# South East Queensland Regional Plan 2017 *ShapingSEQ*

## Background paper 4: Sustain

September 2017

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# Introduction

## Purpose

The purpose of this paper is to inform, support and provide background material for the policy and implementation provisions of the South East Queensland Regional Plan 2017, *ShapingSEQ*, in relation to the sustain theme. Sustain describes the role *ShapingSEQ* plays in supporting communities to grow sustainably and be resilient to major disturbances such as climate change.


**Figure 1: South East Queensland region**

Another four interrelated background papers have been prepared to support *ShapingSEQ* including those covering the themes of:

- Grow – the preferred pattern of settlement changes to best manage projected regional growth.
- Prosper – the approach to supporting improved economic and employment outcomes for the region.
- Connect – the infrastructure demands and integrating land use and transport planning to improve outcomes in the region.
- Live – ways to improve the quality of design and amenity in our urban areas.

Combined, the papers provide the foundation upon which *ShapingSEQ* has been prepared.

## Theme defined

The sustain theme describes the region's natural assets and landscapes that are the foundation of the SEQ way of life. The unique biodiversity of the region drives the ecological processes that natural assets require to provide the ecosystem services that underpin a wide range of economic activities and benefits to the community.[1] The broad range of ecosystem services or benefits available from our natural assets provides SEQ with a natural advantage for lifestyle, liveability and investment.

Maintaining and enhancing this biodiversity is critical for a resilient community and a strong economy. A resilient region is better prepared for climate change and can more readily recover from impacts like extreme weather events and economic shocks. A resilient community is more easily adaptable and can more readily take advantage of opportunities as they arise.

The sustain theme in conjunction with the other *ShapingSEQ* themes will support communities that are healthy, fair, safe and inclusive places with equitable access to education, jobs, housing, services, and the benefits provided by natural assets.

Interactions between SEQ communities and landscapes as a result of other *ShapingSEQ* themes must not compromise the ability of natural assets such as waterways, bushland, beaches and agricultural land to supply the ecosystem services or benefits that will provide quality of life for future generations. This is the essence of ecological sustainability and intergenerational equity.

## Relationship with other themes

The sustain theme has a very strong interrelationship with the other four themes. Sustain works with the live theme to promote good design and amenity that is in tune with the environment to support the health and safety of communities. Grow ensures urban settlement occurs in a strategic and

[1]SEQ Catchments (2010) SEQ Ecosystem Services Framework SEQC Ltd., Brisbane www.ecosystemservicesseq.com.au

efficient manner that minimises vehicle use, time spent commuting and adverse impacts on the environment. Sustain supports the prosper theme by protecting and enhancing natural assets as the basis of a productive and resilient economy. Connect seeks to create cohesive communities by promoting equitable access to the services and transport options that make a community sustainable and promote planning solutions for wildlife movement.

Strategies in the sustain theme guide planning to provide the natural and human resource base that will maintain and enhance the quality of life in SEQ. The sustainable management of natural assets is essential to this outcome.

# Context

Sustainability objectives have long underpinned regional planning in SEQ. The previous *South East Queensland Regional Plan 2009-2031* (SEQRP) described several desired regional outcomes (DROs) for a sustainable region under the following themes:

- greenhouse gas emissions, climate change and oil supply vulnerability
- protection of natural values and resources in all their forms
- strong, resilient communities
- water management
- engaging Aboriginal and Torres Strait Islander peoples
- integrated transport planning.

*ShapingSEQ* continues to build upon this significant commitment to sustainability. Through the use of the regional land use categories, first established in 2005, previous regional plans have sought to promote a more compact urban form by concentrating urban development in the Urban Footprint. This protects a range of values within the Regional Landscape and Rural Production Area (RLRPA). These founding principles continue to apply in *ShapingSEQ* and will play a major role in the success of strategies in the sustain theme.

The policy directions linked to the achievement of DROs were largely implemented through various mechanisms and instruments, including planning schemes, the regional land use categories and programs developed by non-government organisations. The programs and strategies that advanced these policy directions and which will continue to complement the implementation of *ShapingSEQ* are discussed in the following section.

