracy of private property risk assessment underpinning insurance market needs to be urgently investigated. There is no evidence to suggest that there has been any major change to demographic stability, wellbeing and happiness, community health, infrastructure and housing.

Overall the region experienced a no net change in its rating for governance. This was the result of gains in regional governance and leadership and a loss of data and knowledge at a regional level to support decision-making. The region has lost major research functionality (now being delivered via centralised models), local data services and decision support tools. New challenges to effective governance are also emerging from the high turnover of people in leadership positions in the region.

Emerging key strategies and directions

- Regional five year preliminary program to address critical coastal management risk assessment (flood, storm surge, emergency evacuation) and integration of responses into next generation regional plans and local government planning schemes across the Far North Queensland Regional Organisation of Councils (FNQROC) and Cape York and Torres Strait Regional Organisation of Councils (CYTSROC) and Carpentaria Shire.
- Infrastructure risk identification and suitable planning solutions, negotiated with Queensland Rural Adjustment Authority (QRA), resulting in infrastructure risk assessment and retro-fitting/redesign estimates as basis for cost pre-emptive, more rapid regional negotiation and devolution of NDRRA funds.
- Growth and expansion of the Roads Alliance Model, empowering the capacity of Local Government in asset management of strategic feeder roads to address accessibility risks.

- Strategic investment in Bruce Highway Strategy and links to/from Bruce Highway (road infrastructure in the region) to maximise benefit of Gulf freight.
- Recasting the NERP Investment model to establish regionally-oriented stakeholder and research provider partnerships for sustainable regional development associated with the management of NQ's natural assets (e.g., Gulf, reef, rainforests, Cape York Peninsula, etc).
- Collaborative Alliance or Collaborative Research Centre (CRC) Tropical Agriculture. Should refocus on being regionally led and with visionary tropical agriculture activities within key regional nodes. Needs to hook into productivity and innovation agenda. Also should drive tertiary, TAFE and school links into the system. Can be both focused on NQ productivity and potential for knowledge export. Should also focus on rural community innovation and new crop/markets.
- NDRRA Reform for Disaster Response Arrangements. Needs to focus on betterment not replacement and linked to land use planning.
- Farm debt tax write-down and longer term small business adjustment capacity/ servicing.
- Major partnership between Insurance Industry, Governments and Councils in raising urban and rural preparedness. Problem with insurance is that it's all about risk. Better prior assessment of existing properties. Engineers can specialise in that field. Accurate risk assessment so that you are insured to the appropriate level. One of the outcomes is to reduce the number of people with no insurance.
- Outstanding required Cyclone Category 5 shelters within the Wet Tropics.
- Natural Disaster Centre of Excellence established in North Queensland (based on State Election Commitment – to train volunteers) which should be building on the Ergon Remote Service Delivery Capacity Centre of Excellence based in Northern Queensland. Capacity to export knowledge to other countries.
- Collective State and Commonwealth commitment to development and negotiated implementation of a NQ Energy Transformation Strategy.
- NRM Spatial Hub as basis for better property scale management and emergency response.
- Core increase in regional strategic capacity of Human Services Sector.
- Regionally managed water use efficiency programs and further assessments for Cairns water supply options.
- State and Federal agreement for long term commitment to North Queensland place-based governance framework including bench-marking and adaptive climate change strategies.

References

- ABC. (2011). *Cyclone Yasi destroyed 150 homes*. Retrieved from <http://www.abc.net.au/news/2011-02-07/cyclone-yasi-destroyed-150-homes/1933632>
- ABS. (2012). *2011 Census QuickStats*. Retrieved from http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/306
- ABARES. (2011). *Australian climate and agriculture monthly update*. Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences.
- Beard, J., Tomaska, N., Earnest, A., Summerhayes, R., & Morgan, G. (2009). Influence of socioeconomic and cultural factors on rural health. *Australian Journal of Rural Health*, 17(1), 10-15. doi: 10.1111/j.1440-1584.2008.01030.x
- Boon, H. (2009). Climate change? When? Where. *The Australian Educational Researcher*, 36(3), 43-65. doi: 10.1007/BF03216905
- CRC. (2011). *Cairns 2011 business survey*. Retrieved from http://www.cairns.qld.gov.au/__data/assets/pdf_file/0015/40038/Business-Survey-web.pdf
- CRC. (2012). *Cairns 2012 economic snapshot*. Retrieved from http://www.cairns.qld.gov.au/__data/assets/pdf_file/0009/52587/EcoSnapMAR12.pdf
- CSIRO. (2013). *SELTMP 2011: Social and economic conditions - Great Barrier Reef*. Cairns: CSIRO Oceans Flagship.
- Cummings Economics. (2006). The economic importance of community and lifestyle services. *Cairns Post Business Week*. Cairns: Cummings Economics.
- Cummings Economics. (2007). *Mining resurgent*. *Cairns Post Business Review*. Retrieved from <http://www.cummings.net.au/pdf/articles/24MiningResurgentAug07.pdf>
- Cummings Economics. (2009). *Aviation sector and mining and gas developments in Papua New Guinea*. Retrieved from <http://www.cummings.net.au/papers.html>
- Cummings Economics. (2010a). *The Cairns economy: The coming bounce back*. Retrieved from <http://www.cummings.net.au/pdf/recent/J572CairnsEconomyRecentTrends.pdf>
- Cummings Economics. (2010b). *The contribution of the primary industries sector to northern Queensland regional economies*. Retrieved from <http://www.cummings.net.au/pdf/recent/J2315CEAginvestreport.pdf>
- Dalton, N. (2011). *Cairns set to boom as fly-in-fly-out mining hub*. Retrieved from http://www.cairns.com.au/article/2011/08/12/178005_print-version.html
- De Leo, D., & Heller, T. S. (2004). *Suicide in Queensland 1999-2001: Mortality rates and related data*. Griffith University-Australian Institute for Suicide Research and Prevention.
- Dixon, N. (2012, 8 May). Insurer won't pull cover in Far North, *The Cairns Post*, p. 1.
- Elks, S. (2012, 2 February). A year on from Yasi's fury, *The Australian*. Retrieved from <http://www.theaustralian.com.au/news/features/a-year-on-from-yasis-fury/story-e6frg6z6-1226260001580>
- Emtage, N., Herbon, J., & Harrison, S. (2007). Landholder profiling and typologies for natural resource management Policy and program support: Potential and constraints. *Environmental Management*, 40(3), 481-492. doi: 10.1007/s00267-005-0359-z
- Field, D. (2010). *New statistics show Qld's crime rate falling*. Retrieved from <http://www.abc.net.au/news/stories/2010/11/12/3064897.htm?site=westqld>
- Fragar, L., Stain, H. J., Perkins, D., Kelly, B., Fuller, J., Coleman, C., . . . Wilson, J. M. (2010). Distress among rural residents: Does employment and occupation make a difference? *Australian Journal of Rural Health*, 18(1), 25-31. doi: 10.1111/j.1440-1584.2009.01119.x
- Hayes, A. (2011). *Submission: The national disaster insurance review*. Cairns.
- Hogan, A., Berry, H., Ng, S., & Bode, A. (2011). Decisions made by farmers that relate to climate change. *Agricultural Science*, 23(1), 36-39.
- Hunter, E. (2007). Disadvantage and discontent: A review of issues relevant to the mental health of rural and remote Indigenous Australians. *Australian Journal of Rural Health*, 15(2), 88-93. doi: 10.1111/j.1440-1584.2007.00869.x
- Kim, S. (2013). *No skills shortage expected from FIFO recruitment drive*. Retrieved from <http://www.abc.net.au/news/2013-02-21/no-skills-shortage-expected-from-fifo-recruitment-drive/4532448>

- Kreger, A., & Hunter, E. (2005). *Unfenced road ahead: A review of rural and remote mental health service delivery and policy. A report for the Mental Health Unit, Queensland Health*. Brisbane: University of Queensland and Queensland Health. Retrieved from <http://crrmhq.com.au/pdfs/UnfencedRoad.pdf>.
- Larson, S. (2009). Communicating stakeholder priorities in the Great Barrier Reef region. *Society & Natural Resources: An International Journal*, 22(7), 650-664. doi: 10.1080/08941920801992102
- Lynch, B. (2011). Cyclone Yasi hits home prices in North Queensland. *news.com.au*. Retrieved from <http://www.news.com.au/money/property/cyclone-yasi-hits-home-prices-in-north-queensland/story-e6frfmd0-1226061654298>
- McDonald, G., & Weston, N. (2004). *Sustaining the Wet Tropics: A regional plan for natural resource management: Background report* (Vol. 1). Retrieved from http://www.rainforest-crc.jcu.edu.au/publications/nrm_vol1.pdf
- Nilsson, J., Sutton, S., & Tobin, R. (2010). *A community survey of climate change and the Great Barrier Reef*. Cairns: Reef and Rainforest Research Centre, James Cook University. Retrieved from http://www.rrrc.org.au/publications/gbr_climatechange_survey.html
- OESR. (2003). *Crime and social profiles local crime areas, Queensland 2002-2003*. Brisbane: Queensland Government.
- OESR. (2008). *Experimental estimates of Gross Regional Product 2005-2006*. Brisbane: Queensland Treasury.
- OESR. (2012). *Queensland regional profiles: Wet Tropics region*. Brisbane: Office of Economic and Statistical Research.
- Petrinec, M. (2011, 1 March). Yasi slows unemployment rise. *The Cairns Post*, p. 1. Retrieved from http://www.cairns.com.au/article/2011/03/01/151851_local-news.html
- Prideaux, B., & Falco-Mammone, F. (2007). *Economic values of tourism in the Wet Tropics World Heritage Area*. Cairns: James Cook University. Retrieved from <http://www.wettropics.gov.au/site/user-assets/docs/EconomicValuesTourismWHA.pdf>
- Sutton, S. G. (2008). *Recreational fishers' perceptions about the costs and benefits of the 2004 Great Barrier Reef Marine Park Zoning Plan. Report to the Marine and Tropical Sciences Research Facility*. Cairns: Reef and Rainforest Research Centre Limited. Retrieved from http://www.rrrc.org.au/publications/recreational_fishers.html
- Sutton, S. G., Lédée, E. J., Tobin, R. C., & De Freitas, D. M. (2010). *Impacts of the 2004 rezoning of the Great Barrier Reef Marine Park on commercial line, charter and trawl fishers. Report to the Marine and Tropical Sciences Research Facility*. Cairns: Reef and Rainforest Research Centre Limited.
- TTNQ, & TQ. (2010). *Tropical North Queensland: Tourism opportunity plan*. Cairns: Tourism Tropical North Queensland, Tourism Queensland. Retrieved from http://www.tq.com.au/fms//tq_corporate/destinations/tnq/plans_and_strategies/TNQ_TOP-%20FINAL.pdf
- Walker, J., & Parnell, S. (2011, 1 February). Thousands to be evacuated as Cairns is warned of flooding from powerful Cyclone Yasi. *The Australian*. Retrieved from <http://www.theaustralian.com.au/in-depth/cyclone-yasi/evacuations-begin-ahead-of-the-arrival-of-the-powerful-cyclone-yasi/story-fn7rj0ye-1225997968847>

Northern Gulf

For the purposes of this study, the Northern Gulf region covers the area covered by the Northern Gulf Natural Resource Management Group and is particularly inclusive of the Croydon and Etheridge Shires. Both these Shires reside within the Regional Development Australia Far North Queensland and Torres Strait region.

Attribute One: Economic viability

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.1 Diversity and quality of growth in economic activity.	<ul style="list-style-type: none"> Comparison of Gross Regional Product and Gross Value Add by industry. Economic growth rates with sectoral specific analysis. 	<ul style="list-style-type: none"> The region's economy is severely limited by the isolation caused by the annual wet season, the small size of the highly dispersed communities, and limited opportunities for economic development (GRPAC, 2000). The principal industries of the region are grazing on large leasehold properties, mining, tourism, cropping and fishing. Pastoralism represents the most extensive land use. Recreational and commercial fishing are also important in driving stability within the economy. With rapidly rising rural debt, there are limited pastoral support services and value-adding activities in the region outside of primary production (NGRMG, 2008). The Karumba Port services the region's mining and pastoral industries and aims to export live cattle and mineral products to Asia and other countries in the Pacific Ocean (Gulf Savannah Development, 2009; 2011). Although most of the Northern Gulf's area is used for pastoralism, the primary economic activity is mining, including a mixture of small alluvial mining operations and large hard rock 	<ul style="list-style-type: none"> Overall data on regional diversity and quality of growth and debt in economic activity is not very detailed. This requires further investigation. Current Marine Reserve declarations could reduce viability and capacity within the current commercial fisheries industry, reducing resilience in the commercial fishing sector. High debt levels in the pastoral sector have reduced resilience in the grazing sector and associated communities. Little movement in the mining sector, though significant new projects could emerge including coal and uranium. Emerging but as yet unrealised potential for drought proofing arrangements to emerge under the North Queensland Irrigation Strategy, or more significant agricultural intensifications in key locations. Ever-so-slight improvements in the window for tourism and recreation activities on the back of improved roads infrastructure. 	<p>2.5</p> <p>High levels of fragility in the pastoral and fishing sectors balanced by some potential new economic advances in agriculture, mining and an increasing window in tourism and recreation economies.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<p>heap leaching operations.</p> <ul style="list-style-type: none"> • Pastoral sector remains extremely fragile following impacts of live-cattle trade policy changes and post cyclone Yasi impacts, leading to high debt burden. • Mining employs only 3% of the region's workforce (NGRMG, 2008). A large proportion of the workforce are fly-in-fly-out workers sourced exogenously to the region (Taylor, Larson, Stoeckl, & Carson, 2011). • The prawning industry (based out of Karumba) is worth approximately \$40 million to the Gulf annually, however the dollar return to the community is low because of the use of motherships for supplying and processing in the Gulf rather than in Karumba (GRPAC, 2000). • In FNQ during 2010/11 mining sales and production increased with only a slight dip following the GFC. During the same period of time, expenditure on mining in 2010-11 was approximately \$1 billion, whilst it was \$1.8 billion for primary industries and \$2.3 billion for tourism (Cummings Economics, 2012). • Tourism is an emerging industry in the Northern Gulf, which has largely been enabled by the expansion of the road network since the 1990s (GRPAC, 2000). • North Queensland Irrigation Strategy currently exploring potential for agricultural intensification on the Gilbert. • Much of the region's population and businesses are reliant on larger settlements outside the Northern Gulf, including Atherton, Mareeba and Cairns for various essential and non-essential services (NGRMG, 2008). 		

