CLIMATE PROOFING BRIBIE

A CLIMATE ADAPTATION ACTION PLAN

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EXECUTIVE SUMMARY

Driven by a rising trend in Global Mean Temperature due to increased Greenhouse Gases (GHG), it has now been established that climatic conditions are changing (IPCC, 2007). In 2007, South East Queensland was identified on a global scale by the Intergovernmental Panel for Climate Change (IPCC) as one of two coastal hotspots in Australia due to the population growth and the rising sea level.

For low-lying Bribie Island this has inevitable implications. Climate Risk Pty Ltd (2009) modelling shows that 63% of the residential area lies in a storm surge zone. It is projected Bribie could experience more extreme storm events, more hotter days, exposure to heat waves, higher winds and higher fire risk.

Bribie Island is home to an extraordinary array of endemic native flora and fauna. It is also home to an aging population with 41% of residents over 66 years of age. The single bridge entry and exit connected to low-lying land on the mainland means that emergency management requires a cohesive and considered approach.

Adapting to these changes is a necessary path for the community to follow, in conjunction with reducing the per capita greenhouse gas emission as part of our global responsibility. Even beyond the stabilization of GHG, the sea level will continue to rise due to thermal expansion of the oceans.

Climate Proofing Bribie offers the chance for the community and its government to view Bribie Island in a new light that turns threats into opportunities. Historically the social, economic and environmental issues have often been considered in isolation. Adapting to climate change demands an integrated and positive approach by a well-informed and cohesive community.

Over the course of a year and a half, the community of Bribie Island and its three tiers of government have been involved in a process to develop a collective adaptation action plan facilitated by SEQ Catchments and the University of the Sunshine Coast. Seven priority actions each for community and council have been identified. Regardless of the cause of climate change, implementing this action plan will cause no regrets and deliver long-lasting benefits to the Bribie Island community and its environment.

The Climate Proofing Bribie process is a pioneer in this bottom-up approach to climate change adaptation in this country, and offers the Moreton Bay Regional Council an opportunity to lead Australia in this innovation.

This document is the start of a long process that will span many years. The most important thing to bear in mind at this stage is that the journey has now begun. The collective plan will continue to evolve as understanding, knowledge and capacity grows, needing annual review to ensure it remains relevant.

To ensure that the plan is implemented effectively and appropriately, it is recommended a core group of MBRC staff and broadly representative community members with representation from regional, state and federal agencies where relevant be established and supported. This co-ordinating body needs to be able to develop and strengthen positive relationships at all levels of community, government, industry and research.

CLIMATE PROOFING BRIBIE

ABBREVIATIONS

BI	Bribie Island
BICA	Bribie island Community Association
BIEPA	Bribie Island Environment Protection Association
CCAIRR	Climate Change Adaptation through Integrated Risk Reduction
CSIRO	Commonwealth Scientific Investigation & Research Organisation
DEEDI	Department of Employment, Economic Development and Innovation
DERM	Department of Environment and Resource Management
DIP	Department of Infrastructure and Planning
EMQ	Emergency Management Queensland
GHG	Greenhouse Gas
GMT	Global Mean Temperature
IPCC	Intergovernmental Panel on Climate Change
MBRC	Moreton Bay Regional Council
QPWS	Qld Parks and Wildlife Services
SCRC	Sunshine Coast Regional Council
SEMP	Shoreline Erosion Management Plan
SEQ	South East Queensland
SEQC	SEQ Catchments
SES	State Emergency Services
U3A	University of the Third Age
USC	University of the Sunshine Coast
WAG	Wallum Action Group

GLOSSARY

Adaptation (to climate variability and change)

Policies, actions, and other initiatives designed to limit the potential adverse impacts arising from climate variability and change (including extreme events), and exploit any positive consequences.

Adaptive capacity

The potential for adjustments, processes (both natural and human), practices, or structures to moderate or offset the potential for damage, or take advantage of opportunities, created by variations or changes in the climate.

Autonomous Adaptation

The coastal system's spontaneous adaptive response to climate change impact (generally sea-level rise). This is determined by the natural system's resilience and resistance, and the socio-economic system's ability to prevent or cope. Examples include increased wetland accretion, or changes in the price of coastal property.

Climate

At least 30 years of weather (International Meteorological Organisation [IMO] baseline 1961-1990)

Climate change

Trends or other systematic changes in either the average state of the climate, or its variability (including extreme events), with these changes persisting for an extended period, typically decades or longer (i.e., longer term). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. In short, it is statistically measurable from a baseline.

Climate extreme

A climatic event that is rare within its reference statistical distribution for a particular place. Typically "rare" is interpreted as an event that is below the 10th percentile or above the 90th percentile. An extreme climate event may be due to natural internal processes within the climate system, or to variations in natural or anthropogenic external forcing.

Climate proofing

A shorthand term for identifying risks to a development project, or any other specified natural or human asset, as a consequence of climate variability and change, and ensuring that those risks are reduced to acceptable levels through long-lasting and environmentally sound, economically viable, and socially acceptable changes implemented at one or more of the following stages in the project cycle: planning, design, construction, operation, and decommissioning.

Climate variability

Variations in climatic conditions (average, extreme events, etc.) on time and space scales beyond that of individual weather events, but not persisting for extended periods of, typically, decades or longer (i.e., shorter term). Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

Greenhouse gases

Those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiant heat energy at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect.

GLOSSARY

Water vapor, carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), and ozone (03) are the principal greenhouse gases in the Earth's atmosphere.

Mainstreaming (of adaptation)

The effective and equitable integration of adaptation activities into the preparation and implementation of policies, plans, and other instruments concerned with economic development, social progress, and/or environmental protection.

Mitigation (of climate change)

Policies, actions, and other initiatives that reduce the net emissions of greenhouse gases (q.v.), such as CO2, CH4, N2O, that cause climate change through global warming.

No regrets

Policies, plans, or actions that would generate net social benefits whether or not climate change occurs. No regrets opportunities for greenhouse gas emissions reduction are defined as those options whose benefits, such as reduced energy costs and reduced emissions of local/ regional pollutants, equal or exceed their costs to society, excluding the benefits of avoided climate change. No regrets potential is defined as the gap between the market potential and the socioeconomic potential.

Planned adaptation

The planned responses to climate change impact (generally sea-level rise), which usually would involve an informed policy maker and some agreed collective action. Several technical options for planned adaptation have been recognised.

Resilience

The speed with which a system returns to its original state after being perturbed, the ability of the system to bounce back, or return to some quasi-stable state. Resilience concepts can also be applied to various other aspects of the coastal management process, such as social, cultural, or institutional resilience.

Risk

The combination of a hazardous event occurring, and the impact or consequence of that event.

Resilience

The speed with which a system returns to its original state after being perturbed, the ability of the system to bounce back, or return to some quasi-stable state. Resilience concepts can also be applied to various other aspects of the coastal management process, such as social, cultural, or institutional resilience.

Scenario

A plausible and often simplified course of anticipated events or a probable future condition, based on a coherent and internally consistent set of assumptions about key driving forces and relationships, constructed for explicit use in investigating the potential consequences of changes from current conditions.

GLOSSARY

Sea-level rise

An increase in the mean level of the ocean, persisting for an extended period, typically decades or longer. Eustatic sealevel rise is a change in global average sea level brought about by an alteration to the volume of the world ocean. Relative sea-level rise occurs where there is a net increase in the level of the ocean relative to local land movements. Climate modelers largely concentrate on estimating eustatic sea-level change; risk assessors focus on relative sea-level change.

Storm Surge

Storm surge is the rising of the sea level due to the low pressure, high winds, and high waves associated with a storm or cyclone as it makes landfall.

Vulnerability (to climate variability and change)

The extent to which a natural or human system is susceptible to sustaining damage resulting from climate variability and change, despite human actions to moderate or offset such damage. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Weather

What we are experiencing now.