# Policies and programs that support *ShapingSEQ*

A range of other instruments and programs have been produced by state, local and non-government organisations to help support the achievement of outcomes in SEQRP and will continue to facilitate *ShapingSEQ* policy directions. These include the State Planning Policy, the *Environment Protection Act 1994*, the *Nature Conservation Act 1992* and the *Coastal Protection and Management Act 1995*, as well as the SEQ Natural Resource Management Plan 2009–2031 (SEQ NRM Plan).

*ShapingSEQ* will continue to sit alongside and rely upon a number of other instruments and strategies to achieve policy outcomes. These instruments and strategies are discussed further below.

## State Planning Policy

Since the 2009 regional plan came into effect, a single State Planning Policy (SPP) has been introduced and now sits above the regional plan in the planning framework. Regional plans are no longer the pre-eminent planning instruments in Queensland, rather they support the SPP by providing specific policy direction for regionally specific outcomes.[2] This is a significant change to

[2] www.dilgp.qld.gov.au/planning/state-planning-instruments/state-planning-policy.html

the nature and scope of regional plans. New regional plans will focus on those state issues that require regionally-specific policy direction to supplement the policy direction and associated guidance about state interests in the SPP.

In relation to the sustain theme, the SPP contains policies for the protection of biodiversity, coastal environment, water quality and cultural heritage, as well as liveability, natural hazards, floods and emissions. Regional plans will continue to focus on addressing issues through a land use planning response. While all state interests will inform the regional plan, not all issues that occur within the region require a regionally-specific policy response.

## SEQ Natural Resource Management Plan

The SEQ NRM Plan was prepared alongside the 2009 regional plan, and will have an ongoing role supporting *ShapingSEQ*. The SEQ NRM Plan was developed by the Queensland Government, local government, industry, Traditional Owners and the community. The SEQ NRM Plan contains targets for natural assets endorsed by stakeholders in the region[3] and water quality actions from the SEQ Healthy Waterways Strategy[4]. It is also supported by the SEQ Ecosystem Services Framework[5], which has informed the identification of regionally significant natural assets in *ShapingSEQ*. The plan was updated by SEQ Catchments[6] in 2014 to include the latest climate change projections for SEQ[7].

## Other strategies and programs

Other supporting tools and data have been prepared by local government, Seqwater, Queensland Farmers Federation, Queensland Tourism Industry Council, Healthy Land and Water (previously Healthy Waterways Ltd. and SEQ Catchment Ltd.) and other community and industry forums such as the Regional Landscape and Open Space Advisory Committee.[8] Some of these strategies include:

- South East Queensland Traditional Owner Cultural Resource Management Plan (CRMP)
- South East Queensland Outdoor Recreation Strategy 2010
- Queensland Greenspace Strategy
- Active Trails: A Strategy for Regional Trails in South East Queensland
- SEQ Rural Futures Strategy
- Management Plan for the Flinders Karawatha Corridor.

Guidelines and reports have also been developed to inform regional planning including:

- South East Queensland 2001 Cultural Heritage Places Study
- South East Queensland Climate Adaptation Research Initiative
- Identifying and Incorporating Indigenous Landscape Values into Regional Planning Processes[9].

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[3] Department of Environment and Resource Management (2009) South East Queensland Natural Resource Management Plan 2009–2031. Queensland Government, Brisbane.
[4] Healthy Waterways (2007) South East Queensland Healthy Waterways Strategy, Healthy Waterways Ltd., Brisbane.
[5] SEQ Catchments (2010) SEQ Ecosystem Services Framework SEQC Ltd., Brisbane www.ecosystemservicesseq.com.au
[6] SEQ Catchments and Healthy Waterways amalgamated in 2017 to form Healthy Land and Water www.hlw.org.au
[7] Dowdy, A. et al. 2015, East Coast Cluster Report, Climate Change in Australia Projections for Australia's Natural Resource Management Regions: Cluster Reports, eds. Ekström, M. et al., CSIRO and Bureau of Meteorology, Australia.
[8] These have included Implementation Guideline 7 Water Sensitive Urban Design, SEQ Ecosystem Services Framework and decision support tools for local government, and SEQ Water's development guidelines for water catchments.
[9] Low Choy, D.C., Wadsworth, J. and Burns, D. (2010) Seeing the Landscape through New Eyes: Identifying

Other community outcomes have been supported by a range of documents including the SEQRP's Implementation Guideline No. 5: social infrastructure planning, and the Crime Prevention through Environmental Design (CPTED) Guidelines for Queensland.