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.2 Vulnerability of natural and energy resource base.	<ul style="list-style-type: none"> • Comparative measure of natural resource dependency. • Measures of energy security and diversity. • Measures of food security and diversity. 	<ul style="list-style-type: none"> • The Northern Gulf’s economy has four main drivers, all of which are based on natural resources – grazing/ agriculture, mining, tourism and fishing (NGRMG, 2008). • Tourism: The value of Tourism to the region is estimated to be 19% of GRP and is primarily based on self-drive tourists seeking to experience the unique environment of the Northern Gulf or participate in four wheel driving (Cumplings Economics, 2010; Greiner et al., 2004). • In the 2000s it was estimated that between 8,000 and 10,000 tourists visit the region annually largely to partake in ecotourism activities including camping, bird watching, fossicking, and visiting indigenous/non-indigenous cultural heritage sites (GRPAC, 2000). • The Savannah Way is a ‘adventure’ drive from Cairns to Broome that goes through the Northern Gulf and is popular with self-drive tourists (who make up the majority of visitors to the region) who can see and experience many of the region’s rich natural resources and culture heritage sites during the drive (Gray, 2010; Savannah Way, 2014). • Water availability is seasonal though potential for targeted water development schemes under the north Queensland Irrigation Strategy). Water is in limited supply during the dry season due to high evaporation rates (Taylor et al., 2011). • While most Gulf fisheries have been progressing towards sustainability, there is significant competition with national Marine Protected Area objectives. • While overall pasture condition and trend was static or on the improve, the 2010 flooding event led to extensive pasture death in low-lying areas 	<ul style="list-style-type: none"> • Energy security is vulnerable. The regional economy is highly dependent on fossil fuels which are not produced locally and transported to the region through poorly maintained and flood-vulnerable roads. Diesel cost increases could provide system shocks. • Opportunities exist to establish an economic market in environmental and land management services. • The primary industry sector has been and is providing stability to the regional economy however this sector is vulnerable to change in a number of ways and is impacted upon immensely by severe weather which, over the past number of years has been slower to recover and has resulted in an increase in farm debt. • Food security is vulnerable and the region is a net importer. More extreme events with flooding will make communities more vulnerable based on current limited transportation. • Currently, the region and specifically the agricultural sector, is vulnerable to changes in water availability, which is already limited during the dry season. • The Northern Gulf’s pastoral and tourism sector stability will be severely limited by an increase in severe weather events and changing weather. 	<p>3</p> <p>While natural resources are generally in good condition, extensive flooding significantly damages pastoral and tourism assets and fishing assets are heavily competed for. Energy and food security issues decrease resilience. This may be balanced by potentially increased access to mining and water resources.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.3 Inclusiveness and economic fairness/ equity.	<ul style="list-style-type: none"> Individual income (analysed by age, education level, industry and occupation). Household income analysed by (family composition, tenure type and low income 	<p>but now recovering.</p> <ul style="list-style-type: none"> The primary threats to the region's natural resources include pest/feral animals, weeds, inappropriate fire regimes, land degradation (caused by mining, overgrazing, etc) and declining soil quality (loss of ground cover, declining fertility, increasing salinity and acid sulfate soils) (NGRMG, 2008). Pastoral land in the region is monitored using the ABCD land condition assessment tool which grades the quality of the land ranging from very poor condition (D) to good condition (A). This benchmark allows pastoralists to benchmark the condition of grazing lands and identify areas for improved or changed management action (NGRMG, 2008). A Marine Protected Area (MPA) has been proposed for approximately 22,000km² of the North Marine Region (which includes the Gulf of Carpentaria) to protect threatened marine and avian species. If the MPA is successful then commercial fisheries will be unable to access the area. Tourism, recreational and charter fishing operators will be allowed to continue accessing the area (Department of Environment, 2014; SEWPaC, 2011). 	<ul style="list-style-type: none"> Most of the population is on low income - 1/3 of the population earns less than \$400/week indicating a poor financial capacity to adapt to change. This may mean that many residents of the region are living below the Australian poverty line, which is an income of \$234/week. Region has some vulnerable populations, particularly with both high Indigenous and economically disadvantaged populations, including 	<p>2.5</p> <p>High levels of personal financial hardship, though not a significant income inequity as per big mining regions. High business and farm debt levels mean a greater vulnerability to climate change.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
	households).	<p>20% of the Queensland population is in the most disadvantaged quintile, however in the Northern Gulf region, some 44.2% of the population are considered most disadvantaged (OESR, 2012).</p> <ul style="list-style-type: none"> • Some 25% of the Queensland’s Aboriginal or Torres Strait Islander population live in the Northern Gulf region (NGRMG, 2008). • Some 47.5% of the region’s residents had a post-school qualification compared to 50.4% of the state’s residents with a post-school qualification (OESR, 2012). • Data is not currently available which assesses individual income analysed by age, education level and industry occupation or household income by family composition, tenure type and low income. • In 2008-9 some 94.5% of businesses in the Northern Gulf were small businesses. Some 46% have a turnover range of less than \$100K, 35.5% turnover between \$100k-<\$500K, 9% turnover between \$500k-<\$1M, and 8.9% turnover >\$1M (OESR, 2012). • At the time of 2006 census, 16.9% were residing at a different address one year earlier (compared with 19.7% across Queensland) and 40.3 % were at a different address five years earlier (compared with 47.6% across Queensland) (OESR, 2012). • Government-driven Indigenous community support programs such as the Community Development Employment Projects Program are a significant source of additional income in the Northern Gulf (NGRMG, 2008). • Gender balance affected by high proportion of males shifting into mining work within and beyond the region. • Known high levels of illiteracy and affordability 	<p>a debt-laden farming sector.</p> <ul style="list-style-type: none"> • There are few opportunities or facilities within the region for residents to expand their skill-base, with most having to travel to other regions particularly to gain higher education. • Small business in the region generally has a lower per capita income. • The region’s relatively stable population provides a good opportunity for building knowledge and awareness. • Overall, there are additional vulnerabilities associated with major events (particularly floods). 	

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		affects retention in the region.		
1.4 Workforce participation and employment.	<ul style="list-style-type: none"> Regional employment participation rates and trends and employment by industry. 	<ul style="list-style-type: none"> The combined unemployment rate in the Carpentaria Shire, Croydon Shire, Etheridge Shire Local Government Areas (LGA) was 15.2% in November 2012 compared with 5.5% in Queensland (OESR, 2012; QTT, 2012). Regional employment by industry based on 2006 census data: Agriculture, Forestry and Fishing (15.6%), Retail Trade (11.2%), Health Care and Social Assistance (9.4%) (OESR, 2012). Although unemployment in the region is generally high, there are significant opportunities in the emerging industries of tourism, environmental management, cropping and horticulture (GRPAC, 2000). Under-employment is not well reflected in the figures and youth employment remains overly high. 	<ul style="list-style-type: none"> Primary industries employment strongly affected by cyclones. Increased costs to industry associated with disaster recovery limits capacity to employ, expand, develop or grow. Expect that there will be a higher unemployment rate and some degree of redeployment of workforce in response to climate change because of changes to precipitation and seasonal employment opportunities. 	<p>3</p> <p>High levels of unemployment decrease resilience, and pockets of chronic under-employment exist in Indigenous domains.</p>
1.5 Economic confidence.	<ul style="list-style-type: none"> Consumer confidence. Investor confidence. Small business confidence. 	<ul style="list-style-type: none"> Improved expert analysis drawing on information about levels of investment from the banks, population growth is needed. Investment confidence within the pastoral and fishing sectors very low because of significant debt burdens and conservation initiatives in the fishing sector. Farm debt interest at national/state and local government level is a significant cause for concern for internal investment within the region. Increasing levels of interest (national and international) in investment in the region in water and mining resource development opportunities. 	<ul style="list-style-type: none"> Data gathering in this attribute component require further effort. Local business confidence is generally low post-Yasi and to a lesser extent following live cattle export decisions. Low local investor confidence may be eventually balanced by increasing levels of external investor confidence. 	<p>3</p> <p>Very poor internal investor confidence because of high debt burden, but balanced by potentially increasing external investment confidence.</p>
1.6 Vulnerability of Key Economic	<ul style="list-style-type: none"> Data re whether climate change will 	<ul style="list-style-type: none"> Key road transport assets are progressively improving but remain annually vulnerable to 	<ul style="list-style-type: none"> Annualised transport infrastructure vulnerability more vulnerable under more severe events, leading 	<p>3</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
Infrastructure Assets.	stress key infrastructure assets of economic importance.	<p>annualised flooding.</p> <ul style="list-style-type: none"> • Due to the highly unreliable nature of road networks in the region (much of which is unsealed) air transportation is important for freight and passenger travel (GRPAC, 2000). • Air transport is currently very expensive which increases the cost of freight and products in the region. Airstrips in the region are generally poor quality (GRPAC, 2000). • In 2012 the Australian and Queensland Governments and the CSIRO identified the potential to further grow and diversify the northern Qld beef industry as a national/state priority in the North Queensland Irrigated Agriculture Strategy worth \$10 million. The strategy focuses on identifying and expanding water capture/storage, commercial viability of irrigated agriculture and other services and infrastructure (Office of Northern Australia, 2012). • Port Karumba's ability to service the region's pastoral and mining industries product exportation is constrained by the region's poor road infrastructure and the inadequate port facilities (GRPAC, 2000). Port infrastructure is generally undervalued. 	<p>to a narrower trading window.</p> <ul style="list-style-type: none"> • Cost of living will increase in the region due to increased freight and consequently product costs if the roads are flooded more frequently and fuel prices continue to rise. • New realisation that farm assets and stock very vulnerable to more intense cyclonic and flood events. • Natural Disaster Relief funding models not well suited to progressive betterment. • Potential for major port disruption is there but has not been realised. • Progressive improvement in road infrastructure has been emerging. • The region's economic benefit from live cattle and mineral exports is likely to remain limited if port facilities are not upgraded or improved upon. • On farm infrastructure assets annually vulnerable but could be better managed through real time data and information management systems. • On farm infrastructure very vulnerable to increased cyclonic intensity and penetration inland. • Coastal port assets are generally durable but also vulnerable to flooding and cyclone risk. • Regional housing stock could be vulnerable to more intense cyclones that penetrate further inland. 	Economic assets in the Gulf are traditionally vulnerable though economy adapted to that. Increased economic activity and new threats mean community may struggle with new system shocks.
2013 Resilience Rating				17
Maximum for this Attribute				30

Attribute Two: Community knowledge, aspirations and capacity

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
2.1 Community awareness levels of climate change and natural resource sustainability.	<ul style="list-style-type: none"> State and trend in individual and sectoral understanding of NRM issues and current behavior (regular survey). 	<ul style="list-style-type: none"> Post Yasi and 2010 floods, Gulf communities have a heightened awareness of the impacts of intense cyclonic and flooding events, if not an understanding of potential links to climate change. In 2007 NGRMG ran several workshops that included community members and climate scientists. The purpose of the workshops was to disseminate up-to-date information on climate change observations and projections and to identify region-specific targets and actions in response to climate change issues. The issues, targets and actions identified by the community were then used to inform/guide the NGRMG's actions (NGRMG, 2008). Awareness levels of natural resource sustainability in the region have been benchmarked in eastern parts of the region (Emtage, Herbon, & Harrison, 2007) and some categories of NRM practices benchmarked. A recent national study farm decision-making and climate change found that there are different types of farmers and that they differ systematically with respect to factors related to the climate change adaptation. It identified three types of farmers: 'Cash poor long-term adaptors' (55% of our sample), 'Comfortable non-adaptors' (26%) and 'Transitioners' (19%) (Hogan et al., 2011). The applicability of this to the Gulf requires work. 	<ul style="list-style-type: none"> Information about landholder and community understanding of climate change and natural resource sustainability is patchy across region. Recent post-disaster experience suggests awareness levels of climate change and natural resource sustainability would appear to be varied but aroused across the region. Ongoing periods of high environmental variability provide an opportunity to build awareness levels about climate change and natural resource sustainability. People may recognise that changes are happening, but not necessarily because of climate change. 	<p>4</p> <p>People are painfully aware of the impact of extreme events if not climate change and there is strong knowledge of the need to adapt.</p>
2.2 Education/ knowledge levels and spread across the community.	<ul style="list-style-type: none"> Education distribution measures. 	<ul style="list-style-type: none"> Rate of school and post-school education in the Northern Gulf Region is lower than the Queensland Average (OESR, 2010). Some 78.7% of students in the Northern Gulf were attending a government school and 21.3% attending a non-government school in 2009 (OESR, 2012). 	<ul style="list-style-type: none"> Education supports resilience and adaptation by providing individuals with knowledge and skills, and skills mix generally lower in Gulf, but balanced by strong practical and traditional knowledge level. Not a strong understanding of climate change within schools. School curriculums do not yet sufficiently take into account futuring/planning and relevant skills. Students wishing to complete their secondary education must either 	<p>2</p> <p>Due to high levels of individual resilience and practical knowledge, community not more vulnerable as a result of</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<ul style="list-style-type: none"> Some of the towns in the region do not have primary schools and there are limited education support services throughout the region (GRPAC, 2000). There are 7 schools in the Carpentaria, Croydon and Etheridge LGAs, none of which offer secondary education beyond year 10 (GRPAC, 2000; OESR, 2012). Departure of children is a major problem. Many high school students in remote areas attend boarding school in urban/more developed coastal areas or rely on school of the air for their education (Stokes, Holdsworth, & Stafford, 1999). There has been some growth in programs for education and knowledge building in the Northern Gulf developing and in place (TSCRC, 2006). 	<p>leave the region to do so or complete their education through distance education.</p>	<p>reduce formal education.</p>
<p>2.3 Skill levels and spread across the community.</p>	<ul style="list-style-type: none"> Skills distribution measures. 	<ul style="list-style-type: none"> There is a significant skills shortage in the Northern Gulf caused largely by the lack of education or training facilities (NGRMG, 2008). There is also a significant emigration of the region's youth towards larger cities seeking greater education and employment opportunities than the Northern Gulf can offer them (NGRMG, 2008). There is a broad shortage of 'most professionals' in regional and remote areas of Queensland, particularly in non-coastal regions (Bureau Of Transport And Regional Economics, 2006). There is a need to re-skill and provide assistance to develop business plans to help cope with change and increase business resilience. 	<ul style="list-style-type: none"> Skilled workers must be brought into the region to complete work and rarely reside in the Gulf region beyond the scope of their employment. Re-skilling industries/labour forces to adapt to other business models or business enterprises or cope with changed resource conditions is poor. There is a lack of tertiary or vocational education facilities in which to up-skill the region's population in association with enterprise level adjustment. 	<p>2</p> <p>Absence of a higher level skills-based within the region exists with educational migration and fly-in fly-out arrangements. Means lower adjustment capacities.</p>
<p>2.4 Individual leadership and complex problem solving.</p>	<ul style="list-style-type: none"> Expert based indicator of regional leadership (champions). 	<ul style="list-style-type: none"> There is limited quantitative data against which to make a more detailed assessment. Leaders for solving complex problems in the region are emerging within local government and the not-for-profit context. 	<ul style="list-style-type: none"> Leadership capacity in the region continues to group within a number of sectors, but regional leadership improving across the community and different industry sectors. Cyclonic/ flood events have tended to showcase leadership potential. 	<p>4</p> <p>Recent improvements in leadership cohesion means more strategic capacity for adaptation.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<ul style="list-style-type: none"> • External problems increasingly being responded to with a more cohesive leadership. • Greater cross collaboration emerging within the wider FNQROC framework. • Industry sectoral leadership not always strong within the region, leaving local producers vulnerable to policy settings set elsewhere. • Adapters tend to be cash poor, leaving innovators exposed when taking risks. 		
2013 Resilience Rating				12
Maximum for this Attribute				20