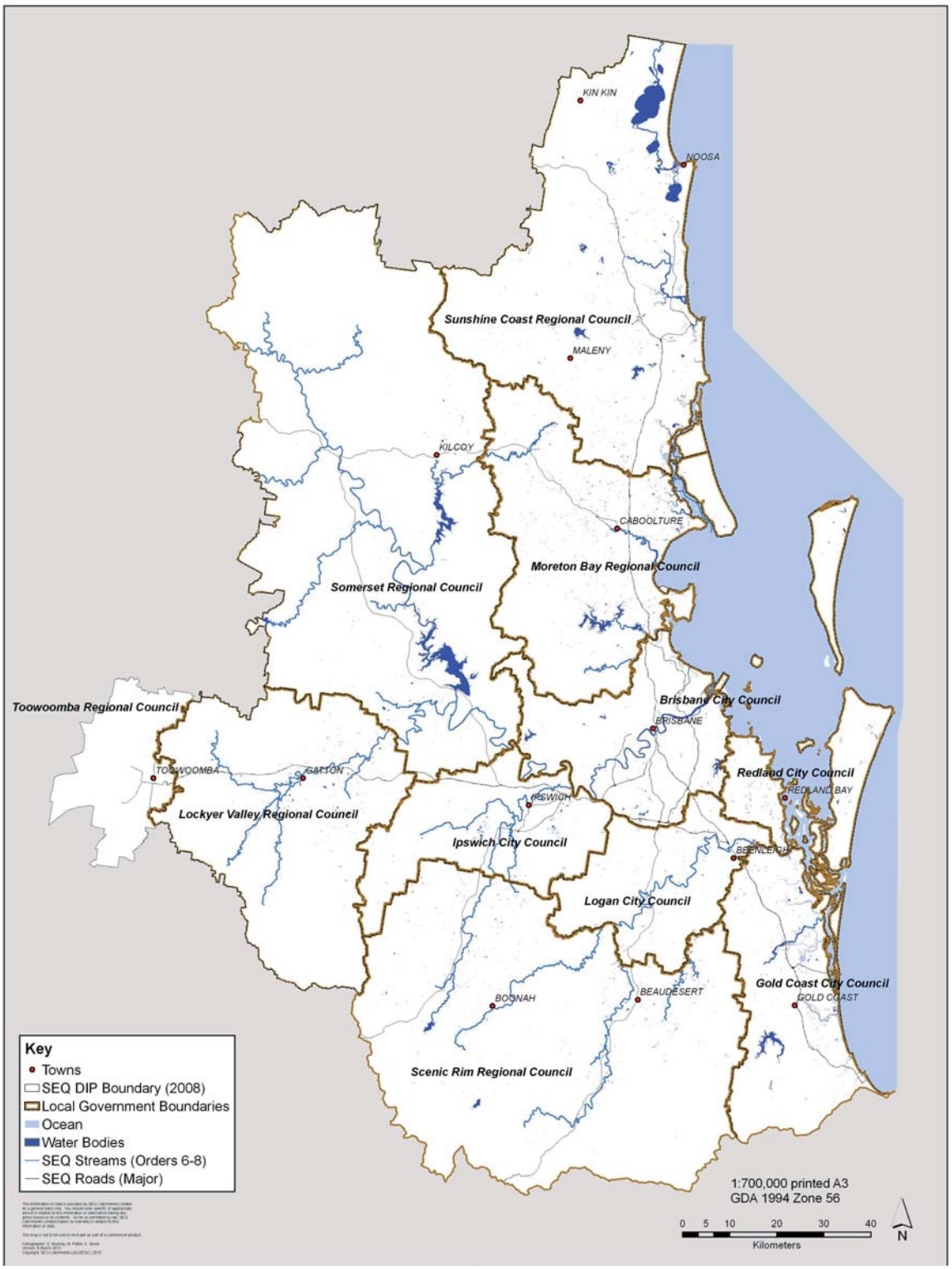


Fig 1. SEQ Local Government boundaries showing Bribie Island in Moreton Bay and Sunshine Coast Regional Councils.

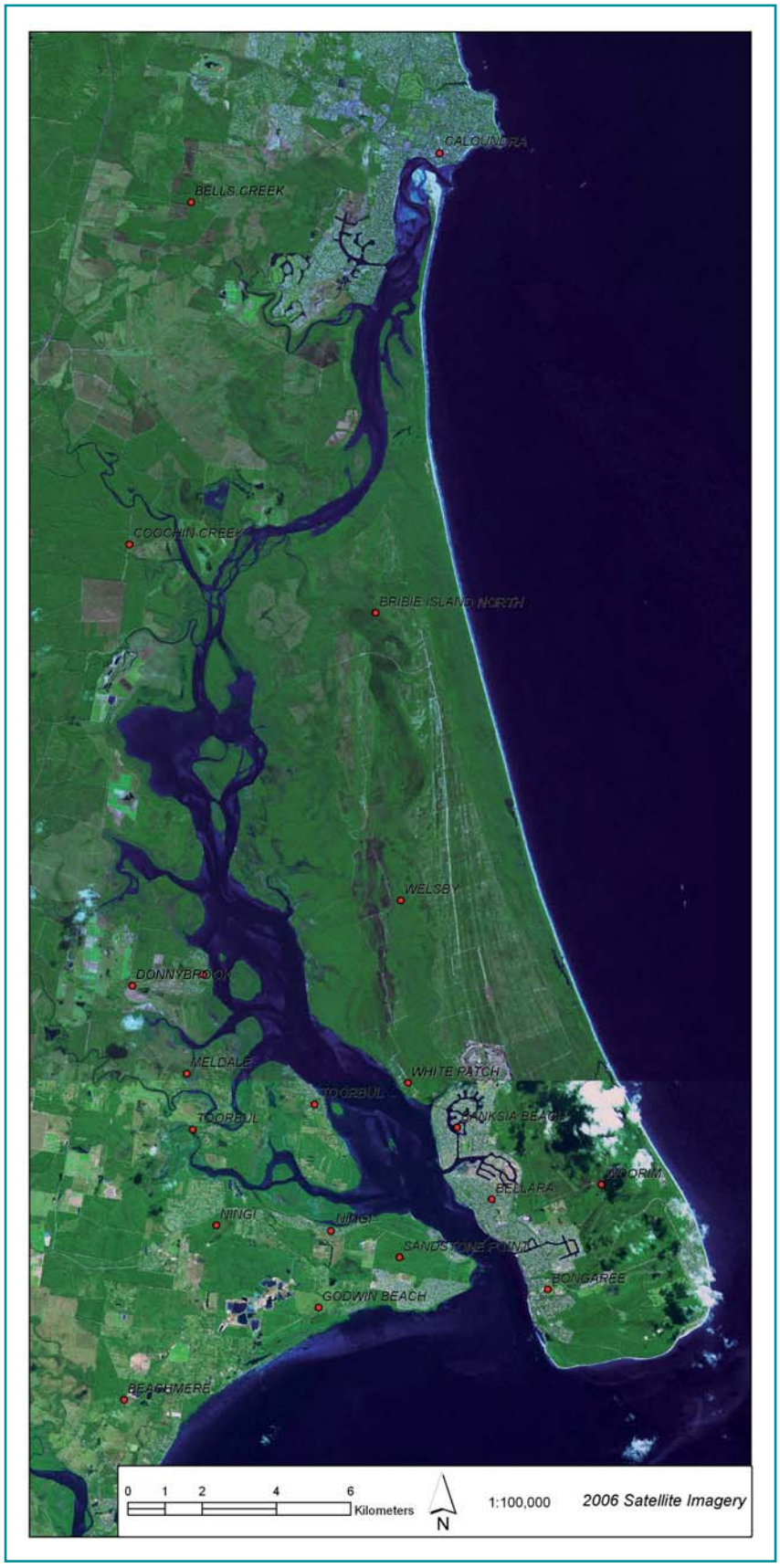


Fig 2. Spot 5 Satellite imagery 2006, Bribie Island.

SETTING THE SCENE

Climate change is already taking place, and further changes are inevitable.

The Intergovernmental Panel on Climate Change (2007) reported that the demonstrated rise in global mean temperature (GMT) trend due to increased greenhouse gas (GHG) emissions is driving a series of environmental consequences. This finding was one of many from the culmination of nearly twenty years of international scientific reporting (IPCC 1991, 1997, 2001 and 2007). Abuodha and Woodroffe (2006) have highlighted that the implications of changing climatic conditions for coastal settlements are sea-level rise due to ocean thermal expansion and melting ice caps, greater variability in patterns of rainfall and run-off, possible changes to wave climate, changes to the frequency, intensity and duration of storms, and changes to ocean chemistry, particularly ocean acidification.

The south east corner of Queensland was cited by the IPCC (2007) as one of two hot spots for climate change impacts in Australia due to coastal location and its growth projections for population and urban development. The fourth IPCC report projected SEQ to experience increasing vulnerability from sea level rise and increases in the severity and frequency of storms and coastal flooding by 2050 (IPCC, 2007).

Steffen (2009) reports that CSIRO modeling projections for the Sunshine Coast for 2100, based on the latest scientific evidence that the rate and magnitude of climate change is already being observed at the high end of the range estimated by the IPCC, show:

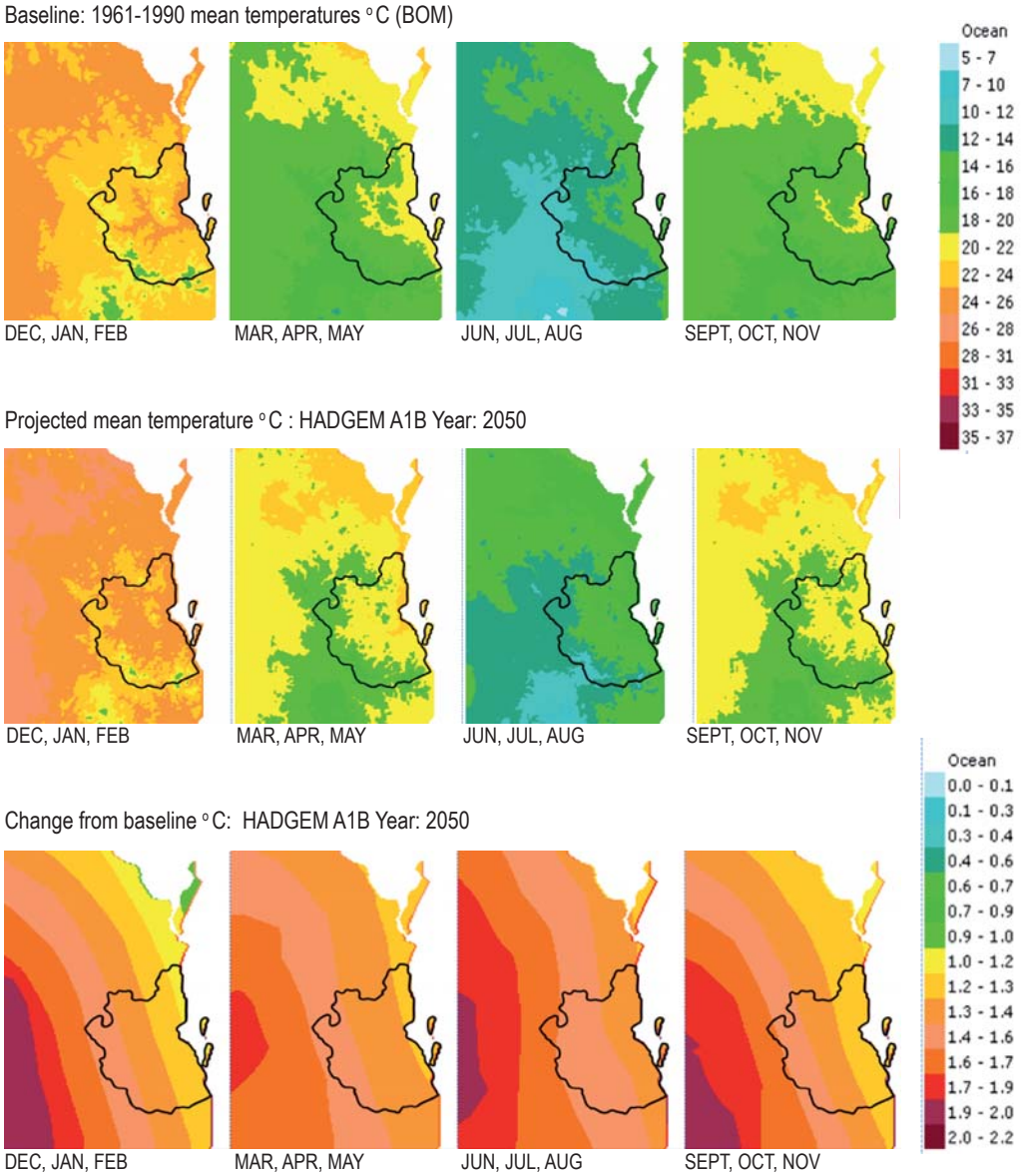
- a temperature increase of up to 6.5°C
- an extra 30 days over 35°C per annum
- 23 per cent reduction in average rainfall
- rainfall events become more intense
- sea level rise up by 0.80 m
- fewer but longer lived cyclones
- and by 2070, 140% increase in number of severe storms

These patterns are similar for other coastal areas of SEQ, as demonstrated with SimCLIM modeling by SEQC and by USC.

Committed sea-level rise refers to the increase in sea level that will occur beyond the potential stabilization of GHG and GMT, as the oceans continue to expand with absorbed heat. This is generally estimated to be about 50 years. Though Australians are responsible for high per capita GHG emissions, second only to the US, as a nation we only produce about 1.8% of the world's GHG. Yet the IPCC models project we will experience dramatic climate change impacts relative to the Northern Hemisphere. The conclusion must be drawn then that we have no choice but to mainstream adaptation policy and action now without delay, whilst simultaneously aiming to reduce our very high per capita emissions levels.

Seasonal Average Temperature Change from Baseline in SEQ Seasonal Average Temperature (HADGEM model A1B emissions)				
	Dec • Jan • Feb	Mar • Apr • May	Jun • Jul • Aug	Sep • Oct • Nov
1961-1990	23.7	19.3	12.6	19.0
2050	25.2	20.7	14.3	20.6
Change in °C	1.5	1.4	1.7	1.6

Fig 3. Mean Temperatures by Season for SEQ – Baseline and 2050



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THE VULNERABILITIES

The **Scoping Climate Change Risk for MBRC** August 2009 identified Bribie Island as being of particular concern with climate change in the council area.

Page 62 focuses on Bribie:

Bribie Island has seen rapid population growth in recent years, and has been particularly attractive for the older population. Recent ABS data shows that almost 50% of the current population is aged over 55 and almost 25% are aged over 65. Bribie Island is geographically isolated, and its single entry and exit point reduces emergency exit and entry points during extreme flooding. When looking at the current and projected climate Bribie Island stands out as a significant challenge.

Climate issues that pose significant threats to Bribie Island residents and council include:

Bush fire risk
Over 8% of buildings in medium risk zone (IID 2007)

Storm surge and sea level rise
63% of residential properties are in the storm tide zone (IID 2007).

High exposure to heat waves
(CLIMsystems & Climate Risk 2008).

Low socio-economic cohort
(22% of households earn less than $400 per week and relatively high unemployment of over 7%) (IID 2007).

Carbon constrained economy
Resident's isolation, low car ownership, poor public transport, low income levels and aging population exacerbate risks associated with carbon constrained future.

Wind
[Bribie Island] has high to very high exposure to wind.

Recent research shows that Bribie has the highest community vulnerability risk rating in Caboolture (IID 2007).

Furthermore some of Bribie Island's critical emergency services infrastructure (such as SES sheds and a fire station) are located in a medium bushfire hazard zone (IID 2007). As discussed earlier in the report climate change may exacerbate bushfire risks, potentially resulting in some medium zone areas being upgraded to a high risk zone.

Page 50* outlines the impact on the natural environment:

Climate change is set to exacerbate the challenges that the natural environment already faces from the urban development, agriculture and weeds. The key challenges of climate change will be through increases in temperature, increase in sea levels, extreme weather events and elevated CO2 in the atmosphere and oceans.

The impacts of these events will result in:

- Changes in the range of species distribution, include pest weeds, pest animals and disease
- Loss of species (plant and animal) and damage to ecosystems through either inundation or drought.
- Loss of ecosystems

These keys challenges will also have a significant impact on the public health and well being of our community. They will be seen through:

- Decrease in the gross value of agricultural production
- Potential food spoilage leading to food borne illness
- Changes in the range and distribution of mosquitoes which carry vector borne diseases
- Increase in the demand for health services due to new and yet unknown communicable diseases, subsequent health effects from heat stress, and poor quality food.

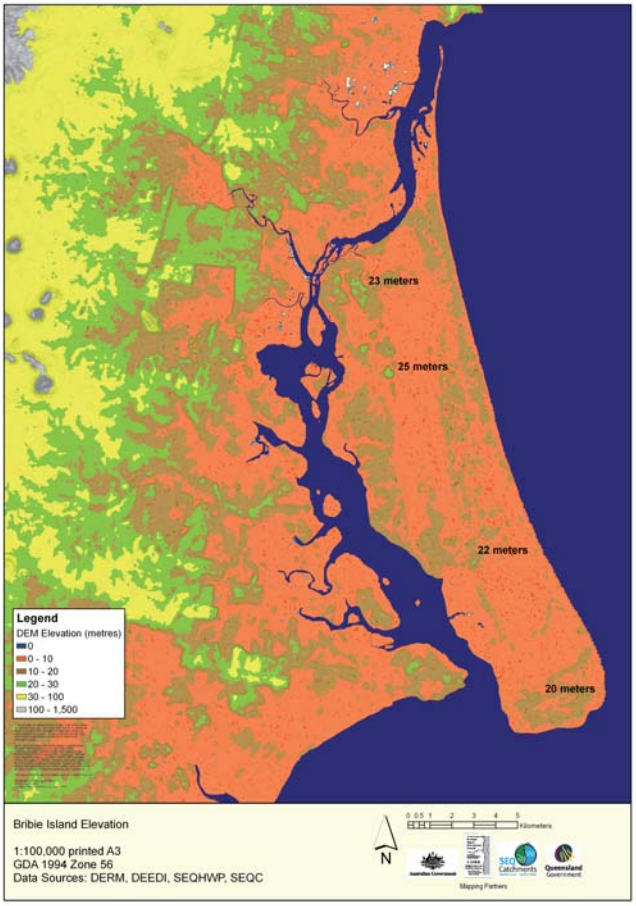

Fig 4. Bribie Island elevation as determined from Spot 5 satellite limagery

* Climate Risk Pty. Ltd., 2009

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THE PROCESS

This plan for collective action to minimise the vulnerability of Bribie Island and its inhabitants in a changing climate has been developed over a year and a half with the community and its government of Bribie Island, supported by SEQ Catchments Ltd and the University of the Sunshine Coast.

This risk reduction approach to climate change adaptation is called Climate Proofing, a term recommended by the Intergovernmental Panel for Climate Change (IPCC) and other international bodies such as the European Union, the World Bank and the Asian Development Bank.

The key steps in this constantly evolving process are to:

1. Develop a shared understanding of climate change generally, the potential local impacts and the most vulnerable areas;
2. Establish and develop relationships and partnerships between community and its government to plan and implement wisely;
3. Develop a 'no-regrets' integrated action plan to strengthen the resilience in the community and the biophysical environment;
4. Build capacity within the community to monitor, model and implement the plan;
5. Celebrate the successes.

Climate Proofing Bribie (CPB) began in 2008 with initial meetings of Bribie group and business leaders with government to establish an agreed approach. This was initiated by SEQ Catchments Ltd, the regional body for natural resource management in conjunction with the University of the Sunshine Coast.