These policies and programs informed the development of regional strategies in the sustain theme.

## The sustainability of communities and natural assets in SEQ

Recent surveys of community attitudes indicate that people think life is getting better in SEQ.[10] However, despite improvement in many community-level indicators, the community has concerns about the decrease in healthy lifestyles and housing affordability in SEQ. This section considers the statistical evidence that describes current trends in community health and housing affordability to inform the shaping of strategies for a sustainable community.

This section also explores several regional indicators to help identify the current and projected sustainability of natural assets. Natural assets such as waterways, bushland, agricultural land and coastal processes provide benefits such as clean water, air, food and recreational opportunities to society and the economy.

The status of natural assets has been measured and reviewed against the SEQ NRM Plan targets.[11] A large body of data and evidence from state and local governments, research organisations, tertiary institutions and the community has informed this review.[12,13] The review concludes that despite the effort and investment to achieve significant individual asset gains, overall there has been a downward trend in the extent and condition of natural assets in SEQ.[14]

Sustain explores a number of regional indicators to help identify the current and projected sustainability of communities and natural assets. These include:

- community health
- affordable living
- bushland extent and diversity
- waterway health.

These indicators are strongly influenced by the other four themes of *ShapingSEQ* and in turn, the prosperity, growth, connectivity and liveability of the region are underpinned by having sustainable communities, landscapes and natural assets.

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and incorporating indigenous landscape values into regional planning processes, in Australian Planner, Vol 47, September 2010, pp 178-190.

[10] TNS (2016) SEQ Regional Plan 2016 Social Research on Population Growth and Liveability in South East Queensland, Queensland Government, Brisbane.

[11] SEQC (2015) Managing Natural Assets for a Prosperous South East Queensland: An Update to the South East Queensland Natural Resource Management Plan (2009-2031), SEQ Catchments Ltd., Brisbane.

[12] SEQC (2015) SEQ Natural Resource Management Plan Part Three: State of the Assets Atlas, South East Queensland Catchments Ltd., Brisbane.

[13] SEQC (2015) Report on Communication and Engagement for the 2014 Update of the SEQ NRM Plan (2009–2031) February–December, 2014, South East Queensland Catchments Ltd., Brisbane.

[14] SEQC (2015) SEQ Natural Resource Management Plan 2014 Update Science Report, South East Queensland Catchments Ltd., Brisbane.

## Community health

Life expectancy in SEQ is increasing, which is reflected in declining death rates at all ages.[15] However about one-fifth of total death and disability burden in Queensland is due to socioeconomic inequality.[16] It is predicted that over the next 15 years, the number of hospitalisations in Queensland will double because of changes in the population (i.e. from growth in population and growth in the ageing population) and the increasing burden of, potentially avoidable, chronic disease.[17]

The number of people in SEQ being diagnosed as obese is on the rise. Some local government areas in SEQ present with adult obesity 52 per cent higher than Queensland (based on age standardised prevalence).[18] At 2014, 16.7 per cent of people more than 18 years of age in Brisbane were obese.[19]

Obesity is fuelling the prevalence of chronic conditions such as stroke, hypertension and type 2 diabetes. Data shows that adults in disadvantaged areas are nearly 80 per cent more likely to report poor health.[20] Obesity, smoking and physical inactivity all contribute to poorer health and are more prevalent in lower socioeconomic areas of Queensland.

An ageing population will also create challenges for the health system, which will become increasingly apparent over the next two decades. For example, during the period 2006–2031, while the number of children (aged 0–14 years) in Queensland is projected to increase by 44.5 per cent to 1.2 million, the number of people aged 65 years and over is expected to more than double (i.e. an increase of 161 per cent) to reach 1.3 million people.[21]

## Affordable living

Only 28.5 per cent of Queensland households in 2014 were in outright home ownership with increasing numbers of people in private rental (35.6 per cent).[22] Brisbane had a 27.7 per cent home ownership rate in 2011 down from 32.9 per cent in 2006.[23] At a national scale, 72 per cent of households in the bottom 20 per cent of Australia's income distribution are in housing affordability stress.[24],[25]

While the cost of housing itself is an issue for the region, strategies in *ShapingSEQ* are based on an understanding of what is required for affordable living which is more encompassing of an individual's ability to participate in society and the economy. Affordable living includes the consideration of the overall cost to live in a particular location (i.e. the cost of housing, cost to access services and, particularly, the cost of transport). Many households in SEQ are reporting difficulty in meeting these