Attribute Three: Community vitality

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
3.1 Demographic stability.	<ul style="list-style-type: none"> Basic demographic characteristics (e.g., population, age structure, migration and growth rates). 	<ul style="list-style-type: none"> Population in the Northern Gulf grew 0.9% between 2010-11 (OESR, 2012). Most of the population is in the 45-64 (29.3%), 25-44 (23.5%), and 0-14 (19.7%) age groups (OESR, 2012). In the Northern Gulf some 14% of the population were born overseas, 11.5% Indigenous and 44.2% in the most disadvantaged profile (OESR, 2012). The Northern Gulf's population only has a 16.9% annual turnover compared with Cairns which had a 22.3% turnover in the same period, and Qld which had an average turnover of 19.7% (OESR, 2012). 	<ul style="list-style-type: none"> Population growth and turnover is steady and stable. There is greater proportion of adults at working age and few older people compared to Queensland. There is a strong opportunity to build local knowledge and system to resolve problems re climate change. 	<p>3.5</p> <p>Great stability in this component bodes well for durable adaptation measures.</p>
3.2 Wellbeing/happiness within the general community.	<ul style="list-style-type: none"> Happiness, wellbeing or genuine progress indexes. Dissatisfaction ratings. 	<ul style="list-style-type: none"> People living in remote areas of Queensland reported higher satisfaction with life, particularly with safety and feeling part of the community, and were more willing to help each other, compared with urban and rural areas (Queensland Health in Kreger & Hunter, 2005, p. 14). Post Yasi recovery efforts suggest this is mitigated against in the Gulf via high levels of post trauma-stress associated with disaster recovery. 	<ul style="list-style-type: none"> Having been through significant recent disasters and high debt level, the general community may be more vulnerable and prone to depression, suicide risk and have lowered resilience to change when there is a lack of adequate support networks. 	<p>3</p> <p>Community is generally more vulnerable at this point on time post-Larry, Yasi and 2010 flooding events.</p>
3.3 General community health and disparities.	<ul style="list-style-type: none"> Specific general health indicators. Comparative indicators across key community 	<ul style="list-style-type: none"> Socioeconomic and cultural factors specific to rural Australia are key influences. These range from individual-level factors (e.g., rural stoicism, poverty and substance use norms) to neighbourhood-level social characteristics (Beard 	<ul style="list-style-type: none"> While health is not bad in an international context, there are significant disparities within the community and with the outside world, impacting resilience. 	<p>2</p> <p>General regional disparity suggests need for cautious approach to improving</p>

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
	sectors.	<p>et al., 2009).</p> <ul style="list-style-type: none"> • People in remote areas are more likely to die from lung cancer, chronic heart disease, stroke, suicide, injury, poisoning, road traffic injury, diabetes, asthma and COPD. In remote areas, there were higher death and hospitalisation rates due to hazardous and harmful consumption of alcohol and tobacco smoking as well as a higher proportion of harmful and hazardous alcohol consumption (Queensland Health cited in Kreger & Hunter, 2005, p. 14). • Rural communities have socioeconomic and cultural characteristics that are distinct from non-rural communities. Evidence that socioeconomic disadvantage is a key driver of rural health disparities (Beard et al., 2009). • The rate of suicide in rural Australia indicates that there is a high prevalence of mental health issues. Certain occupations have been found to be associated with a higher risk of mental disorders. Programs to combat mental health issues in rural areas have focused on farmers (Fragar et al., 2010). • Rural workers have relatively high levels of psychological distress. While much attention has been focused on those working on farms, the rural unemployed have high levels of distress. Early intervention and vocational rehabilitation programs should be developed in rural communities to serve this hard-to-reach, but needy, rural population (Fragar et al., 2010). • ‘Suicide in Queensland 1999-2001’ provided an indicator of the extent of variance in mental health status between in metropolitan, rural and 		servicing. Major problems in health in the agricultural sector.

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<p>remote areas. Mortality rates for males in remote areas (42.3 per 100,000) were significantly higher than the male rates for metropolitan areas and Queensland as a whole. Regional rates for males and all persons were significantly higher than those from counterparts in metropolitan areas (De Leo & Heller 2004 cited in Kreger & Hunter, 2005, p. 18). This requires investigating in NG with expert panels.</p> <ul style="list-style-type: none"> Relationship between levels of mental health and wellbeing with employment and occupational status of rural residents found the highest levels of distress and functional impairment were reported in those permanently unable to work and the unemployed (Fragar et al., 2010). Rural unemployed suffer considerable psychological distress and 'disability', yet they are not the target of specific mental health promotion and prevention programs (Fragar et al., 2010). Indigenous residents of rural and remote Australia experience mental health issues associated with social disadvantage (Hunter, 2007). 		
3.4 Community services, infrastructure, access, and disparities.	<ul style="list-style-type: none"> Generalisable and comparable service benchmarks. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> Data shows numbers of aged care, child care; hospital services significantly lower than numbers across Queensland (OESR, 2012). Data about services is not benchmarked across the community. 	<ul style="list-style-type: none"> Access to services is much poorer than metropolitan areas. Key linkage infrastructure continues to threaten short-term food security and availability of fresh produce after major weather events. 	<p>2</p> <p>General regional disparity suggests need for cautious approach to improving servicing.</p>
3.5 Housing, accommodation	<ul style="list-style-type: none"> Levels of rental dependency. 	<ul style="list-style-type: none"> Public transport availability poor if available at all. 	<ul style="list-style-type: none"> Housing stress is a problem in attracting and retaining services and staff. 	<p>2</p>

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
and accessibility.	<ul style="list-style-type: none"> Levels of mortgage stress. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> There is limited road freight access in the Northern Gulf and sea freight is available only out of Weipa in the Cape York region, north of the Northern Gulf region (Bureau of Infrastructure Transport and Regional Economics, 2011). Land availability for housing poor within the region due to significant agriculture and mining land uses (Bureau of Infrastructure Transport and Regional Economics, 2011). 	<ul style="list-style-type: none"> Access to services poor and weaker than metropolitan areas. High vulnerability food and petrol shortages when main access roads are closed or flooded after major weather events such as cyclones. 	General regional disparity suggests need for cautious approach to improving servicing.
3.6 Community safety, risk and risk management.	<ul style="list-style-type: none"> Spatially identified flood, cyclone, drought and other natural risk ratios. Levels of community response and insurance. Criminality/ response reporting indicators. 	<ul style="list-style-type: none"> Anecdotal evidence of rural communities knowing what to do in the case of extreme events (due to high contact with variability in climate and weather). Very strong disaster preparedness and response mechanisms in place though require improved information flows (e.g., radar/ flood monitoring, etc). Cyclone Yasi (Category 5) caused significant environmental and property damage between the east coastline and Mt Isa due to wind, flooding and torrential rain (Felderhof & Poon, 2011). The environmental damage caused by Yasi led to increased fuel loads and an increased wildfire risk (which was mitigated by NGRMG through fire management practices and strategies) (Felderhof & Poon, 2011). In 2011 following significant flood events in Brisbane and much of regional Queensland, it was discovered that many insurers did not include flood coverage in their content insurance policies (AGT, 2011). 	<ul style="list-style-type: none"> Strong community preparedness and response mechanisms but improved real time data systems required. Growing stresses emerging from policy (NDRRA and insurance failures). Community and safety issues associated with criminality are of limited importance. 	<p>2.5</p> <p>While disaster preparedness and responses are strong, increasing stress due to insurance and NDRRA policy failures.</p>

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<ul style="list-style-type: none"> • Cyclones are fully covered by most insurers meaning most policy-holders claiming loss or damage from Cyclone Yasi were compensated by their insurers (AGT, 2011). • Following Cyclones Yasi some insurers increased their premiums by up to 300% (AGT, 2011). • Government NDRRA are relatively centralised, bureaucratic and inflexible, resulting in reduced betterment outcomes post disaster. • The rate of fraud-based crimes increased by 31%, robbery offences increased by 13% and armed robbery offences decreased by 18% in Northern Queensland between 2009 and 2010 (Field, 2010), Gulf implications likely to be less significant. 		
2013 Resilience Rating				15
Maximum for this Attribute				30

Attribute Four: Governance

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
4.1 Connectivity within and among key decision making institutions and sectors.	Expert based indicator of institutional connectivity.	<ul style="list-style-type: none"> Increasing connectivity between NRM body, traditional owners, human service sector, Local government and key industry players. Historically poor linkages between Councils, but now improving and integrating with FNQ ROC. Connections beginning to be made between Councils, Industry and NRM Body with steerage arrangements under the NQRDI. Clear connection between regional interests and higher lever RDA regional and cross regional strategic interests. Traditionally strong linkages to science community severed by changes in NRM and MTSRF funding models towards greater centralisation. 	<ul style="list-style-type: none"> Connectivity among regional institutions has improved and is now increased capacity for more integrated responses to emerging issues. Serious severance in strategic linkages within and across science institutions is slowly being rebuilt. 	<p>3</p> <p>Level of cross community connections are generally strong and improving. Regional players know how to secure science inputs as required.</p>
4.2 Adaptive management capacity of key decision making institutions and sectors.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> Limited consideration of climate change within the economic and social sector. Consideration of climate change is improving in the infrastructure and NRM sectors. Strategic capacity of regional councils improving but still seriously hampered by resource constraints. Traditional owner institutional capacities have been improving. There is somewhat of a cooperative relationship between the NGRMG and Cape York NRM particularly surrounding the Mitchell River catchment, which is a shared management area and fire management (Cape York NRM, 2013). Collaboration is largely limited by the availability 	<ul style="list-style-type: none"> Strategic capacity of key regional and sub-regional institutions has been stable and improving. General strategic capacity of key institutions remains chronically limited by available resources. 	<p>3</p> <p>Strong strategic capacity across most regional and sub-regional institutions within serious resource limitations.</p>

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
4.3 Adaptive use and management of integrated knowledge sets.	Expert based indicator of regional leadership and capacity.	<p>of human and financial resources.</p> <ul style="list-style-type: none"> • NGRMG has been progressively developing long term resource condition monitoring and reporting frameworks. • Science investment in the region has been limited and poorly coordinated, though key regional institutions have key linkages and good knowledge of location and value of existing knowledge. • Relatively strong regional acceptance and respect for traditional and historical knowledge. • Economic and social data weak and not able to adequately track short term changes. • The region is still some way off having long-term condition and trend assessment in monitoring of natural resources and the integration of social and economic (including governance) data is embryonic. • Currently limited use of effective decision support tools to integrate data into decision-making and adaptive management processes, but being explored. • Strong regional beef extension frameworks in place, supported by Regional NRM arrangements. 	<ul style="list-style-type: none"> • While there are data limitations, regional has a reasonably high capacity of access and use a wide range of data. • Science effort and coordination has declined with changing Commonwealth and State funding models, including beef extension. 	<p>3</p> <p>Strong strategic capacity across most regional and sub-regional institutions to access and use wide range of knowledge, but may become limited by changing Commonwealth and State investment models.</p>
2013 Resilience Rating				9
Maximum for this Attribute				15