A public meeting was subsequently held at the Bribie Island Recreation Hall on November 18th 2008 to introduce the project, present the global situation with a changing climate and discuss how it might impact on Bribie Island. The meeting was attended by 80 residents including the members of all three tiers of government – national, state and local.

All issues of concern expressed and actions suggested at this first public meeting were captured and form the basis of this action plan. Community members volunteered on the evening to form a working group. They have met on nine occasions throughout the year, building their collective knowledge and understanding of necessary, appropriate and realistic action.

Issues and concerns were divided into five action groups:

1. **Infrastructure & Planning** (includes waste and transport)
2. **Water** (surface and groundwater)
3. **Emergency Management** (sea level rise, storm surge, fire, flood)
4. **Shoreline Management**
5. **Biodiversity** (flora and fauna)

The draft Action Plan presented at the second public meeting on November 19th 2009 was deliberately simplistic yet broad-ranging. All issues converge at the community level and it is important that the integration of these different impacts and areas of responsibility be addressed.

The working group ensured that no comments from the first public meeting were lost. Through group negotiation, the responsible party, collaborating partners, timeline and priority actions were completed at the second public meeting.

Climate Proofing as a risk reduction process

Effective adaptation to climate change and climate variability requires a combination of bottom-up and top-down approaches to be able to effectively meld the legislation, funding and expertise with the community support, knowledge and networks. This melding forms the basis of an adaptation process called Climate Proofing which has been endorsed by the IPCC (2007).

The term and process of Climate Proofing has been adopted by international bodies such as the Asian Development Bank (ADB), the World Bank (WB) and a range of European organizations as the term used to describe the suite of actions needed to make areas and assets resistant to climate variability and change and to make communities and people more resilient (Hay et al 2004, ADB 2006, WB 2006 and 2008a, Kabat et al 2005). Hay (2004) observes that climate proofing provides a proactive operational approach for raising governmental, industry and community awareness, and initiating 'no-regrets' actions to meet the challenges of changing climatic conditions and rising sea levels, by reducing risk. Generally this risk reduction equates to cost-saving measures.

Preliminary stakeholder meeting, October 2009.

Second public meeting, November 2009.

Climate proofing does not mean reducing climate-based risks to zero as interpreted by some opponents of the term. This is clearly an unrealistic goal for any country or region.

In application, climate proofing refers to a dynamic process of implementation of collectively planned discrete actions - that may involve hard and soft infrastructure - in a staged sequence, moving the community toward resilience and the assets and activities toward resistance to climate change and variability.

It uses the adaptive management framework suited to complex systems to achieve continual improvement in cycles.

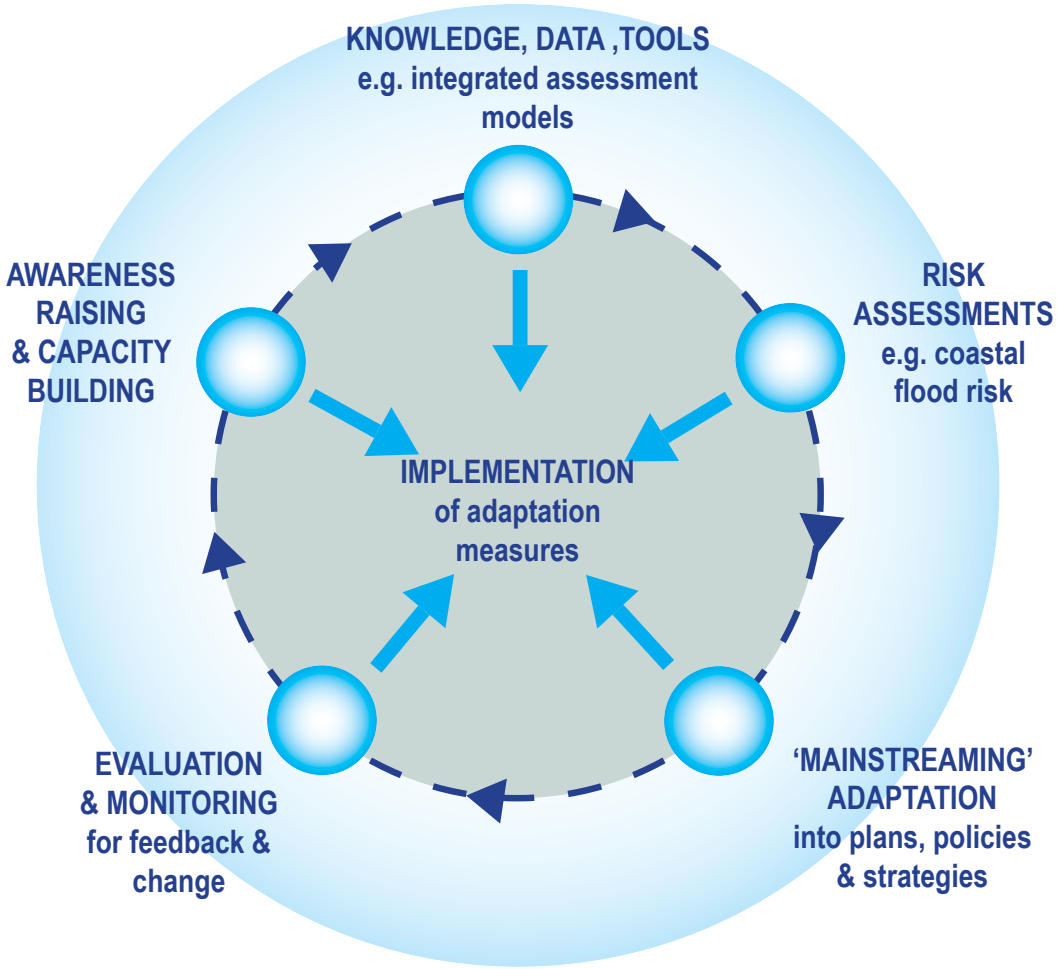

Fig 5. Adaptation as a process, IGCI (2006)

Adaptation and Mitigation

Whilst mitigation of climate change by reducing GHGs is an imperative to avoid irreversible ecological and resulting human impacts, it is clear that adaptation is also required to address the changes already occurring, and those committed by lack of mitigational action. The IPCC (2007) recommends both approaches are required as a matter of urgency to reduce risk of irreversible global change.

The Climate Proofing Bribie Action Plan has chosen no regrets actions which are both adaptational and mitigational. This removes the focus of climate change from one that can be perceived as a depreciation of our lifestyles by reducing our carbon emissions. In so doing, the actions will not only reduce the risks for the island and its community in changing climatic conditions and help to remove the cause of global changes, but will bring multiple benefits such as improved health and well-being, greater community involvement and a more integrated approach to planning.

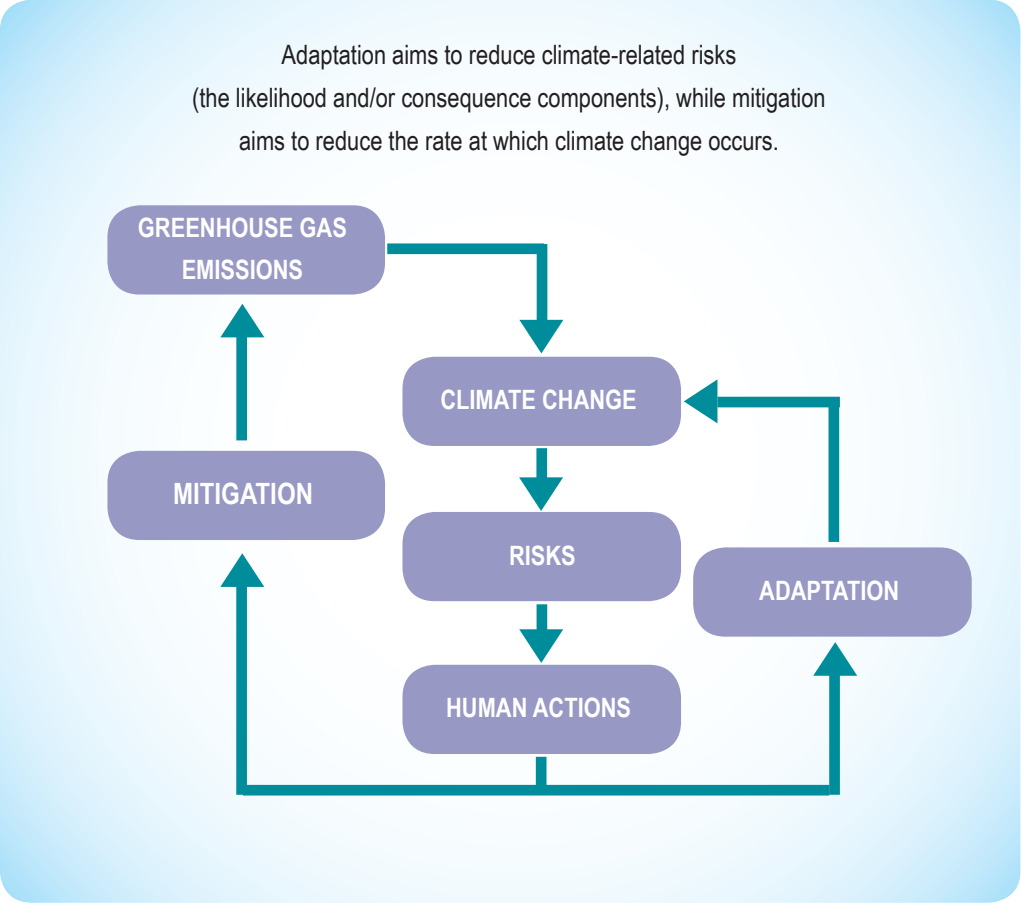

Figure 2: Adaptation and Mitigation
Source: CCAIRR findings.

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THE POLICY AND PLANNING CONTEXT

Adaptation to climate change and variability requires a combination of top-down and bottom-up approaches to be able to effectively meld the legislation, funding and expertise with the community support, knowledge and networks. Climate Proofing Bribie being a collective bottom-up process is unusual in Australia with no lack of top-down initiatives, and has consequently attracted a deal of interest from within and without the region.

As 2009 progressed, a succession of local, regional, state and national action plans were delivered. They have all served to support and reinforce the adaptation work begun on Bribie Island, and have built the local knowledge of the broader issues and how the Climate Proofing Bribie process fits in to all scales of necessary action.

In July 2009, the draft **South East Queensland Climate Change Management Plan** was released for public consultation in conjunction with the SEQ Regional Plan. Robert Preston from the Department of Infrastructure and Planning addressed the CPB Working Group to discuss the draft plan, being a combination of measures for climate change mitigation and adaptation. Coastal SEQ has been globally acknowledged as one of six hotspots in Australia by the IPCC and this draft plan demonstrates the State Government is taking the matter seriously. Action 5.3.5 – Building resilience through increased awareness and behaviour change – mirrors the risk reduction approach of the CPB initiative.

In October 2009, the Federal House Standing Committee on Climate Change, Water, Environment and the Arts presented its report on the **Inquiry into Climate Change and Environmental Impacts on Coastal Communities in Australia.** The Committee examined existing policies and programs related to coastal zone management, ways to promote sustainable use of coastal resources and strategies to deal with climate change adaptation, particularly in response to projected sea level rise. The committee is also looking at mechanisms to promote sustainable coastal communities, and governance and institutional arrangements for the coastal zone.

In August 2009, the Moreton Bay Regional Council released the Scoping Climate Change Risk for MBRC, prepared by Climate Risk Pty Ltd. This report has modeled and analysed the comparative risks of areas in the council jurisdiction. It outlines twelve suggestions for adaptation. The Climate Proofing Bribie Action Plan assists Council in delivering on a number of these recommendations by providing a starting point for concerted and focused adaptation. Most particularly it supports:

Recommendation #11. Raise community awareness of risks and support for adaptive measures by Council. Ultimately the community will be dealing with the risks from climate change. As such it is important to ensure that they have a grasp of the issue and understand and support Council efforts to adapt. A meeting with key community groups and businesses may provide a valuable insight as to how each of these groups are (or are not) dealing with the issue.

In June 2010, the Sunshine Coast Regional Council endorsed the **Sunshine Coast Climate Change and Peak Oil Strategy 2010 - 2020**.

These reports can be viewed at:

http://www.sunshinecoast.qld.gov.au/sitePage.cfm?code=cc-strategy

http://www.dip.qld.gov.au/regional-planning/management-plan.html

http://www.aph.gov.au/house/committee/ccwea/coastalzone/report.htm

www.moretonbay.qld.gov.au/.../moretonbay/.../Scoping-Climate-Change-Risk.pdf

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THE VISION

The self-reliant, resourceful and cohesive community of Bribie Island and its governance work together to protect the safety and livelihoods of its people and the Island's unique natural assets through a changing climate.

This vision was not sought or offered at the outset, but emerged through the year-long process of developing the action plan following the first public meeting and workshop. Three words became significant: *self-reliant, resourceful* and *cohesive*. They acknowledge the experiences and skills of the aging population in living through previous hardship. They acknowledge the need for the community to deal with a narrow and easily flooded island exit in times of emergency.

Although Bribie Island has political and philosophical divisions, the desire and need for cohesion is appreciated as essential in order for the island residents to develop resilience.

It is the uniqueness of Bribie Island that bonds its inhabitants.

This is different for different folks – the wonderful community spirit, the variety of waterways, the special vegetation, the bridge, the shorebirds, the family opportunities..

It is suggested the first action for this plan could be to conduct a broad campaign throughout schools, businesses, groups, clubs and individual residents – 5 things I love about Bribie.

This will put into words and pictures the special feeling that the community has expressed for this little sand island they call home. This collective valuing of the island will form the basis of concerted action.

Photos by Diane Oxenford

BRIBIE'S UNIQUE FEATURES

Bribie Island is a large sand island, located 70 km north of Brisbane in the north western area of Moreton Bay.

Bribie, approx 2m above sea level is 34km long and up to 8 km wide and is separated from the mainland by Pumicestone Passage, which was named by Captain Cook. It is the only island in Queensland connected to the mainland by a bridge.

Much of the Island is National Park (5580 ha) and the extensive wetlands and waters around Bribie Island are protected as part of Moreton Bay Marine Park and it is recognised internationally as an important Ramsar site. Along the eastern coastline beyond the low lying dunes, are a series of outstanding lakes. Buckley's Hole Conservation Park is an 87 ha reserve on the Island's southern tip.

Over 250 species of birds have been recorded on the Island as well as rare wallum frogs, dugongs, turtles and dolphins and in the summer months up to 15,000 migratory waterbirds visit the area for R&R before flying back to their breeding areas in Siberia and Alaska in the winter.

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CORE THEMES

Four core themes have emerged through this planning process that connect all areas of proposed actions:

1. The need to strengthen relationships and communication within the community and between community and all levels of government, particularly local government.
2. The need to continually share information and develop understanding of the objective facts surrounding Bribie Island's vulnerability and its opportunities with climate change.
3. The need to acknowledge and use the vast collective community skills and experience of Bribie Island, many of whom are retired leaders in industry, academia and public service.
4. The need to apply an adaptive management framework, continually improving through planning, implementing, monitoring and reviewing.

Many of these connecting and strengthening actions are currently happening and can be developed further in a myriad of ways. It is important to understand and acknowledge the value of the Neighbourhood Watch networks, Health Care Services, Scouts and Girl Guides, the many local groups and clubs that build resilience and can support emergency response. These social, sporting and professional networks will be paramount to the success of the island's climate adaptational response by bringing cohesion and self-reliance.

Most of the older population of Bribie Island has lived through times, before the advent of plentiful consumer products, where they relied on their resourcefulness for survival and enjoyment. It is this same resourcefulness that needs to be fostered and encouraged of the younger generation in order that we may simplify lives, reduce energy and water usage and respond well in times of emergency. A possible action, for example, could be a school mentoring system that could include gardening, water saving devices and bicycle repair.

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IDENTIFIED PRIORITIES

Through the prioritisation process at the second public meeting, a number of key actions were identified. These included actions for community and for council.

COMMUNITY ACTIONS

Priority community actions with council and state government support.

1. Offer regular community tree planting opportunities including free trees and native vegetation education through established community groups and schools;
2. Encourage clubs and public utilities to install solar panels, choose sustainable design and promote it to their patrons;
3. Establish community groundwater monitoring and awareness programme linking with State Government borefield investigations;
4. Practice and encourage responsible pet ownership;
5. Promote wisdom of using insulation, sustainable design and renewable energy for lower energy prices through a range of avenues including manufacturer support, Living Smart Homes etc;
6. Practice and encourage household recycling;
7. Support public transport – especially when a new trial is established.

COMMUNITY ACTION

GOVERNMENT ACTIONS

The following Action Tables will use these highlights to indicate Government and Community actions.

GOVERNMENT ACTIONS

Priority government actions with community support:

1. Review and implement 1995 council policy on vegetation protection and maintenance;
2. Development with community consultation of a specific Bribie Island Precinct Plan which considers the unique features of Bribie soils, groundwater system etc. and whereby the cumulative impact of development minimises vulnerability;
3. Plan and implement Nature Conservation Strategy for Bribie in consultation with community organisations and businesses as a matter of urgency;
4. Improve public transport frequency, connections and promote services eg trial free bus service to the beach in holidays
5. For times of emergency, identify, secure and promote a network of elevated points with enough distance from the coastline appropriate for public marshalling;
6. Increase the number of Fire Services permanent staff;
7. Ensure full and open community consultation in development and implementation of Shoreline Erosion Management Plans (SEMPs) for east and west shorelines with monitoring and evaluation programmes and regular reviews.

1. PLANNING & INFRASTRUCTURE

DESIRED OUTCOME: Well-consulted planning for sustainability in housing, public infrastructure, transport and waste that appreciates Bribie Island's unique features, its demography and average income will be undertaken as a matter of urgency to reduce risk with climate change promote self reliance.