References

- AGT. (2011). *Natural disaster insurance review: Inquiry into flood insurance and related matters*. Canberra: The Australian Government Treasury.
- Beard, J., Tomaska, N., Earnest, A., Summerhayes, R., & Morgan, G. (2009). Influence of socioeconomic and cultural factors on rural health. *Australian Journal of Rural Health*, 17(1), 10-15. doi: 10.1111/j.1440-1584.2008.01030.x
- Bureau of Infrastructure Transport and Regional Economics. (2011). *North Australian statistical compendium 2011 update*. Retrieved from http://www.bitre.gov.au/publications/2011/files/stats_014.pdf
- Bureau of Transport and Regional Economics. (2006). *Skill shortages in Australia's regions*. Canberra: Bureau of Transport and Regional Economics.
- Cape York NRM. (2013). *Cape York natural resource management, annual community report 2012-2013*. Atherton: Cape York Natural Resource Management.
- Centre for Social Responsibility in Mining. (2008). *Completion of mining at Oz Minerals Century Mine: Implications for Gulf Communities*. Retrieved from http://www.csr.m.uq.edu.au/docs/Completion%20of%20Mining%20at%20Oz%20Minerals%20Century%20Mine_Final_report.pdf
- Cummings Economics. (2010). *The contribution of the primary industries sector to Northern Queensland regional economies*. Retrieved from <http://www.cummings.net.au/pdf/recent/J2315CEAginvestreport.pdf>
- Cummings Economics. (2012). *Value of mining activity in Far North Queensland now up to \$1bn*. Retrieved from <http://www.cummings.net.au/pdf/recent/J2551CENoteMiningFNQ201011.pdf>
- Department of Environment. (2014). *Gulf of Carpentaria Commonwealth Marine Reserve*. Retrieved from <http://www.environment.gov.au/topics/marine/marine-reserves/north/gulf-of-carpentaria>
- Emtage, N., Herbon, J., & Harrison, S. (2007). Landholder profiling and typologies for natural resource-management policy and program support: Potential and constraints. *Environmental Management*, 40(3), 481-492. doi: 10.1007/s00267-005-0359-z
- Felderhof, L., & Poon, L. (2011). *Post-cyclone Yasi wildfire mitigation project*. Atherton: Firescape Science.
- Field, D. (2010). *New statistics show Qld's crime rate falling*. Retrieved from <http://www.abc.net.au/news/stories/2010/11/12/3064897.htm?site=westqld>
- Fragar, L., Stain, H. J., Perkins, D., Kelly, B., Fuller, J., Coleman, C., . . . Wilson, J. M. (2010). Distress among rural residents: Does employment and occupation make a difference? *Australian Journal of Rural Health*, 18(1), 25-31. doi: 10.1111/j.1440-1584.2009.01119.x
- Gray, D. (2010). *Gulf Savannah: Cairns and Great Barrier Reef - Where rainforest meets the reef*. Cairns: Tourism Tropical North Queensland.
- Greiner, R., Mayocchi, C., Larson, S., Stoeckl, N., & Schweigert, R. (2004). *Benefits and costs of tourism for remote communities: Case study for the Carpentaria Shire in north-west Queensland*. Darwin: CSIRO Sustainable Ecosystems and Townsville and Tropical Savannas CRC. Retrieved from <http://www.savanna.org.au/downloads/Carpentaria%20Report.pdf>
- GRPAC. (2000). *Gulf Regional Development Plan*. Cairns: Gulf Regional Planning Advisory Committee. Retrieved from http://www.dsdp.qld.gov.au/resources/plan/gulf-region/grdp_dec_2000.pdf
- Gulf Savannah Development. (2009). *Gilbert River irrigation area: Investment report April 2009*. Cairns: Gulf Savannah Development. Retrieved from <http://www.gulf-savannah.com.au/images/stories/documents/Gilbert%20River%20Investment%20Area%20Report%20Only.pdf>
- Gulf Savannah Development. (2011). *Gulf Savannah Northern Australia: Green and gold*. Cairns: Gulf Savannah Development.
- Hogan, A., Berry, H., Ng, S., & Bode, A. (2011). Decisions made by farmers that relate to climate change. *Agricultural Science*, 23(1), 36-39.
- Hunter, E. (2007). Disadvantage and discontent: A review of issues relevant to the mental health of rural and remote Indigenous Australians. *Australian Journal of Rural Health*, 15(2), 88-93. doi: 10.1111/j.1440-1584.2007.00869.x
- Kreger, A., & Hunter, E. (2005). *Unfenced road ahead: A review of rural and remote mental health service delivery and policy. A report for the Mental Health Unit, Queensland Health*. Brisbane: University of Queensland and Queensland Health. Retrieved from <http://crrmhc.com.au/pdfs/UnfencedRoad.pdf>

- NGRMG. (2008). *A natural resource management plan for the Northern Gulf region 2008-2013*. (07-374-R-002). Georgetown: Northern Gulf Resource Management Group (NGRMG). Retrieved from http://www.northerngulf.com.au/regional_plan.html
- OESR. (2010). *Queensland regional profiles: Northern Gulf. Based on local government area (2010)*. Brisbane: Queensland Treasury.
- OESR. (2012). *Queensland regional profiles Torres Regional. Based on local government area (2012)*. Brisbane: Queensland Treasury.
- Office of Northern Australia. (2012). *North Queensland irrigated agriculture strategy—fact sheet*. Canberra: Department of Regional Australia, Local Government, Arts and Sport. Retrieved from <http://www.regional.gov.au/regional/ona/files/sustainable-development-in-the-north-fact-sheet-20120720.pdf>
- QTT. (2012). *Queensland Regional Profile: Selected LGAS Region*. Brisbane: Queensland Treasury and Trade: Government Statistician.
- Savannah Way. (2014). *Australia's adventure drive*. Retrieved from <http://www.savannahway.com.au/index.html>
- SEWPac. (2011). *Fact sheet: Proposed Gulf of Carpentaria Commonwealth marine reserve*. Canberra: Department of Sustainability, Environment, Water, Population and Communities (SEWPac).
- Stokes, H., Holdsworth, R., & Stafford, J. (1999). *Rural and remote school education: A survey for the Human Rights and Equal Opportunity Commission. Final Report*. Retrieved from https://www.humanrights.gov.au/sites/default/files/content/pdf/human_rights/rural_remote/scoping_survey.pdf
- Taylor, A., Larson, S., Stoeckl, N., & Carson, D. (2011). The haves and have nots in Australia's tropical north – new perspectives on a persisting problem. *Geographical Research*, 49(1), 13-22. doi: 10.1111/j.1745-5871.2010.00648.x
- TSCRC. (2006). *Knowledge building and education*. Retrieved from <http://savanna.cdu.edu.au/research/projects/communication.html>

Notes

- All Office and Economic and Social Research (OESR) data is a combination of the statistical information/census data for Carpentaria Shire, Croydon Shire, Etheridge Shire and Tablelands Regional Council.
- The Northern Gulf region falls across the Northern, North West and Far North statistical regions.
- The OESR 2011 data on disadvantage, housing, education, business and education has not been released yet as a basis for update.

Cape York Peninsula

For the purposes of this study, the Cape York Peninsula region covers the area covered by the Cape York Peninsula NRM Region. This sub-region falls entirely within the Regional Development Australia Far North Queensland and Torres Strait region.

Attribute One: Economic viability

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.1 Diversity and quality of growth in economic activity.	<ul style="list-style-type: none"> • Comparison of Gross Regional Product and Gross Value Add by industry. • Economic growth rates with sectoral specific analysis. 	<ul style="list-style-type: none"> • The mining industry contributes 56.9% to GRP, public administration, defence and community services constitute 18.1% of GRP (primarily through CDEP programs in indigenous communities) and agriculture (which makes up 57% of land use in the region) contributes 2.4% to GRP (Cape York Sustainable Futures, 2008; National Heritage Trust, 2005). • Rio Tinto's mining operations in Weipa expanded their production output by 40% in 2007 to ship more than 16 million tonnes of bauxite annually. Mining operations in Weipa and Aurukun may be expanded (Cummins Economics, 2007). • Nature-based tourism in Cape York is expanding as the primary access road is progressively sealed, allowing those without 4WDs to access the region (National Heritage Trust, 2005). • The tourism industry in the Far North has been impacted on by the global financial crisis and recent extreme weather events (Churchill, 2012). • The relevance and impact of this on the diversity and quality in economic activity in CY requires further investigation with expert panel members. • Cape York's economy is somewhat Government-driven through welfare and indigenous 	<ul style="list-style-type: none"> • Economic activity in the region is dominated by the mining industry – but it has a limited real impact on the regional economy as economic benefits occur outside the region and much labor force is imported. • Pastoral industry economy is significantly subsidised. • Mining industry is particularly vulnerable to changes in the economy. • Ongoing mining expansion is likely to increase the already widening economic gap between residents/workers in Weipa and other communities in the Peninsula. • Agricultural land uses and emerging tourism industry are likely to be impacted by climate change (Queensland Government, 2011). • The construction industry is under-pinned by government funded housing stimulus. • Increasing conservation declarations have generally not been progressed with compensation and targeted economic structural adjustment. 	<p>2</p> <p>Economy is significantly dependent of welfare system and industry subsidies. Mining profits still largely exported, but increasing Indigenous engagement.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.2 Vulnerability of natural and energy resource base.	<ul style="list-style-type: none"> • Comparative measure of natural resource dependency. • Measures of energy security and diversity. • Measures of food security and diversity. 	<p>development programs. For example in 2007 the Federal Government invested \$48 million into Welfare Reform Trials in Cape York (a program undertaken by the Cape York Institute and Cape York Partnerships) and continued to provide funding in subsequent years (\$11.8 million in 2013) (Cape York Institute, 2007; Commonwealth of Australia, 2012).</p> <ul style="list-style-type: none"> • The vulnerability of energy security in the Cape requires further investigation. • The vulnerability of food security in CY requires investigation. More extreme events with flooding will make communities more isolated and thus vulnerable based on current transportation infrastructure (Queensland Government, 2011). • Mining underpins GRP in CY which is dependent on natural resource extraction conferred via long term leases. Negotiation of future mining activity is vulnerable to land use conflict without improved negotiation frameworks. • Economic independence for Traditional Owners in CY is increasingly associated with their participation in natural resource economies (grazing, nature based tourism) which are increasingly vulnerable to climate change. • Water availability for agriculture requires further assessment and will become a bigger issue into the future for both agricultural and non-agricultural land uses (Kleinhardt, 2007). • Primary industries are vulnerable to expected decreases in rainfall and increased evaporation rates (Queensland Government, 2011). • Agriculture land in the Cape has poor pasture quality. Invasive weed species are increasing within the region (Queensland Government, 	<ul style="list-style-type: none"> • Despite high levels of welfare dependency, the CY region is also very dependent on natural resources. For many segments of the CY community, their growing participation in the natural resource economy represents a way forward to resolve complex social, economic and environmental problems facing people in CY. • The natural resource economy is vulnerable to conflict between stakeholders over land use/access. • The natural resource base in CY is declining due to increased protections and resources are further vulnerable in the face of climate change. • CY is a net importer of food and energy with many communities still operating from diesel generators thus extremely vulnerable to fossil fuel spikes. 	<p>2</p> <p>Cape York Peninsula (CYP) has significant mining and conservation assets and some agricultural capabilities but significant conflict over planning and use remains. CYP has low levels of food, energy and water security.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.3 Inclusiveness and economic fairness/ equity.	<ul style="list-style-type: none"> Individual income (analysed by age, education level, industry and occupation). Household income analysed by (family composition, tenure type and low income households). 	<p>2011).</p> <ul style="list-style-type: none"> Land use is vulnerable to the impacts of extreme weather events such as flooding, wind damage, and damaged transport infrastructure (Queensland Government, 2011). Cyclones and flooding are impacting unpredictably on fisheries and fisheries management in the Far North (Queensland Government, 2011). <ul style="list-style-type: none"> CYP has vulnerable populations linked to the Indigenous 'welfare economy' (OESR, 2012; Pearson, 2013). There is a significant lack of employment opportunities in the Peninsula. Employment has traditionally been limited to cattle stations (though less so since the 1960s), government welfare or employment programs or tourism ventures. Much of the Peninsula's Indigenous population are highly reliant on welfare and social outreach programs such as the Community Development Employment Projects (CDEP) Program or Centrelink payments (Queensland Ambulance Service, 2000). Some 70.6% of people of CYP are in the most disadvantaged profile (OESR, 2010). In 2011, some 32% of individuals earned < \$400/week (lower than the state average of 34.6%) and 28.4% of individuals earned \$400-\$999/week (OESR, 2012). Some 95.2% of registered businesses in the Cook Local Government Area (LGA) are small businesses (OESR, 2012). In 2008-9 the average annual personal income of Cook LGA residents was \$31,294 which is lower than the state average for the period (\$44,239) 	<ul style="list-style-type: none"> Some 60% of the population in CYP are low income earners and many rely on welfare as their main income. Low income earners are vulnerable to change due to their lowered capacity to afford to make lifestyle changes. A significant part of the CYP population is not employed and when they are it is largely via small businesses with low turnover in vulnerable sectors (e.g., retail and food services). Small business generally has a lower per capita income. 	<p>1.5 CYP is highly welfare dependent.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.4 Workforce participation and employment.	<ul style="list-style-type: none"> Regional employment participation rates and trends and employment by industry. 	<p>(OESR, 2012).</p> <ul style="list-style-type: none"> Some 100% of the population in many Cape York communities are considered to be in the lowest quintile of Socio-Economic Index of Disadvantage. Aurukun Shire had the highest proportion of persons with an individual weekly income less than \$400 in the region 86.8% in 2006 (OESR, 2012) compared to Cook LGA. The family composition in Cape York is relatively similar to that of the Queensland average with 17.3% of Cape York Families being single parent households compared with 16.1% of Queensland families (OESR, 2012). <p>In March 2012 unemployment in Cook LGA was 18.5% compared with 5.5% in Queensland (OESR, 2012) and some 18.5% of QLD unemployment is in the Cook Regional LGA (OESR, 2012).</p> <ul style="list-style-type: none"> High unemployment rates are linked to the Indigenous 'welfare economy' (Pearson, 2005). Regional employment by industry: Agriculture (18.2%), mining industry (12%) Public Administration and Safety (12.3%) Retail trade (11.9%), Accommodation and Food Services (11.9%) (OESR, 2012). The primary industry workforce is seasonal, while many of the mines employ Fly in Fly Out (FIFO) (Burke, 2011). Similarly the WT assessment expected that there will be a higher unemployment rate and some degree of redeployment of workforce in response to climate change. This requires investigation in CYP. 	<ul style="list-style-type: none"> Very high rates of unemployment and welfare dependence in the region particularly among Indigenous sector (20%+ unemployment rate in many CYP Indigenous communities). Primary industries employment is largely seasonal requires low-skilled workforce and is low-income. Employment in retail and accommodation services is largely via small business with low income. Mining activity, which drives GRP and employs FIFO workers. Primary industries employment strongly affected by cyclones (Kleinhardt, 2007). Conservation economies have not yet delivered sustainable job outcomes. 	<p>1.5</p> <p>Workforce participation and employment outcomes extremely limited. Some improvements in mining sector engagement and emerging ecosystem service market opportunities.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
1.5 Economic confidence.	<ul style="list-style-type: none"> Consumer confidence. Investor confidence. Small business confidence. 	<ul style="list-style-type: none"> CY has a limited regional economy due to unemployment, the Indigenous welfare economy, and mining (where benefits largely are not locally returned). Conflict over land use has a significant impact on economic confidence and longer term investment. The impact of other factors on economic confidence also requires further investigation (e.g., population growth, levels of investment from the banks, global trends, natural disasters etc). 	<ul style="list-style-type: none"> Land title uncertainty inhibits land to be purchased and financed through financial institutions (Cape York Institute, 2007). Development and external investment into the economy impeded by land issues, transport access issues. Uncertainty surrounding World Heritage Listing affecting community confidence in future of land use and natural resource management. 	<p>2</p> <p>Significant planning, tenure and land use conflicts reduce investor confidence in economic opportunities.</p>
1.6 Vulnerability of Key Economic Infrastructure Assets.	<ul style="list-style-type: none"> Data re whether climate change will stress key infrastructure assets of economic importance. 	<ul style="list-style-type: none"> Key road transport assets are progressively improving but remain annually vulnerable to annualised flooding. Due to the unreliable nature of road networks in the region (much of which is unsealed) air transportation is important for freight and passenger travel. Air transport is currently very expensive which increases the cost of freight and products in the region. Airstrips in the region are generally poor quality. In 2012 the Australian and Queensland Governments and the CSIRO identified the potential to further grow and diversify the northern QLD beef industry as a national/state priority in the North Queensland Irrigated Agriculture Strategy worth \$10 million. The strategy focuses on identifying/expanding water capture/ storage, commercial viability of irrigated agriculture and other services/infrastructure (DRALGAS, 2012). 	<ul style="list-style-type: none"> Annualised transport infrastructure vulnerability more vulnerable under more severe events, leading to a narrower trading window. Cost of living will increase in the region due to increased freight and consequently product costs if the roads are flooded more frequently and fuel prices continue to rise. New realisation that farm assets and stock very vulnerable to more intense cyclonic and flood events. Natural disaster relief funding models not well suited to progressive betterment. Progressive improvement in road infrastructure has been emerging. The region's economic benefit from live cattle and mineral exports is likely to remain limited if port facilities are not upgraded or improved upon. On farm infrastructure assets annually vulnerable but could be better managed through real time data and information management systems. 	<p>2</p> <p>Economic assets are traditionally vulnerable though economy has adapted. Increased economic activity and new threats mean community may struggle with new system shocks. Major road and tele-communication risks as a result.</p>
2013 Resilience Rating				11
Maximum for this Attribute				30

Attribute Two: Community knowledge, aspirations and capacity

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
2.1 Community awareness levels of climate change and natural resource sustainability.	<ul style="list-style-type: none"> State and trend in individual and sectoral understanding of NRM issues and current behavior (regular survey). 	<ul style="list-style-type: none"> Limited local benchmarking of community attitudes, understanding and behavior in relation to climate change in Tropical Queensland in general – conditions in CYP require further investigating specifically in relation to Traditional Owner conceptions of climate change. Student benchmarking in 2007 shows unacceptably low levels of knowledge about the greenhouse effect, greenhouse gases and climate change among high school students in a regional Queensland city conditions in CY require further investigating (Boon, 2009). Most people in Queensland coastal communities and southern capital cities believe that climate change is a threat requiring immediate action, but preparedness to act is unclear. High school students and teachers knowledge (including those citing science and environmental studies) of climate science insufficient for informed citizenship participation (Boon, 2009). James Cook University published the results of an extensive survey of people living adjacent to the Great Barrier Reef (GBR) regarding their awareness and understanding of climate change and its impacts. 65.2% of respondents believed that human activity is highly influential on the climate and 72.6% believed that action was necessary (Nilsson, Sutton, & Tobin, 2010). There is considerable variation in the 	<ul style="list-style-type: none"> Understanding about climate change and natural resource sustainability is varied/inconsistent and generally low across the region but growing. Sectoral differences within CYP require further investigation, particularly between Indigenous and non-Indigenous sectors. Frequency and intensity of resource use does not necessarily correlate to a higher understanding and appreciation for sustainability or support for action to manage resources sustainability. Recent environmental variability provides an opportunity to build awareness levels about climate change and natural resource sustainability. Traditional Owners, through stories and recollections of ‘what once was and what now is’ are witnessing changes as a result of; temperature rises/decreases, sea-level rises etc. 	<p>3</p> <p>People are painfully aware of the impact of extreme events and climate change and there is strong knowledge of the need to adapt.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
2.2 Education/ knowledge levels and spread across the community.	<ul style="list-style-type: none"> Education distribution measures. 	<p>recognition and acknowledgement of climate change across the spectrum of stakeholders in the GBR.</p> <ul style="list-style-type: none"> There is a significant truancy problem in school age children in the CY region (National Indigenous Radio Service, 2012). Attendance of primary and tertiary students in the Aurukun area was 40% in 2009 and 65% in 2010 after the establishment of the Cape York Aboriginal Australian Academy (APNM, 2010). There are currently 512 students in Cape York participating in vocational education or training. There is little information surrounding the percentage of the CY population undertaking tertiary or post-graduate study (OESR, 2012). Student benchmarking in 2007 shows unacceptably low levels of knowledge about climate change among high school students and pre-service teachers including those specialising in SOSE in a regional Queensland (Boon, 2009). 	<ul style="list-style-type: none"> New programs (like Direct Instruction) are seeking to address significant problems with school attendance/ performance standards. There is a poor understanding of climate change in schools in Queensland in general. School curriculums do not yet sufficiently take into account futuring/planning and relevant skills. Traditional/cultural skills still being transferred but eroding. Education supports resilience by providing individuals with a range of knowledge and skills however rates of school based education also need to be considered in terms of capacity needs for resilience and adaptation in the face of climate change. 	<p>2</p> <p>More limited individual education resilience a little tempered by practical knowledge.</p>
2.3 Skill levels and spread across the community.	<ul style="list-style-type: none"> Skills distribution measures. 	<ul style="list-style-type: none"> Broad shortage of 'most professionals' in regional and remote areas of Queensland, particularly in non-coastal regions (BTRE, 2006). There is a lack of tertiary or vocational education facilities in which to teach or up-skill the region's population (OESR, 2012). Re-skilling industries/labour forces to adapt to other business models or business enterprises or cope with changed resource conditions is poor and regional support to small business has declined. Requires further investigation via expert panel. 	<ul style="list-style-type: none"> There is a need to re-skill for appropriate employment pathways and provide assistance to entrepreneurs to develop business plans to help the traditional owner and other segments of the CY community to cope with change and be resilient. Longer term skills development strategies required to better link current and required skills to emerging economic opportunities. 	<p>2</p> <p>Absence of a higher level skills-based within the region exists with educational migration and fly-in fly-out arrangements.</p>
2.4 Individual leadership and complex problems solving.	<ul style="list-style-type: none"> Expert based indicator of regional leadership (champions). 	<ul style="list-style-type: none"> Regional scale leadership has sought to tackle strategic issues concerning education, welfare reform and land title. Greater cross collaboration emerging within the wider cross Council framework. 	<ul style="list-style-type: none"> High degree of contestation between stakeholders in the region has historically been an issue for leadership and complex problem solving in the region. Opportunities through new regional organisations 	<p>2</p> <p>While there is some strong individual leadership, this is not wide-spread enough to</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<ul style="list-style-type: none"> Requires further expert assessment. 	<p>which have recently emerged to provide support to decision making in CY.</p> <ul style="list-style-type: none"> Local government capacity is challenged by the complex leadership decision making required in the face of climate change and adaptation and the increasing pressures placed on communities by devolvement from other levels of government. 	<p>lift strategic capacity for adaptation, but presents some strategic opportunities.</p>
<p>2013 Resilience Rating</p>				<p>9</p>
<p>Maximum for this Attribute</p>				<p>20</p>

Attribute Three: Community vitality

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
3.1 Demographic stability	<ul style="list-style-type: none"> Basic demographic characteristics (e.g., population, age structure, migration and growth rates). 	<ul style="list-style-type: none"> CYP's rate of population growth is strong relative to QLD (second fastest growing LGA in regional QLD and number 8 LGA in QLD (OESR, 2012). Population in Cook LGA grew 6.4% between 2010-11 and 2.7% between 2006-11 (OESR, 2012). Most of the population are in the 45-64(31.4%) and 25-44 (27%) age groups (OESR, 2012). At the time of 2006 census, 16.8% were residing at a different address one year earlier (compared with 19.7% across Queensland) and 40% were at a different address five years earlier (compared with 47.6% across Queensland) (OESR, 2012). In 2006 there were some 11% born overseas, 16.1% Indigenous, 70.6% in the most disadvantaged profile. By 2011 23.1% were born overseas, 20% Indigenous. The region's population is highly dispersed with approximately 18,000 people living over an area half the size of Victoria (Phillpot, 2005). High infrastructure, construction and maintenance costs per person occur because of the dispersed population (Green & Preston, 2010). 	<ul style="list-style-type: none"> Very high proportion of population in the most disadvantaged profile. Population growth is strong requiring further economic diversification. High rates of mobility within the region if not beyond. Generally a very young population relative to the State average. Instability, disadvantage and fewer older people provide challenges for dealing with climate change. 	<p>2.5</p> <p>Growing and very young population presents significant challenges, including frequent loss of strong community leaders.</p>
3.2 Wellbeing/happiness within the general community.	<ul style="list-style-type: none"> Happiness, wellbeing or genuine progress indexes. Dissatisfaction ratings. 	<ul style="list-style-type: none"> In 2008 'wellbeing centres' were established in Aurukun, Hope Vale and Mossman Gorge to provide counseling and other wellbeing services to the community. In 2010 further counselors were employed in Aurukun because of the high demand for such services (Sexton-McGrath, 2010). People living in remote areas of Queensland reported higher satisfaction with life, particularly 	<ul style="list-style-type: none"> Residents are more vulnerable and prone to depression, suicide risk and have lowered resilience to change when there is a lack of adequate support networks. Accessibility to community services and facilities such as those in Aurukun, Hope Vale provide important personal support. Substance abuse impacts overall community well-being and safety and also contributes to community 	<p>2</p> <p>Well-being generally seriously affected by social and economic conditions as well and continuing cultural declines. Some improvements via structured alcohol and child-protection</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
3.3 General community health and disparities.	<ul style="list-style-type: none"> • Specific general health indicators. • Comparative indicators across key community sectors. 	<p>with safety and feeling part of the community, and were more willing to help each other, compared with urban and rural areas (Queensland Health, 2004 cited in Kreger & Hunter, 2005, p. 14).</p> <ul style="list-style-type: none"> • A BTRE study indicates that in FNQ a significant proportion of the population have weak family and community bonds, feelings of loneliness and a lack of emotional or financial support (BTRE, 2005). • Some 70.6% of the Cook LGA population are in the most disadvantaged profile (OESR, 2012). • Developed mining settlements in the Peninsula such as Weipa have a much higher average annual income than the more remote or Indigenous communities (OESR, 2012). • Indigenous residents of rural and remote Australia experience mental health issues associated with social disadvantage (Hunter, 2007). • Diseases such as Ross River Fever are endemic to parts of the region (Green & Preston, 2010). • People in remote areas are more likely to die from lung cancer, CHD, stroke, suicide, injury, poisoning, road traffic injury, diabetes, asthma and COPD. In remote areas, there were higher death and hospitalisation rates due to hazardous and harmful consumption of alcohol and tobacco smoking (Queensland Health 2004, cited in Kreger & Hunter, 2005, p. 14). • Mortality rates for males in remote areas (42.3 per 100 000) were significantly higher than the male rates for metropolitan Qld (De Leo & Heller, 2004). • Relationship between levels of mental health and well-being with employment and occupational status of rural residents found the 	<p>health.</p> <ul style="list-style-type: none"> • Cape in general has unacceptable higher rates of morbidity/mortality. • Socioeconomic and cultural factors are key determinants of rural health. • Evidence that socioeconomic disadvantage is a key driver of rural health disparities (Beard et al., 2009). • Mosquito borne diseases such as malaria and dengue fever are likely to spread further south throughout the Cape York and Wet Tropics regions (Green & Preston, 2010). Disease risks are also increasingly associated with proximity to PNG/Asia. • Substance abuse causes other related diseases such as diabetes, organ failure prevalent in communities. 	<p>programs.</p> <p>2 General regional disparity suggests need for urgent reform towards improved servicing.</p>