Identified issues	Actions to address/issue	Responsible party	Potential collaborators	Timeline/ priority status
WHY?	**WHAT?**	**WHO?**	**WITH WHOM?**	**WHEN?**
1.1 **PLANNING** Currently the uniqueness of Bribie Island's features, demography and vulnerability to climate change impacts are not adequately considered in planning for development	**1.1.1** Value the knowledge and relevant experience of Bribie Island community members to guide planning and policy development by consultation through regular meetings	MBRC DIP	Bribie Island community, BIEPA, U3A	short term, high priority
	1.1.2 A specific BI town plan to be developed and consulted considering unique features including soil types and cumulative impact of development is to minimize vulnerability	MBRC DIP	Bribie Island community including Real Estate and development industry	to be started short term, high priority
	1.1.3 Important infrastructure to be sited in areas of lower vulnerability	MBRC EMQ	businesses associated	established - medium term, medium priority new - immediate, high priority

	1.1.4 Ensure new development does not negatively impact on existing development with **adequate buffers and drainage**	MBRC DIP	UDIA, Master Builders Assoc, architects, Real Estate & developers	medium term, medium priority (start now)
	1.1.5 Benchmarks for planning need to be **raised** with increasing frequency and severity of climate-related events (eg review Q100)	DIP	MBRC	short term, medium priority (start now)
	1.1.6 Identify **carrying capacity** and manage to it whilst incorporating housing affordability policy	MBRC	Universities	medium term, high priority
	1.1.7 Developments to incorporate adequate vegetation and open space	MBRC	Development industry	short term, high priority
	1.1.8 Influence urban development to ensure orientation of houses suits passive solar design	MBRC	Development industry	
	1.1.9 Disallow underground carparks and minimize deep excavation due to unfavourable geology	MBRC	community groups	medium term, high priority

WHY?	WHAT?	WHO?	WITH WHOM?	WHEN?
1.2 PUBLIC INFRASTRUCTURE Public infrastructure must reflect greater consideration of the welfare of the community with changing climatic conditions.	**1.2.1** For carparks in public places, **remove curbing and channeling** to recharge aquifers and plant appropriate trees for shade (see Section 5)	MBRC	Development industry	medium term, high priority
	1.2.2 **Encourage clubs** and public utilities with incentives to install solar panels, choose sustainable design and promote it to their patrons	MBRC DERM	Community groups	short term, high priority
	1.2.3 Council facilities need to be **better designed** for climate eg park benches, bus shelters etc. in constructed or vegetation shade, water tanks for showers and preserve shading vegetation wherever possible.	MBRC		short term start, high priority
	1.2.4 Ensure **vulnerability of communication,** energy and water pipelines is minimized by running underground conduits where possible in existing corridors	MBRC	relevant State agencies	medium term, medium priority

1.3 Sustainable housing design Many dwellings are not designed appropriate to the conditions and are not energy or cost efficient.	**1.3.1 Promote wisdom of using insulation, sustainable design and renewable energy** for lower energy prices through a range of avenues including manufacturer support, Living Smart Homes (see box) etc.	MBRC, DERM	community networks and businesses	short term start, high priority
	1.3.2 Update building codes incorporating sustainable design such as eaves, light reflective colours	MBRC	building industry	medium term, medium priority
1.4 Transport Public transport, bikeways and footpaths are currently inadequate	**1.4.1 Improve public transport** frequency, connections and promote services	MBRC Transport companies	community usage	short term high priority
	1.4.2 Maintain, increase and promote **cycle and walking paths**	MBRC		medium term, high priority
	1.4.3 Promote public education/works campaign to reduce **broken glass** on paths and public places	MBRC	community Chamber of Commerce	medium term, medium priority
	1.1.4 Widen shared path on **bridge** (clip-on extension)	MBRC		medium term, medium priority

WHY?	WHAT?	WHO?	WITH WHOM?	WHEN?
1.5 Waste Per capita, the island community generates a high level of non-biodegradable waste that needs removing from the island, maintains high dependence on consumer products that must be brought in and when littered,impacts on visual amenity, waterways and wildlife. The organic waste in landfill produces methane, the highest greenhouse gas contributor for local government.	**1.5.1** Encourage **household recycling** including effective composting e.g. council subsidy compost bins	MBRC	community networks and businesses	short term, high priority
	1.5.2 Review Council's **waste strategy** incorporating world's best practices and exploring economic opportunities for using waste as a resource e.g. centralized composting from domestic green waste bins	MBRC		medium term, medium priority
	1.5.3 Encourage community **resourcefulness** through range of avenues including school education programmes	MBRC Education Qld		long-term, medium priority

Removing kerbing and channelling drains stormwater to grassy verges to recharge groundwater.

IMPLEMENT ENERGY DEMAND MANAGEMENT AS AN ADAPTATION MEASURE

The magnitude of climate-induced impacts is not proportional to a particular country's emission levels. Improving energy efficiency should be a cornerstone of any energy policy, regardless of consumption levels. Moving from a business-as-usual scenario to one where energy efficiency is the objective reduces the need for new energy sources. Using energy more efficiently through the deployment of low energy technologies will help decrease the sector's vulnerability.

Williamson, L. E., Connor, H., Moezzi, M. (2009): Climate-proofing Energy Systems HELIO International

THE VALUE OF STREET TREES

Street trees are each worth an average of $424.40 a year and up to $25,500 in their lifetime by saving costs for households and councils and improving the community environment according to researcher Professor Randy Stringer.

Agricultural economist Professor Stringer advises that the value of street trees could increase substantially in the next decade because of the important role they play in tackling climate change, by providing shade and cooling the air.

Research involving Professor Stringer found a typical street tree in Adelaide would give a household $64 in energy savings each year, as it provided shade and cooled the air. Street trees were estimated to be worth about $65 through improved aesthetics of the street and add $72 a year to the value of a house (Killicoat & Stringer, 2002).

Moore (2006) also notes that appropriately trees enhance property values, local hydrology, bird populations, wind regulation and sense of well-being.

LIVING SMART HOMES

The Living Smart Homes online program can be accessed for free at www.livingsmarthomes.net.au and by registering, households are able to work their way through four sustainability modules covering energy, water, transport and waste, to improve their energy efficiency as they go. The program is jointly managed between Sunshine Coast Regional Council (SCRC) and Moreton Bay Regional Council (MBRC). Households signed up are saving more than 460 tonnes a year in greenhouse gases and reducing landfill by 73.6 tonnes per year. The scheme has also recorded savings of about four Olympic swimming pools of water a year, and reduced travel by 557,000 kilometres per year. Based on a median tariff, the 353,000 kilowatts of energy saved per year would equate to savings of up to $45,000. Participants receive a Living Smart sign to display on their gate, post box or front door. Information, activities, games and calculators provided help you reduce green house gas emissions and save money. Workshops around sustainable living are also planned for Living Smart participants in 2010.

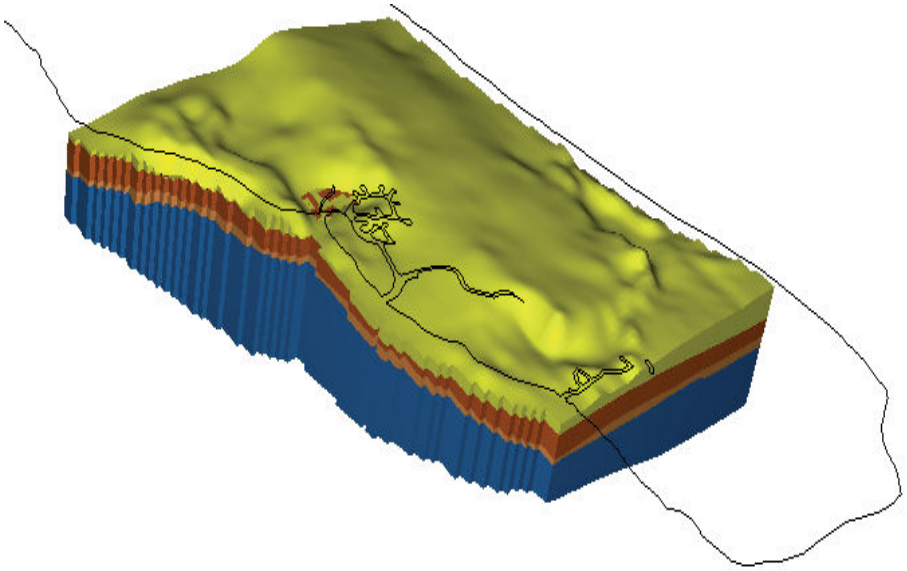
2. WATER

DESIRED OUTCOME: Bribie Island's critical surface and groundwater resources are sustainably managed as an entity for human and ecological purposes under circumstances of changing rainfall patterns and increasing demand.