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<p>highest levels of distress in those permanently unable to work and the unemployed (Fragar et al., 2010).</p> <ul style="list-style-type: none"> Rural unemployed suffer considerable psychological distress and 'disability', yet they are not the target of specific mental health promotion and prevention programs (Fragar et al., 2010). 		
3.4 Community services, infrastructure, access, and disparities.	<ul style="list-style-type: none"> Generalisable and comparable service benchmarks. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> Data shows numbers of aged Care, child Care, hospital services are very low relative to numbers across Queensland (OESR, 2012) Services data not benchmarked across communities. Roads limit service access (Kleinhardt, 2007). Strong service disparities within rural and remote parts of the region (OESR, 2012). 	<ul style="list-style-type: none"> Availability of and access to services is particularly poor in CYP. Broad variety of government services offered across CYP, but often duplicated/limited due to costs. 	<p>1.5 General regional disparity suggests need for urgent reform towards improved servicing.</p>
3.5 Housing, accommodation and accessibility.	<ul style="list-style-type: none"> Levels of rental dependency. Levels of mortgage stress. Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> Buildings more expensive because they have to be cyclone rated and goods need to be transported further from major production hubs (BITRE, 2011). Limited road freight access in the Cape and sea freight is available only out of Weipa (BITRE, 2011). Many structure now suitably maintained to meet the requirements of extreme events. 	<ul style="list-style-type: none"> Access to housing is particularly poor with significant over-crowding. High vulnerability for food and petrol shortages when main access roads are closed or flooded after major weather events such as cyclones (BITRE, 2011). 	<p>1.5 Significant housing stress with low levels of extreme event housing preparedness.</p>
3.6 Community safety and risk.	<ul style="list-style-type: none"> Spatially identified flood, cyclone, drought and other natural risk ratios. Criminality/ reporting indicators. 	<ul style="list-style-type: none"> Anecdotal evidence of difficulty of communities knowing how to prepare for and what to do in the case of extreme events. Low levels of adequate insurance coverage. Crime rates are substantially higher than State average (OESR, 2003). The rate of fraud-based crimes increased by 31%, robbery offences increased by 13% and armed robbery offences decreased by 18% in Northern Queensland between 2009 and 2010. 	<ul style="list-style-type: none"> Significant risks from poor insurance and other coverage in communities. Climate change pressures on the costs of living are likely to exacerbate already high rates of crime. 	<p>1.5 Limited insurance coverage plus high levels of violence-based crimes.</p>
2012 Resilience Rating				11

Attribute Component	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
Maximum for this Attribute				30

Attribute Four: Governance

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
4.1 Connectivity within and among key decision making institutions and sectors.	Expert based indicator of institutional connectivity.	<ul style="list-style-type: none"> • Current significant stressors on connectivity between significant regional players, exacerbated by poorly coordinated Government strategies. • Some connectivity re-emerging via Regional Plan. • Historically poor linkages between Councils, but now improving and integrating with ROCCY. • Weak linkages to science community and the region. Clear connection between regional interests and higher lever RDA regional and cross regional strategic interests. 	<ul style="list-style-type: none"> • Much discord among regional groups as a result of externally driven strategies in the Cape. • Ongoing severance in strategic linkages within and across science institutions is slowly being rebuilt. 	<p>2</p> <p>Level of cross community connections weak.</p>
4.2 Adaptive management capacity of key decision making institutions and sectors.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Regional Indigenous development capacities, not even across the regional landscape. • Limited opportunity for consideration of climate change within the economic and social sector. • Consideration of climate change is improving in the infrastructure and NRM sectors. • Strategic capacity of regional councils improving but still seriously hampered by resource constraints. • Traditional Owner institutional capacities have been improving over time. 	<ul style="list-style-type: none"> • Strategic capacity of key regional and sub-regional institutions has been stressed by resourcing and significant policy uncertainty. • General strategic capacity of key institutions remains chronically limited by available resources. 	<p>2.5</p> <p>Some strategic capacity but seriously limited by resource and governance constraints.</p>
4.3 Adaptive use and management of integrated knowledge sets.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Limited long term social, economic and resource condition monitoring and reporting frameworks. • Science investment in the region has been limited and poorly coordinated. • Relatively strong regional acceptance and respect for traditional and historical knowledge. • Economic and social data weak and not able to adequately track short term changes. 	<ul style="list-style-type: none"> • Some considerable attention has been paid to recording/ preserving tradition knowledge. • Science effort and coordination remains poorly coordinated/ invested. 	<p>2</p> <p>Limited science and traditional knowledge integration but desire for new local level models. Non-cohesive regional science.</p>

Attribute Components	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value and Logic (1-5)
		<ul style="list-style-type: none"> • The region is still some way off having long term condition and trend assessment in monitoring of natural resources and the integration of social and economic (including governance) data is embryonic. • Currently limited use of decision support tools to integrate data into decision-making and adaptive management processes, but being explored. • Strong regional beef extension frameworks in place. 		
2012 Resilience Rating				6.5
Maximum for this Attribute				15

References

- APNM. (2010). Cape York's education revolution. *Education Review*. Retrieved from <http://www.educationreview.com.au/pages/section/article.php?s=Breaking+News&idArticle=19499>
- Beard, J., Tomaska, N., Earnest, A., Summerhayes, R., & Morgan, G. (2009). Influence of socioeconomic and cultural factors on rural health. *Australian Journal of Rural Health*, 17(1), 10-15. doi: 10.1111/j.1440-1584.2008.01030.x
- Boon, H. (2009). Climate change? When? Where. *The Australian Educational Researcher*, 36(3), 43-65. doi: 10.1007/BF03216905
- Bureau of Infrastructure Transport and Regional Economics (BITRE). (2011). *Northern Australia statistical compendium 2011 update*. Canberra: Department of Infrastructure and Transport.
- BTRE. (2005). *Focus on regions no. 4: Social capital*. Canberra: Bureau of Transport and Regional Economics. Retrieved from http://www.bitre.gov.au/publications/2005/files/ip_055.pdf
- BTRE. (2006). *Skill shortages in Australia's regions*. Canberra: Bureau of Transport and Regional Economics. Retrieved from http://www.bitre.gov.au/publications/2006/files/wp_068.pdf
- Burke, J. (2011). Cape York mine approved by traditional owners. *Australian Mining*. Retrieved from <http://www.miningaustralia.com.au/news/cape-york-mine-approved-by-traditional-owners>
- Cape York Institute. (2007). *From hand out to hand up: Cape York reform project - Aurukun, Coen, Hope Vale, Mossman Gorge design recommendations*. Cairns: Cape York Institute for Policy and Leadership.
- Cape York Sustainable Futures. (2008). *Key industries*. Retrieved from <http://www.cysf.com.au/cape-york/industry-a-economy/71-key-industries.html>
- Churchill, M. (2012). *\$3m budgeted for North Queensland*. Retrieved from <http://www.tourismportdouglas.com.au/3m-budgeted-for-Far-North-tourism.4176.0.html>
- Commonwealth of Australia. (2012). *Budget: Continuing our efforts to close the gap*. Canberra: Commonwealth of Australia.
- Cummings Economics. (2007). Mining resurgent. *Cairns Post Business Review*. Cairns: Cummings Economics.
- De Leo, D., & Heller, T. S. (2004). *Suicide in Queensland 1999-2001: Mortality rates and related data*. Brisbane: Griffith University-Australian Institute for Suicide Research and Prevention.
- DRALGAS. (2012). *North Queensland irrigated agriculture strategy fact sheet: Sustainable development in the north*. Canberra: Department of Regional Australia, Local Government, Arts and Sport, Office of Northern Australia.
- Fragar, L., Stain, H., Perkins, D., Kelly, B., Fuller, J., Coleman, C., . . . Wilson, J. (2010). Distress among rural residents: Does employment and occupation make a difference? *The Australian Journal of Rural Health*, 18(1), 25-31. doi: 10.1111/j.1440-1584.2009.01119.x
- Green, D., & Preston, B. (2010). *Climate change in Cape York*. Cairns: CSIRO.
- Hunter, E. (2007). Disadvantage and discontent: A review of issues relevant to the mental health of rural and remote Indigenous Australians. *Australian Journal of Rural Health*, 15(2), 88-93. doi: 10.1111/j.1440-1584.2007.00869.x
- Kleinhardt. (2007). *Cape York Peninsula: Regional economic and infrastructure framework report*. Cairns: Kleinhardt.
- Kreger, A., & Hunter, E. (2005). *Unfenced road ahead: A review of rural and remote mental health service delivery and policy. A report for the Mental Health Unit, Queensland Health*. Brisbane: University of Queensland and Queensland Health. Retrieved from <http://crrmhq.com.au/pdfs/UnfencedRoad.pdf>
- National Heritage Trust. (2005). *Cape York natural resource management plan: Final draft*. Cooktown: Cape York Peninsula Landcare.
- National Indigenous Radio Service. (2012). *Schools need to find ways to engage kids: Cape York group*. Retrieved from <https://nirs.org.au/blog/NEWS/article/27631/Schools-need-to-find-ways-to-engage-kids%3A--Cape-York-group.html>
- Nilsson, J., Sutton, S., & Tobin, R. (2010). *A community survey of climate change and the Great Barrier Reef*. Cairns: Reef and Rainforest Research Centre, James Cook University.
- OESR. (2003). *Crime and social profiles local crime areas, Queensland 2002-2003*. Brisbane: Queensland Government.
- OESR. (2010). *Queensland regional profiles: Cape York region*. Brisbane: Office of Economic and Statistical Research.
- OESR. (2012). *Queensland regional profiles Torres regional. Based on local government area (2012)*. Brisbane: Queensland Treasury.

- Pearson, N. (2005). *'The Cape York agenda'*. Speech to the National Press Club of Australia, 30 November, Canberra. Retrieved from http://cyi.org.au/wp-content/uploads/2011/09/4-The-Cape-York-Agenda_National-Press-Club.pdf
- Pearson, N. (2013, June 15-16). Failures can't be pinned on Aborigines, *The Weekend Australian*, p. 19.
- Phillpot, R. (2005). *The 'gammon economy' of Cape York: Lessons for nation building in Pacific island countries*. Paper presented at the Oceania Development Network Pacific Conference on Growth and Development, University of Papua New Guinea. Retrieved from <http://113.20.9.89/~zcmscom2/cyi.org.au/wp-content/uploads/2011/09/7-20The-20-27Gammon-20Economy-27-20of-20CY.pdf>
- Queensland Ambulance Service. (2000). *Enhancing the capacity of Cape York Communities to prevent and respond to health care emergencies and injuries*. Cairns: Queensland Ambulance Service & Aboriginal and Torres Strait Islander Coordination Unit.
- Queensland Government. (2011). *Climate change in the Cape York region*. Brisbane: Queensland Government: Toward Q2. Queensland Government, Brisbane.
- Sexton-McGrath, K. (2010). *Cape wellbeing centres get \$2.5m*. Retrieved from <http://www.abc.net.au/news/2010-04-21/cape-wellbeing-centres-get-25m/404518>

Torres Strait

Please Note: All OESR data is a combination of the statistical information/census data for the Torres and Torres Strait Islands LGAs

Attribute One: Economic viability

	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
1.1 Diversity and quality of growth in economic activity.	<ul style="list-style-type: none"> Comparison of Gross Regional Product and Gross Value Add by industry. Economic growth rates with sectoral specific analysis. 	<ul style="list-style-type: none"> There is limited information available regarding the GRP or economic growth in the Torres region. Torres Strait is a unique regional area: <ul style="list-style-type: none"> It is predominantly comprised of island communities spread over an area approaching the size of Tasmania. Its population is dispersed with 38% only in the Thursday Island/Horn Island area. It is a remote community 800 km from the nearest major regional service centre, Cairns, and 2,200 km from the nearest metropolitan centre with its remoteness accentuated by lack of road access and dependence on sea and air access from Cairns. The Torres Strait lies deep in the tropics with limited land areas for agricultural development and mining, but is rich in marine resources (Cummings Economics, 2007). Because of its unique location on the border with Papua New Guinea, much of the region falls within jurisdictional arrangements (including Fisheries and movement of people across the border) under the Torres Strait Treaty (1985). 	<ul style="list-style-type: none"> Low diversity of industries and economic activity due to limited primary (agricultural and mining) resources. Limited fishing resources provide some economic stimulus. Much of the region's economy is dependent on small businesses and government intervention programs that employ a significant proportion of the population. The limited diversity of industries makes the region's economy highly vulnerable to climate change particularly because the dominant marine industry is highly sensitive and vulnerable to both extreme weather events and long-term changes in water and atmospheric temperature. The Torres Strait economy is likely to become even more limited as the impacts of climate change occur. Reduced fish numbers and diversity will more adversely impact some islands in the Torres Strait due to their higher economic reliance (based on distribution across the region). 	2

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
	<ul style="list-style-type: none"> • Commercial Fishing: <ul style="list-style-type: none"> • The region has a long history of subsistence (finfish, dugong, turtle) and commercial fishing (trochus, prawns, pearls, crayfish, and beche-de-mer) (Cummins Economics, 2007). • In 1989 commercial fisheries in the Torres Strait were worth approximately \$21 million (Arthur, 1991). There is a lack of data indicating the current value of the industry to the region. • In 1989 prawns were the most profitable commercial fishery, however they were completely harvested by non-islander workers. In fact, trochus harvesting was the only commercial fishery to employ only islander workers (Arthur, 1991). It is unclear if this has changed since the introduction of CDEP. • Small-scale Torres Strait Islander commercial fisheries are growing and have been increasing in number and size since CDEP was introduced in 2009 (Fairhead & Hohnen, 2007). • Commercial fisheries target finfish and tropical rock lobster (Fairhead & Hohnen, 2007). • Species targeted by commercial fisheries are not equally distributed across the region meaning some islands have fisheries of greater value compared with other islands (Arthur, 2005). • Within the context of influences affecting general development of the north, the Torres Strait has experienced its own pattern of economic and population 		

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
	<p>growth. The area has had some limited participation in marine industries and limited tourism development related mainly to the Northern Peninsula Area (NPA) initiatives (Cummings Economics, 2007).</p> <ul style="list-style-type: none"> • There is very little capacity to expand existing commercial fisheries and Islanders are in direct competition with non-islanders who have greater access to resources (Arthur, 2005). • The major contributor to economic growth in the region has been government expenditure: <ul style="list-style-type: none"> • On defence and surveillance. • On bringing government services and infrastructure up to national standards. • Special job creation funds through CDEP and workforce training initiatives (Cummings Economics, 2007). • Based on these industries, a service industry structure develops that can, in time, come to provide more jobs than the base industries. However, if you take the base industries away, the service structure will disappear. While there are prospects of developing business and job opportunities in the service structure in the Torres Strait, if the Torres Strait economy is to become fully self sustaining, it is vital that the level of "outside earnings" of the "base" industries are greatly increased. The most extensive opportunities tend to be in the traditional field of marine industries/aquaculture and, on a growing scale, in tourism and related culture based industries (Cummings Economics, 2007). • The primary income sources for Islanders are: 		

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)	
1.2 Vulnerability of natural and energy resource base.	<ul style="list-style-type: none"> • Comparative measure of natural resource dependency. • Measures of energy security and diversity. • Measures of food security and diversity. 	<p>CDEP work and community council employment; employment outside island communities; and traditional fishing (import substitution) (Arthur, 2005).</p> <ul style="list-style-type: none"> • Islands in the region fall into one of four categories: Central Coral Islands, Eastern Volcanic Islands, Western Continental Islands and Top Western Mud Islands. Each of which is vulnerable to the impacts of climate change due to their geographic and topographic differences (Mackie, 2010). • Coastal erosion is a problem for most of the island communities with Boigu, Saibai, Masig, Poruma, Warraber, Iama, Mer, Mabuiag, Moa and Erub being the impacted (Mackie, 2010). • Inundation is also a problem on Boigu, Saibai, Masig, Poruma, Warraber, Iama, Mer, Mabuiag, Erub, Thursday Island, and Horn Hammond (Mackie, 2010). • The region's primary economic resource is marine-based tourism and fisheries. • The Torres Strait Fisheries have significant economic value to the region with the total catch in 2007-08 having an approximate value of \$21 million (BITRE, 2011). • The majority of food is imported from Cairns by shipping/air and prices are up to 40% higher in the Torres Strait compared to the same products in Brisbane (Cummings Economics, 2007). • Fresh fruits and vegetables can cost up to 75% more in the Torres Strait than in Brisbane (NATSINWP, 2000) • Many households rely on backyard vegetable patches to provide cheaper fresh vegetables 	<ul style="list-style-type: none"> • The region is already low lying and increases in sea level are likely to increase inundation frequency and severity and potentially permanently inundate entire islands in the region. • Communities dependent on fisheries for income, culture knowledge and food will become increasingly vulnerable as the climate changes. • Energy security is vulnerable. The regional economy is very dependent upon fossil fuels, none of which are produced locally and are transported to the region through poorly maintained and flood-vulnerable roads. Thursday Island does produce some energy with Wind Turbines and some preliminary research has been done on other alternative options e.g., tidal and solar energy. • Food security is vulnerable. More extreme events with flooding will make communities more vulnerable based on current limited transportation. • Most drinking water is imported during the dry season and several are totally reliant on desalination plants as their general water supply throughout the year. • The natural resource base in the region is highly vulnerable to climate, particularly salinisation of soil due to rising sea and water tables. • The region is vulnerable to changes in water availability, which is already limited during the dry season. • High costs and low income indicate that there is a high level of economic vulnerability in the region. 	2

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
	<p>than those available in shops. These gardens very vulnerable to inundation and soil salinity (Mackie, 2010).</p> <ul style="list-style-type: none"> • Housing demand and rent costs are increasing (Cummings Economics, 2007). • Only 54% of households own a car, however a significant number of households own boats (Cummings Economics, 2007). • Airfares between Cairns and the Torres Strait are as expensive as flights between Cairns and Brisbane (Cummings Economics, 2007). • Soil quality is generally very poor on the islands due to increasing salinisation and erosion, which means that other than small scale gardens, there is no agriculture industry within the region (Lawrence & Lawrence, 2004). • Groundwater supplies are limited, meaning the islands are reliant on small-scale above-ground water storage in the form of rainwater tanks (Lawrence and Lawrence, 2004). • Cummings Economics (2007) identifies numerous opportunities for expansion of and increased local participation in existing and potential small scale commercial fisheries and aquaculture such as cultured pearls, black lipped oysters, sea sponge, and prawns. • There are also opportunities for greater eco-tourism activities and industries to develop particularly surrounding turtle nesting, cruise ship docking on Thursday Island, and accommodation and transport infrastructure between islands to support visiting tourists (Cummings Economics, 2007). • Fuel costs approximately \$3 per litre on Outer Islands, double that of fuel in Brisbane (NERP, 2012). 	<ul style="list-style-type: none"> • Existing opportunities for expansion and increased local economic development are likely to decline due to the sensitivity of marine and eco-tourism industries to changing atmospheric and water temperatures, and sea levels. • Fleet boats used for such industries are also highly vulnerable to increased major weather events which may cause significant structural damage to the ships if moored. • Mining operations are vulnerable to flooding during major weather events. 	

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)	
1.3 Inclusiveness and economic fairness/ equity.	<ul style="list-style-type: none"> Individual income (analysed by age, education level, industry and occupation). Household income analysed by (family composition, tenure type and low income households). 	<ul style="list-style-type: none"> 57.8% of individuals earn less than \$400/week and 27.4% of individuals earn between \$400-\$999/week (OESR, 2012). This may mean that a large number of residents in the region may be living below the Australian poverty line, which is an income of \$234/week. 44.5% of the region's residents had a post-school qualification compared to 50.4% of the state's residents with a post-school qualification (OESR, 2012). Data is not currently available which assesses individual income analysed by age, education level and industry occupation or household income by family composition, tenure type and low income. Further assessment is required by Torres Strait Island expert panel members. 20% of the Queensland population are in the most disadvantaged quintile, however in the Torres region a very high proportion of the population are in the most disadvantaged quintile (OESR, 2012). In 2008-9 some 91.3% of businesses in the region were small businesses. Some 58.2% have a turnover range of less than \$100K, 24.5% turnover between \$100k-<\$500K, 5.8% turnover between \$500k-<\$1M, and 11.5% turnover >\$1M (OESR, 2012). At the time of 2006 census, 12.6% were residing at a different address one year earlier (compared with 19.7% across Queensland) and 24.6 % were at a different address five years earlier (compared with 47.6% across Queensland) (OESR, 2012). The number of Torres Strait Islanders living outside their region of birth is treble the current population of the region (Cummings Economics, 	<ul style="list-style-type: none"> Most of the population is on low income – more than 1/2 of the population earns less than \$400/week indicating a poor financial capacity to adapt to change. Entire population is 'most disadvantaged' making them incredibly vulnerable to the impacts of change. Employment is largely via small businesses with low turnover in vulnerable sectors (e.g., retail trade, accommodation and food services). Small business generally has a lower per capita income. Region has some vulnerable populations, particularly with both high indigenous and economically disadvantaged populations. Overall, there are additional vulnerabilities around major events (cyclones, floods). 	2

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)	
1.4 Workforce participation and employment.	<ul style="list-style-type: none"> Regional employment participation rates and trends and employment by industry. 	<p>2007).</p> <ul style="list-style-type: none"> The unemployment rate of the Torres region in the December quarter of 2011 was 8.2% compared with 5.5% across Queensland (OESR, 2012). In 2006 Public Administration and Safety was the largest industry of employment, employing 55.7% of the work force (OESR, 2012). Regional employment by industry based on 2006 census data: Public Administration and Safety (55.7%), Health Care and Social Assistance (9.5%), Education and Training (8.9%) (OESR, 2012). Many non-indigenous workers in the Torres Strait are transitory (fly-in, fly-out) (Cummings, 2007) and the majority are employed to provide support for social and/or health programs such as the Community Development Employment Projects (CDEP) (Fairhead & Hohnen, 2007). The CDEP is the single largest employer of Torres Strait Islanders in the region, employing 29% of the working population (Fairhead & Hohnen, 2007). There are limited employment opportunities outside of fishing and marine industries in the Torres Strait (Fairhead & Hohnen, 2007). The lack of employment opportunities in the Torres Strait has led to a diaspora of Islanders to other parts of Australia (Cummings Economics, 2007). There are a maximum of 500 full-time jobs based in the Torres Strait primarily in fishing, tourism, art/craft, national defence/security and government services (Cummings Economics, 2007). 	<ul style="list-style-type: none"> Fairly predictable patterns of workforce and employment that are not seasonally influenced apart from within the fishing industry. Generally significant economic and natural resource limits to employment rates across the region. 	2

	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
1.5 Economic confidence	<ul style="list-style-type: none"> • Consumer confidence. • Investor confidence. • Small business confidence. 	<ul style="list-style-type: none"> • Expert analysis drawing on information about levels of investment from the banks, population growth is needed by Torres Strait Island expert panel members. • There is limited information available regarding the economic performance of the Torres region. 	<ul style="list-style-type: none"> • Access to professional services is either difficult or costly (e.g., Accountants) and this impinges on the development of small businesses. • Access to government support/finance for entrepreneurs is limited. • Significant economic opportunities exist, but will require significant reforms to access effectively. 	2
1.6 Vulnerability of Key Economic Infrastructure Assets	<ul style="list-style-type: none"> • Data re whether climate change will stress key infrastructure assets of economic importance. 	<ul style="list-style-type: none"> • Key road transport assets are progressively improving but remain vulnerable to annualised flooding. • Due to the unreliable nature of road networks in the region (much of which is unsealed) air transportation is important for freight and passenger travel. The majority of freight shipping however is by sea. • The Torres Strait has additional serious risk threats due to the very high frequency of shipping traffic that traverses the shallow waters of the region on a 24 hour basis. • Whilst people in the region continue to travel between island communities by dinghy, this mode of transport is fraught with danger & risk to life given the treacherous conditions throughout the year. • Air transport is currently very expensive which increases the cost of freight and products in the region. Airstrips in the region are generally of substandard quality. • In 2012 the Australian and Queensland Governments and the CSIRO identified the potential to further grow and diversify the northern Qld beef industry as a national/state priority in the North Queensland Irrigated Agriculture Strategy worth \$10 million. The strategy focuses on identifying/expanding water capture/ storage, commercial viability of 	<ul style="list-style-type: none"> • Annual transport infrastructure vulnerability more acute under more severe events, leading to a narrower trading window. • Cost of living will increase in the region due to increased freight and consequently product costs if more severe events and fuel prices continue to rise. • Infrastructure assets vulnerable to more intense cyclonic and flood events. • NDRRA funding models not well suited to progressive betterment. • Progressive improvement in road infrastructure has been emerging. • Infrastructure assets annually vulnerable but could be better managed through real time data and information management systems. 	3

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
	irrigated agriculture and other services/infrastructure (DRALGAS, 2012).		
2013 Resilience Rating			13
Maximum for this Attribute			25

Attribute Two: Community knowledge, aspirations and capacity

2. Community knowledge, aspirations and capacity	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
2.1 Community awareness levels of climate change and natural resource sustainability.	<ul style="list-style-type: none"> State and trend in individual and sectoral understanding of NRM issues and current behavior (regular survey). 	<ul style="list-style-type: none"> Limited local benchmarking of community attitudes, understanding and behavior in relation to climate change in the Torres region. This needs further discussion with expert panelists in the Torres Strait. Islands in the Torres Strait are already experiencing significant inundation due to rising sea levels and erosion, particularly during high tides and major weather events. Awareness of the impacts of climate change is considered generally high in the region (TSRA, 2010). 	<ul style="list-style-type: none"> Understanding about climate change and natural resource sustainability is highly varied/inconsistent and generally low across the region but growing. Frequency and intensity of resource use does not necessarily correlate to a higher understanding and appreciation for sustainability or support for action to manage resources sustainability. Recent environmental variability provides an opportunity to build awareness levels about climate change and natural resource sustainability. People may recognise that changes are happening, but not necessarily because of climate change? 	2.5
2.2 Education/ knowledge levels and spread across the community.	<ul style="list-style-type: none"> Education distribution measures. 	<ul style="list-style-type: none"> Rate of school and post-school education in the Torres Region is lower than the Queensland Average (OESR, 2012). Many of the inhabited islands have small government-run primary schools, including: Badu, Dauan, Erub, Horn, Kubin, Mabuyag, Malu Kiwai, Masig, Mer, Poruma, Saibai, St Paul's, Thursday, Ugar, Warraber and Yam Island (DETE, 2013). Thursday Island also has a secondary school (DETE, 2013). 93.8% of students in the Torres region were attending a government school and 6.2% were attending a non-government school in 2009 (OESR, 2012). Students in remote areas often attend boarding school for their secondary education on the Australian mainland, particularly in settlements 	<ul style="list-style-type: none"> Education supports resilience by providing individuals with a range of knowledge and skills however rates of school-based education also need to be considered in terms of capacity needs for resilience and adaptation in the face of climate change. High proportion of low income across the region indicates that post-school education more likely to be at certificates and diploma level rather than bachelor degrees or higher. Poor understanding of climate change within schools. School curriculums do not yet sufficiently take into account futuring/planning and relevant skills. 	2.5

2. Community knowledge, aspirations and capacity	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
		<p>along the east coast (Stokes, Stafford, & Holdsworth, 2000). This needs to be tested in the Torres Strait with expert panels.</p> <ul style="list-style-type: none"> • There is very limited access to early childhood education facilities with the region home to no day cares, kindergartens, 3 long day cares, 2 school aged care facilities, and no limited hours care or child care hubs (OESR, 2012). • Nature deficit disorder a broad problem across Queensland with low understanding of climate/carbon linkages (Boon, 2009). This requires investigating in TS with expert panel members. • There has been some growth in programs for education and knowledge building such as the CDEP (Fairhead & Hohnen, 2007). 		
2.3 Skill levels and spread across the community.	<ul style="list-style-type: none"> • Skills distribution measures. 	<ul style="list-style-type: none"> • There is limited data against which to assess this in terms of social resilience in the face of climate change. • Workforce and business skills and experience, although improved, are still below national averages (Cummings Economics, 2007). • BTRE identify a broad shortage of ‘most professionals’ in regional and remote areas of Queensland (BTRE, 2006). This needs to be discussed further with expert panel members in the Torres Strait. 	<ul style="list-style-type: none"> • There is a lack of tertiary or vocational education facilities in which to teach or upskill the region’s population. • There is a need to re-skill and provide assistance to develop business plans to help cope with change and be resilient. 	2
2.4 Individual leadership and complex problems solving.	<ul style="list-style-type: none"> • Expert based indicator of regional leadership (champions). 	<ul style="list-style-type: none"> • Requires expert assessment by Torres Strait Island expert panel members. • There is very limited data against which to make a more detailed assessment. 	<ul style="list-style-type: none"> • There have been both periods in this region where individual leadership has stood out clearly in the past alongside a history of conflict and conflicted leadership at all scales. • Indications are that there is growing leadership 	3