Identified issues	Actions to address/issue	Responsible party	Potential collaborators	Timeline/priority status
WHY?	**WHAT?**	**WHO?**	**WITH WHOM?**	**WHEN?**
The issues have been grouped together due to their interrelationship: 2.1 Groundwater and surface water are intrinsically linked on Bribie and should be treated as an entity. 2.2 Aquifers are very important for buffering island's biodiversity against impacts of climate change. 2.3 No Environmental Impact Assessment (EIA) undertaken for current borefield allocation.	2.1.1 Establish community **groundwater monitoring and awareness programme**, including 3-D visualization and value of wetlands	community, Banksia Garden Club, QUT	MBRC SEQ Water High Schools	short term, high priority
	2.1.2 Encourage **water use efficiency** for private and public facilities (eg Woorim golf course) including bore usage, applaud good examples (eg Pacific Harbour Golf Course)	MBRC Qld Water Commission	community, DERM	short term, high priority
	2.1.3 Use combination of incentives and regulation to encourage **water infiltration** into ground to recharge aquifers and minimize run-off with appropriate design buildings, carparks, limit curbing & channeling, tank overflow etc.	MBRC State Government	Qld Water Commission	short to medium term, medium priority

2.4 No Water Allocation Management Plan (WAMP) for water extraction. 2.5 Currently no strategic management of private bores 2.6 The field capacity for water storage is not high being a sand island 2.7 Too many impervious surfaces prevents recharge of stormwater and increase risk of local flooding 2.8 Saltwater intrusion is already evident from overuse of groundwater	2.1.4 Localize collection and use of rainwater in public and private buildings with tanks and stormwater capture	MBRC State Government	QWC	medium term, medium priority
	2.1.5 Encourage **vegetation** to assist infiltration and filtration to groundwater	MBRC	community	short term, high priority
	2.1.6 Implement fit-for-purpose **waste water** treatment and usage	MBRC State Government	businesses, community	medium term, medium priority
	2.1.7 Undertake full EIA of borefield extraction	SEQ Water		short term high priority
	2.1.8 Manage and educate for proper acid sulphate soils management to avoid low pH impact on waterways	MBRC DERM	developers community	short term medium priority
	2.1.9 Ensure all water treatment and supply is **carbon neutral** by 2020	MBRC State Government	SEQWater, Qld Water Commission	long-term medium priority
2.2 Lyngbya Majuscula (blue-green algae) blooms in ocean	2.1.8 Ensure causes of **Lyngbya** are established and minimized and community is notified of risks and appropriate action	Healthy Waterways, MBRC	local fishermen, businesses, community	medium term, medium priority

HYDROGEOLOGY OF BRIBIE ISLAND



Quaternary sand deposits, sitting on bedrock of sandstone at 30m.

- Unconsolidated sands (3.5m)
- Indurated sand “coffee rock” (6.5m) – low permeability layer
- Weekly indurated sands (5m)
- Sand & Clayey sand (16.5m)

Ref. J. Jackson, 2008

The existence of the coffee rock layer with low permeability creates two relatively distinct aquifers, or groundwater reserves, with apparently little exchange between the two. The shallow spears in the urban coastal areas tap the top aquifer and the deep bores nearer the centre of the island tap the bottom.

Without the groundwater, Bribie would not be able to support the abundance of wildlife and vegetation that rely on the wetlands, lagoons and underground reserves. The groundwater lens conveys some resilience to the island with the projected climate change impact of lower average rainfall.

With support from SEQWater, the Qld University of Technology is currently developing a 3-Dimensional model of the groundwater of Bribie Island as a educational tool for understanding the aquifers.


Coffee Rock 1


Coffee Rock 2


Coffee Rock 3

Above photos by Malcolm Cox, QUT

3. EMERGENCY MANAGEMENT

DESIRED OUTCOME: In times of extreme life-threatening events, the community will respond collaboratively and efficiently guided by well-communicated emergency response action plans.

For Bribie Island, these events exacerbated by climate change could be: **storm surge, high winds**, and **fire**. Bribie Island has been identified as the most vulnerable area in the Moreton Bay Regional Council by the Moreton Risk Assessment August 2009.

Identified issues	Actions to address/issue	Responsible party	Potential collaborators	Timeline/priority status
WHY?	**WHAT?**	**WHO?**	**WITH WHOM?**	**WHEN?**
3.1 Presently there is no identified elevated area for marshalling in times of emergency	3.1.1 A network of **elevated points** with enough distance from the coastline appropriate for public marshalling needs to be identified, secured, included in BI Emergency Management Plan and communicated broadly	MBRC, Emergency Management Qld (inc SES)	QPWS, community	short term, high priority
3.2 Island road exit restricted to two-lane bridge, the bridge and the western side of the bridge could be inundated	3.2.1 Bribie Island community needs to be encouraged to be **independent and self-reliant** including health services	all parties		medium term, medium priority
	3.2.2 Establish **register** of skilled community members that could assist voluntarily in an emergency including Voluntary Marine Rescue and train leaders in specifics	SES, Community groups and Clubs	community members and groups	short term, high priority

	3.2.3	Clear & prompt **communication** Incorporate learnings from Victorian bushfires including siren, community radio station announcements, neighbourhood alert and care	EMQ (SES), Police Services, MBRC	community	short term, high priority
3.3 Most Fire Services and Emergency Services staff are currently voluntary	3.3.1	Need more **permanent staff**	EMQ	MBRC	short term, high priority
	3.3.2	Promote current **fire management plan** and its integration into this climate change plan, review if necessary with community involvement	QPWS	community	short term, high priority

4. SHORELINE MANAGEMENT

DESIRED OUTCOME: Shoreline erosion due to natural coastal processes or human activity will be minimized by collective planning and action to protect dunes and remove erosive processes where possible.

Identified issues	Actions to address/issue	Responsible party	Potential collaborators	Timeline/priority status
WHY?	**WHAT?**	**WHO?**	**WITH WHOM?**	**WHEN?**
4.1 Both sides of the island are being eroded. There is no community involvement in current erosion planning process for the western shoreline. Inconsistencies exist between endorsed SEMP and dunes being actively removed at Woorim. There is a lack of clarity as to whether boatwash is contributing to erosion	4.1.1 Ensure full and open **community consultation** in development of Shoreline Erosion Management Plan (SEMP) for western shoreline.	MBRC Planning & Environment DERM	community Shoreline Erosion Management Group (SEMG)	short term high priority
	4.1.2 Ensure appropriate review with **monitoring and evaluation** process for Woorim	SEMP MBRC Planning & Environment Dept	SEMG	short term high priority
	4.1.3 Implement **soft options** for shoreline erosion – eg groundcover to increase dunal height	MBRC Friends of Woorim BIEPA		short to medium term high priority

	4.1.4 Raise awareness of value of dunes - turtles, habitat protection, wave buffer	MBRC BIEPA		short to medium term, medium priority
	4.1.5 Explore innovative options e.g. Hinkel Reef	MBRC	BIEPA Friends of Woorim	long term, medium priority
	4.1.6 Study required to establish impact of boatwash	QPWS Marine Parks Maritime Safety	MBRC	medium term medium priority
	4.1.7 Encourage use of user-friendly **propellers**			medium term medium priority
	4.1.8 Ensure mangroves are protected	MBRC Planning & Environment Dept & SCRC	DEEDI	short term, high priority
4.2 Turtle nests are being desecrated	4.2.1 Turtle nests need identification and protection through physical constraints and education	MBRC Planning & Environment Dept, Dept Asset Management & Maintenance & SCRC	BIEPA	short term, high priority
	4.2.3 Support expansion of turtle monitoring programme		BIEPA	medium term, medium priority

EASTERN SHORELINE EROSION MANAGEMENT PLAN (SEMP)

In early 2006, the beaches at Woorim was battered by heavy seas which caused significant erosion and damage. This led to various meetings of concerned community members calling for the Caboolture Shire Council (CSC) to take action to repair the damage and to take steps to protect the surrounding areas.

In response to these representations made by community members such as friends of Woorim Beach, CSC agreed to develop a “master plan” or Shoreline Erosion Management Plan (SEMP) to guide both short-term and long-term decisions and actions that would be required to address the general foreshore management issues along the ocean side of Bribie.

According to the SEMP Guidelines prepared by the Department of Environment and Resource Management (DERM), these reports allow councils to..“proactively plan for erosion management in erosion hotspot areas.

Council engaged the services of internationally recognised marine erosion consultants BMT WBM to develop the SEMP that would outline the causes of the erosion that was occurring at that time. The SEMP would also outline remedial actions that were required, and would outline a timetable for those actions.

In accordance with the guidelines for preparation of SEMP reports,

Council also initiated the Woorim Erosion Reference Group (WERG) and recruited community stakeholders to be part of this Group and work along with BMT WBM as the SEMP was developed. The resulting report and recommendations was titled the Woorim Beach Shoreline Erosion Management Plan (WBSEMP) and this was presented to, and endorsed by Council in October 2007.

The document was to guide all future decisions and actions along the Woorim foreshore and, as noted scientist Dr John Shaw points out, it provides a balance of short-term, long-term and do-nothing options. This was a major piece of work involving a great deal of input by a wide group of individuals from Council and BMT WBM as well as volunteers from the community. *John Oxenford, 2010*

5. BIODIVERSITY

DESIRED OUTCOME: Vegetation: There will be adequate and appropriate native and other vegetation cover on this unique island essential for: **shade** and **temperature management**, **biodiversity**, **wind protection**, **groundwater recharge** and **transpiration**, **erosion control**.

Vegetation cover will be essential for coping with extreme events associated with a changing climate. This will assist in meeting statutory commitments by meeting Local Law 12 and the SEQ Regional Plan.