2. Community knowledge, aspirations and capacity	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
			<p>within a number of sectors, but regional leadership remains fragmented.</p> <ul style="list-style-type: none"> • Disparate island communities face challenges of leadership on and within each island community. 	
2013 Resilience Rating				10
Maximum for this Attribute				20

Attribute Three: Community vitality

	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
3.1 Demographic stability	<ul style="list-style-type: none"> Basic demographic characteristics (e.g., population, age structure, migration and growth rates). 	<ul style="list-style-type: none"> Population in the Torres region decreased by 0.3% between June 2010 and 2011. Most of the population are in the 0-14 (33%), 25-44 (26.4%), and 45-64 (18.1%) age groups (OESR, 2012). Some 0.5% born overseas, 82.5% indigenous, 100% of the population in the most disadvantaged profile (OESR, 2012). Spatially dispersed population – a population similar to the size of remote/rural areas on the mainland spread across an area just under the size of Tasmania (Cummings Economics, 2007). The population is steady – only a 12.6% annual turnover compared with Cairns which had a 22.3% turnover in the same period, and Qld which had an average turnover of 19.7% (OESR, 2012). 	<ul style="list-style-type: none"> ABS data is considered unreliable with an estimated 30% error in population figures. Population growth is relatively stable with minor fluctuations. Significantly greater numbers of young people (under the age of 14) compared to Queensland. High proportion of indigenous residents compared to other regions There is an opportunity to build local knowledge problems re climate change. Challenges may exist with future migration from vulnerable islands. 	3
3.2 Wellbeing/happiness within the general community.	<ul style="list-style-type: none"> Happiness, wellbeing or genuine progress indexes. Dissatisfaction ratings. 	<ul style="list-style-type: none"> People living in remote areas of Queensland reported higher satisfaction with life, particularly with safety and feeling part of the community, and were more willing to help each other, compared with urban and rural areas (Queensland Health, 2004 cited in Kreger & Hunter, 2005). This requires investigating with Torres Strait Island expert panel members. High rates of unemployment amongst Torres Strait Islanders contributes to mental health and wellbeing issues being more prevalent than in non-indigenous Australians (Headspace, 2011). A 2008 ABS survey found that 92% of indigenous adults and 94% of indigenous children 	<ul style="list-style-type: none"> Generally high levels of wellbeing in the Torres Strait may be readily undermined with climate impacts. Residents are more vulnerable and prone to depression, suicide risk and have lowered resilience to change when there is a lack of adequate support networks. General level of social wellbeing are already low and may become increasingly more vulnerable without adequate support and interventions. Loss of cultural sites will significantly impact Islander's sense of place, culture, history and community. 	3

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
	<p>participate in some form of community, social or sporting group throughout Australia (ABS, 2008). This needs to be tested in the Torres Strait by expert panel members.</p> <ul style="list-style-type: none"> • Many cultural sites (graveyards, sacred sites) are flood during high tides and are likely to be lost entirely if inundation increases in quantity or frequency (Dean, 2010). 		
<p>3.3 General community health and disparities.</p> <ul style="list-style-type: none"> • Specific general health indicators. • Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> • Life expectancy of Torres Strait Islanders is lower than that of non-indigenous Australians (Headspace, 2011). This needs to be tested in the Torres Strait by expert panel members. • Suicide rates of Aboriginal and Torres Strait Islander males are twice the national average and are four times higher than the average in young men (Headspace, 2011). This needs to be tested in the Torres Strait by expert panel members. • Aboriginal and Torres Strait Islanders suffer high rates of substance abuse which is often co-morbid with mental health issues such as depression (Headspace, 2011). • Community facilities such as rubbish tips, desalination plants and sewerage treatment plants are all low lying in the Torres Strait and heavily prone to flooding during king tides (Dean, 2010). • Local water supplies are also vulnerable to contamination of salt water during inundation events (Dean, 2010). • People in remote areas are more likely to die from lung cancer, CHD, stroke, suicide, injury, poisoning, road traffic injury, diabetes, asthma and COPD. In remote areas, there were higher 	<ul style="list-style-type: none"> • Flooding of sewerage, rubbish and water infrastructure increases the likelihood of disease being spread. • Water retention in low-lying areas following flood events is likely to increase the occurrence of water-breeding insect-based diseases such as malaria and dengue fever. • People who are susceptible to chronic diseases (e.g., cancer, diabetes, malaria etc) in regional centers go undetected for longer, don't have access to medical health, recover less and die. • Indigenous communities have higher rates of morbidity and mortality. Socioeconomic and cultural factors are key determinants of rural health. Torres region's communities have socioeconomic and cultural characteristics that are distinct from non-indigenous communities. Evidence that socioeconomic disadvantage is a key driver of health disparities. • The rate of suicide in the Torres Strait indicates that there is a high prevalence of mental health issues. • Cross border health risks with PNG. 	<p>2.5</p>

Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)	
	<p>death and hospitalisation rates due to hazardous and harmful consumption of alcohol and tobacco smoking as well as a higher proportion of harmful and hazardous alcohol consumption (Queensland Health, 2004, cited in Kreger & Hunter, 2005).</p> <ul style="list-style-type: none"> • Torres Strait Islanders are more likely than non-indigenous Australians to experience psychological distress, with 77% in 2008 reporting high distress levels in the past 12 months (ABS, 2008). • Indigenous residents of rural and remote Australia experience mental health issues associated with social disadvantage (Hunter, 2007). 			
3.4 Community services, infrastructure, access, and disparities.	<ul style="list-style-type: none"> • Generalisable and comparable service benchmarks. • Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> • Aged Care, child Care and hospital services are considerably lower than numbers across Queensland. Data about services is not benchmarked across the community (OESR, 2012). This needs to be tested in the Torres Strait by expert panel members. • Access to the region is limited to either air or sea travel and is costly (BITRE, 2011). 	<ul style="list-style-type: none"> • Access to services is much poorer than metropolitan areas. • High vulnerability due to low self-sufficiency of food, energy and other resources (e.g., clothing). 	2
3.5 Housing, accommodation and accessibility.	<ul style="list-style-type: none"> • Levels of rental dependency. • Levels of mortgage stress. • Comparative indicators across key community sectors. 	<ul style="list-style-type: none"> • Public transport is non-existent and previous attempts to operate ferries between islands have failed (Cummings Economics, 2007). • 25.6% of the 1,474 dwellings have internet access • 84% of dwellings were rented and 86% fully owned in 2006 (OESR, 2012). • Land availability for housing poor within the region due to rising sea levels (OESR, 2012). 	<ul style="list-style-type: none"> • Access to services poor and significantly weaker than metropolitan areas. • Rising sea levels are threatening land and consequently housing security. • Exorbitant development costs, increasing demand in housing and high rents not sustainable. 	2
3.6 Community	<ul style="list-style-type: none"> • Criminality/ 	<ul style="list-style-type: none"> • Torres Strait and Aboriginal Australians are 	<ul style="list-style-type: none"> • Trends indicate that this is likely to continue despite 	2.5

	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
safety and risk.	reporting indicators. <ul style="list-style-type: none"> Spatially identified flood, cyclone, drought and other natural risk ratios. 	overrepresented in the criminal justice and child protection systems. This needs to be confirmed in the Torres Strait by Torres Strait Island expert panel members. <ul style="list-style-type: none"> Considerable risks with respect to individualised insurance cover within the region. 	an abundance of community wellbeing and social support programs.	
2013 Resilience Rating				15
Maximum for this Attribute				30

Attribute Four: Governance

	Possible Pressure, State and Trend Indicators	Evidence	Conclusions	Value (1-5)
4.1 Connectivity within and among key decision making institutions and sectors.	Expert based indicator of institutional connectivity.	<ul style="list-style-type: none"> • There is a strong Australian Government presence in the Torres Strait due to its proximity to Papua New Guinea (NERP, 2012). • There are issues of quarantine and population migration between Papua New Guinea and Torres Strait (NERP, 2012). • Requires expert assessment on horizontal and vertical integration by Torres Strait Island expert panel members. 	<ul style="list-style-type: none"> • The institutional space is highly contested and fragmented in the Torres Strait. • Poor connectivity and integration between sectors and institutions. 	2.5
4.2 Adaptive management capacity of key decision making institutions and sectors.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Requires expert assessment of institutional leadership and capacity by Torres Strait Island expert panel members. 	<ul style="list-style-type: none"> • Limited consideration of climate change within the economic and social sector. Consideration of climate change is improving in the infrastructure and NRM sectors. 	3
4.3 Adaptive use and management of integrated knowledge sets.	Expert based indicator of regional leadership and capacity.	<ul style="list-style-type: none"> • Expert assessment of monitoring, evaluation, review and improvement needed by Torres Strait Island expert panel members. 	<ul style="list-style-type: none"> • Economic data weak and not able to adequately track short term changes. • Significant weaknesses in social data. • The region is still a long way off having long term condition and trend assessment in monitoring of natural resources and the integration of social and economic (including governance) data is embryonic. • Limited use of effective decision support tools to integrate data into decision making and adaptive management processes. • Few strong institutional owners/ integrators for knowledge management, but some leadership (e.g., TSRA, RRRC, etc.). 	3
2011 Resilience Rating				8.5

Possible Pressure, State and Tend Indicators	Evidence	Conclusions	Value (1-5)
Maximum for this Attribute			15

References

- ABS. (2008). *National Aboriginal and Torres Strait Islander social survey* (No. 4714.0). Canberra: Australian Bureau of Statistics.
- Arthur, B. (2005). *Torres Strait Islanders and fisheries: An analysis of economic development programs*. Canberra: Australian National University and Australian Government: National Oceans Office.
- Arthur, W. (1991). *Indigenous economic development in the Torres Strait: Possibilities and limitations*. Canberra: Centre for Aboriginal Economic Policy Research (CAEPR).
- Boon, H. (2009). Climate change? When? Where. *The Australian Educational Researcher*, 36(3), 43-65. doi: 10.1007/BF03216905
- BITRE. (2011). *Northern Australia statistical compendium 2011 update*. Canberra: Department of Infrastructure and Transport - Bureau of Infrastructure, Transport and Regional Economics.
- BTRE. (2006). *Skill shortages in Australia's regions*. Canberra: Bureau of Transport and Regional Economics.
- Cummings Economics. (2007). *Torres Strait economic study: Phase 1 - General report on economic opportunities*. Cairns: Cummings Economics.
- Dean, A. (2010). *Responses to climate change in the Torres Strait*. Bachelor of Development Studies with Honours, University of Newcastle, Newcastle.
- DETE. (2013). *Tagai State College*. Retrieved from <https://tagaisc.eq.edu.au/Facilities/Campuses/Pages/Campuses.aspx>
- DRALGAS. (2012). *North Queensland irrigated agriculture strategy fact sheet: Sustainable development in the north*. Canberra: Department of Regional Australia, Local Government, Arts and Sport, Office of Northern Australia.
- Fairhead, L., & Hohnen, L. (2007). *Torres Strait Islanders: Improving their economic benefits from fishing*. Canberra: ABARE economics.
- Headspace. (2011). *Position paper: Aboriginal and Torres Strait Islander social and emotional wellbeing*. Melbourne: Headspace: National Youth Mental Health Foundation.
- Hunter, E. (2007). Disadvantage and discontent: A review of issues relevant to the mental health of rural and remote Indigenous Australians. *Australian Journal of Rural Health*, 15(2), 88-93. doi: 10.1111/j.1440-1584.2007.00869.x
- Kreger, A., & Hunter, E. (2005). *Unfenced road ahead: A review of rural and remote mental health service delivery and policy. A Report for the Mental Health Unit, Queensland Health*. Brisbane: University of Queensland and Queensland Health.
- Lawrence, D., & Lawrence, H. R., (2004). Torres Strait: The region and its people. In R. Davis (Ed.), *Woven histories, dancing lives: Torres Strait Islander identity, culture and history* (pp. 15-29). Canberra: Aboriginal Studies Press.
- Mackie, W. (2010). *Climate change issues and adaptation: A Torres Strait Islander perspective*. Iama Island: Torres Strait Regional Authority (TSRA).
- National Aboriginal Torres Strait Islander Nutrition Working Party. (2001). *National Aboriginal and Torres Strait Islander nutrition strategy and action plan 2000 2010 and first phase activities 2000 2003*. Canberra: Signal & National Public Health Partnership. Retrieved from <http://www.health.vic.gov.au/archive/archive2014/nphp/publications/signal/natsinsa1.pdf>
- NERP. (2012, April). *Issues in the Torres Strait*. Presented at the Building Resilient Communities for Torres Strait Futures Workshop, Cairns. Retrieved from <http://www.nerptropical.edu.au/publication/project-111-torres-strait-community-factsheet-building-resilient-communities-torres>
- Office of Economic and Statistical Research (OESR). (2012). *Queensland regional profiles. Torres Regional. Based on local government area (2012)*. Brisbane: Queensland Treasury.
- Stokes, H., Stafford, J., & Holdsworth, R. (2000). *Rural and remote school education: A survey for the Human Rights and Equal Opportunity Commission*. Melbourne: Youth Research Centre, University of Melbourne.
- TSRA. (2010). *Torres Strait climate change strategy 2010-2013*. Thursday Island: Torres Strait Regional Authority Environmental Management Program. Retrieved from http://www.tsra.gov.au/__data/assets/pdf_file/0020/1775/TS-Climate-Change-Strategy-2010-2013.pdf