Identified issues	Actions to address/issue	Responsible party	Potential collaborators	Timeline/priority status
WHY?	**WHAT?**	**WHO?**	**WITH WHOM?**	**WHEN?**
5.1 Removal and heavy pruning of remnant vegetation (including old habitat trees) on public land - including native vegetation through the middle of the island (Poverty Ck) Too much red tape prevents appropriate action	5.1.1 Review 1995 **council policy** on vegetation protection and maintenance	MBRC DERM	QPWS, Fire Services, BIEPA, FOWB, BICA, Nursery, community consultation	short term, high priority
	5.1.2 **Protect** what vegetation currently exists, especially old habitat trees	MBRC Bushcare Officer	QPWS policing parks and education, recreational conflict etc	short term, high priority,

WHY?		WHAT?		WHO?	WITH WHOM?	WHEN?
		5.1.3	Ensure all **council staff** and contractors are educated in the vegetation management issues now and the policy once established	MBRC HR and Environment & Planning	Wallum Action Group, Wildlife Carers and Spotters, BIEPA, community	short term, high priority
5.2	Mangroves disappearing on west coast	5.2.1	Develop and implement **Shoreline Erosion Management Plan** (SEMP) for West Coast and Red Beach including studies of causes (see Shoreline Management)	MBRC SCRC Port of Brisbane	DERM QPIF should include community members in process of development and implementation	short term, high priority
5.3	Appropriate species need to be planted in appropriate areas for changing conditions	5.3.1	Collate from existing knowledge list of **ecosystem types and appropriate vegetation types** – including wetlands, dunal zone, western foreshore.	Wallum Action Group develop list and propagate with MBRC, QPWS, BIEPA, Garden Club, birdos collaboration potential Honours project	Richard Proudfoot will work with John Ward and SEQC mapping to spatialise this developing list, nrm groups from mainland	medium term, high priority
		5.3.2	List of endemic plant species with tolerance of higher temps and lower rainfall be developed and distributed			

	5.3.3 **Appropriate species** to be propagated (including Bribie Island Pines) and education of nursery industry	Wallum Action Group community nursery, co-ordination by MBRC	schools, Shaftbury School nursery, Friends of Woorim Beach	medium term, high priority
	5.3.4 Ensure species are planted in **appropriate areas** so as not to increase fire risk, unnecessary shading solar panels, passive solar design, storm events etc	MBRC Planning & Environments Depts – could be included on planning approvals and other educational opportunities and in time in planning scheme through landscaping plan	BIEPA QPWS SES BICA Community Bushcare groups	medium term, medium priority
	5.3.5 For carparks in public places – avoid new and partially remove existing curbing and channeling and plant appropriate trees (see Section 1)	MBRC Planning & Environment Depts and other	BIEPA Healthy Waterways (Water by Design) QUT SEQWater	long term, medium priority
	5.3.6 Street tree plantings to reduce heat, perhaps businesses and local groups to sponsor	MBRC	BI Chamber of Commerce BIEPA BICA WAG BI Garden Club	medium term, medium priority

5. Biodiversity continued...

WHY?	WHAT?	WHO?	WITH WHOM?	WHEN?
	5.3.7 Community tree planting days, free trees and native plant education	MBRC Environment Dept Cr Gary Parsons	Eco Community, Schools Banksia Garden Club BICA BIEPA BI Chamber of Commerce	short term, high priority
5.4 No register of trees	5.4.1 Establish tree register with differentiation of remnant, woody weeds, exotic, trees of historical and cultural significance	MBRC Environment Dept	Traditional owners BIEPA Wallum Action Group	medium term, medium priority
	5.4.2 Establish baseline mapping satellite imagery with ground - truthing that can be replicated to guage change	MBRC Environment Dept	SEQ Catchments (satellite imagery with community ground-truthing) BIEPA (Alan Kerr) Wetland Care Australia Wallum Action Group	short term, high priority
5.5 Weeds invading native habitat and will increase and change with climate change conditions	5.5.1 Education programme for pest / weed identification and management	MBRC Environment Council	Biosecurity Qld SEQ Catchments Wallum Action Group DERM	medium term, medium priority

5.6 Financial value of vegetation to humans is not currently appreciated – destruction of vegetation erodes value.	5.6.1	Explore options through Ecosystem Service valuation of vegetation to begin with especially old trees (as per SEQ Regional Plan policy) (Council has valued habitat trees at $2.2 mill)	BIEPA SEQ Catchments (Simone Maynard)	MBRC UQ (Paul Dargusch) BI Garden Club Schools	medium term, medium priority
	5.6.2	Value of Bribie trees – can set up a cap and trade system – can be a carbon sink and create value	MBRC	SEQC, Greening Australia	medium term, high priority
5.7 No local plan for protection of wildlife and the relationship with water and vegetation	5.7.1	Plan and implement **Nature Conservation Strategy** for Bribie in consultation with community organizations and businesses.	DERM (& QPWS)	community	short term, high priority
	5.7.2	Need people resources on Bribie to manage unique wildlife, and consider **voluntary rangers**			
5.8 Council mosquito and midge control uses compounds which may be an issue to wildlife	5.8.1	Need environmentally sensitive **midge management plan**	MBRC	BIEPA, community	medium term, high priority

5.9 Pets are not properly managed for wildlife protection	5.9.1 **Responsible pet management** including sterilization, micro-chipping, mandatory catbells and restraint at night	MBRC	Rangers	medium term, high priority
5.10 Pest species eg toads, foxes need to be managed	5.10.1 Education, awareness-raising & eradication campaigns for pest species e.g. Toadbusters, Miner bird traps	MBRC	DERM (& QPWS) BIEPA Wader Group	short term, high priority
	5.10.2 Increase **monitoring** of native and pest species and ensure data is collated and publicly accessible			
5.11 Lack of understanding of value of wetlands, migratory birds, turtle nesting	5.11.1 Education and awareness-raising of unique species on Bribie eg froglets adapting to salinity and acidity and their dependence on ecosystem health, turtles, shorebirds	MBRC	BIEPA community Birds Qld Wetlands care Australia	medium term, high priority

WHAT IS BIODIVERSITY AND WHY IS IT IMPORTANT?

Biodiversity is defined by Australia's Biodiversity Conservation Strategy 2010-2020

…the variety of all life forms – the different plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part.

Biodiversity is the variety of all life forms, supporting the recreational, social, economic and aesthetic values that are integral to a region's viability and vibrancy. Biodiversity and healthy functioning ecosystems are fundamental to all life, providing a range of essential ecosystem services such as clean air and water. As plants grow, they capture carbon dioxide (which is the main greenhouse gas contributing to climate change) and convert it to produce oxygen. They filter pollutants caused by human activities. Healthy ecosystems also absorb and recycle essential nutrients and help purify water. Vegetation within ecosystems regulates the water balance and also helps to prevent erosion and silting of our waterways.

Climate change exposes biodiversity to many threats. Conversely, there is general consensus that protecting and enhancing green infrastructure across the landscape will build resilience to climate change not only for the biodiversity but also for the human community. Green infrastructure is the physical natural environment within and between our cities, towns and villages. It is a network of parks, gardens, native vegetation, green corridors, waterways, street trees and open countryside.

Natural features help make cities and towns liveable, and can restore the effects of extreme weather. Commercial and recreational fishing industries depend on the food sources, breeding areas and shelter provided by healthy marine, wetland and estuarine habitats. There is a strong relationship between protecting biodiversity and securing a robust economic future for the tourism industry.

REDUCE STRESSES ON WILDLIFE

As Hannah and Salm (2005) note: 'One of the best safeguards against climate change impacts is to reduce stress on biodiversity from nonclimate sources.' These stresses include control burning, hydrological changes, nutrient enrichment (from dog faeces and storm water runoff) and other forms of pollution, invasion of pest animal and plant species and disturbance and hunting by domestic animals. Turtle nests and migratory shorebirds are very susceptible to dog disturbance on Bribie, and cats prey on native birds.

Photo by Robert Inglis

8

THE WAY FORWARD

The Climate Proofing Bribie process is a pioneer in this bottom-up approach to climate change adaptation in this country, and offers the Moreton Bay Regional Council an opportunity to lead Australia in this innovation.

This document is the start of a long process that will span many years. The most important thing to bear in mind at this stage is that the journey has now begun. The collective plan will continue to evolve as understanding, knowledge and capacity grows, needing annual review to ensure it remains relevant.

To ensure that the plan is implemented effectively and appropriately, a core group of MBRC staff and broadly representative community members with representation from regional, state and federal agencies where relevant must be established and supported. This co-ordinating body needs to be able to develop and strengthen positive relationships at all levels of community, government, industry and research.

To date there has been little interest demonstrated from the Traditional Custodians of the land, despite invitation. It is essential that the Aboriginal community feels an intrinsic part of this process, and is assisted in understanding the implications that will come with climate change. They are proven masters of adaptation having borne witness to many dramatic changes over the milennia of their settlement here. To be able to move forward sustainably together, we must acknowledge and appreciate all that has gone before in ancient Aboriginal history, and in more recent European history.

The collection of historical records and photographs is an essential component of the Climate Proofing process to develop our collective understanding of change and vulnerability. Overlays of aerial photos will demonstrate where changes have occurred in the coastline and help identify hotspots for coastal zone changes. To date through this process we have been contacted by community members with valuable information, and there is a great deal more that exists in private collections. A public request and co-ordinated collation and presentation of the records will engage community in an objective and meaningful way that will inform the planning.

As discussed in Section 4 – The Vision, an important first step in implementation is to broadly engage the community with a campaign to celebrate Bribie island's uniqueness. This could take many forms depending on the creativity and enthusiasm of those involved, eg artwork, photography, prose or poetry or just simple words. There is no disputing the fact that everyone who calls Bribie home cherishes it in their own way.

Climate Proofing Bribie offers the chance for community and its government to view Bribie Island in a new light that turns threats into opportunities. Historically the issues have been considered in isolation. Adapting to climate change demands an integrated and positive approach by a well-informed and cohesive community. Regardless of the cause of climate change, implementing this action plan will cause no regrets and deliver extraordinary and long-lasting benefits to the Bribie Island community.

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