[15]Queensland Government Statistician's Office, Queensland Treasury (2016) Queensland Regional Profiles: Resident Profile for South East Queensland Regional Planning Area.
[16]State of Queensland (2016) My health, Queensland's future: Advancing health 2026, Queensland Health, Brisbane.
[17]Ibid.
[18] Queensland Government (2014) 2011–12 Self-reported health status, Department of Health, Brisbane.
[19] Queensland Government (2014) Preventive health survey results, Department of Health, Brisbane.
[20]State of Queensland (2016) My health, Queensland's future: Advancing health 2026, Queensland Health, Brisbane.
[21]State of Queensland (2016) My health, Queensland's future: Advancing health 2026, Queensland Health, Brisbane.
[22]Queensland Government (2016) Working together for better housing and sustainable communities, Department of Housing and Public Works, Brisbane.
[23] Australian Bureau of Statistics (2013) Perspectives on Regional Australia: Housing Arrangements - Home Ownership in Local Government Areas, Australian Government, Canberra.
[24] Q1 households are those whose income is in the bottom quintile (i.e. the bottom 20 per cent) of Australia's income distribution.
[25] Hulse, K., Reynolds, M., and Yates, J. (2014) Changes in the supply of affordable housing in the private rental sector for lower income households, 2006–11.

costs and paying for essential items such as food, electricity and water.[26]

## Bushland extent and diversity

A diversity of vegetation types and habitats must be maintained and strengthened if SEQ is to adapt and transition in response to environmental or climatic changes. It is this diversity that fuels the ecological functions that provide the benefits central to the SEQ way of life and economy. Despite sustained effort and investment to achieve significant individual natural asset gains, there has been a downward trend in the size and diversity of SEQ's bushland areas.[27] However, significant gains have been made in the enhanced protection of four of the 39 regional ecosystems (bushland types) that were considered poorly conserved in 2001.[28] Considerable gains have also been made with another six regional ecosystems. Improved conservation of these ecosystems has been achieved through partnerships between governments, industry and private landholders and additions to national parks and reserves.

However, remnant vegetation has experienced an overall estimated loss of 10,500 hectares since 2001, leaving 35.5 per cent remnant vegetation cover in SEQ.[29] Since 2008, 87 per cent of clearing has occurred in the Urban Footprint and Priority Development Areas (PDAs) (see figure 2). This is in part a consequence of concentrating urban development in the Urban Footprint (through regulation), which has had the intended outcome of reducing vegetation loss in the RLRPA. The management of vegetation and green space inside the Urban Footprint for recreation, flood mitigation and habitat values is also important for a sustainable community.

Further losses should be minimised as evidence strongly suggests that an accelerated loss of biodiversity may occur when bushland cover is reduced significantly. [30,31] Any loss of biodiversity impacts the ability of natural assets to provide benefits for society, the environment and the economy into the future.

[26]QCOSS (2011) Submission to the Queensland Floods Commission of Inquiry April 2011, Queensland Council of Social Services, Brisbane.
[27] SEQC (2015) SEQ Natural Resource Management Plan 2014 Update Science Report, South East Queensland Catchments Ltd., Brisbane.
[28] SEQC (2015) South East Queensland Natural Assets Status Report: Evaluation of progress against the 2009-2031South East Queensland Natural Resource Management Plan Targets—June 2015, South East Queensland Catchments Ltd., Brisbane.
[29] Department of Science, Information Technology, Innovation and the Arts (2014) Land cover change in the South East Queensland Catchments Natural Resource Management region 2010–11. Queensland Government, Brisbane.
[30]Doerr, V., Williams, K., Drielsma, M., Doerr, E., Davies, M., Love, J., Langston, A., Low Choy, S., Manion, G., Cawsey, M., McGinness, H., Jovanovic, T., Crawford, D., Austin, M. and Ferrier, S. (2013) Designing landscapes for biodiversity under climate change: final report, National Climate Change Adaptation Research Facility Gold Coast, pp. 276.
[31] SEQC (2015) South East Queensland Natural Assets Status Report: Evaluation of progress against the 2009–2031 South East Queensland Natural Resource Management Plan Targets—June 2015, South East Queensland Catchments Ltd., Brisbane.

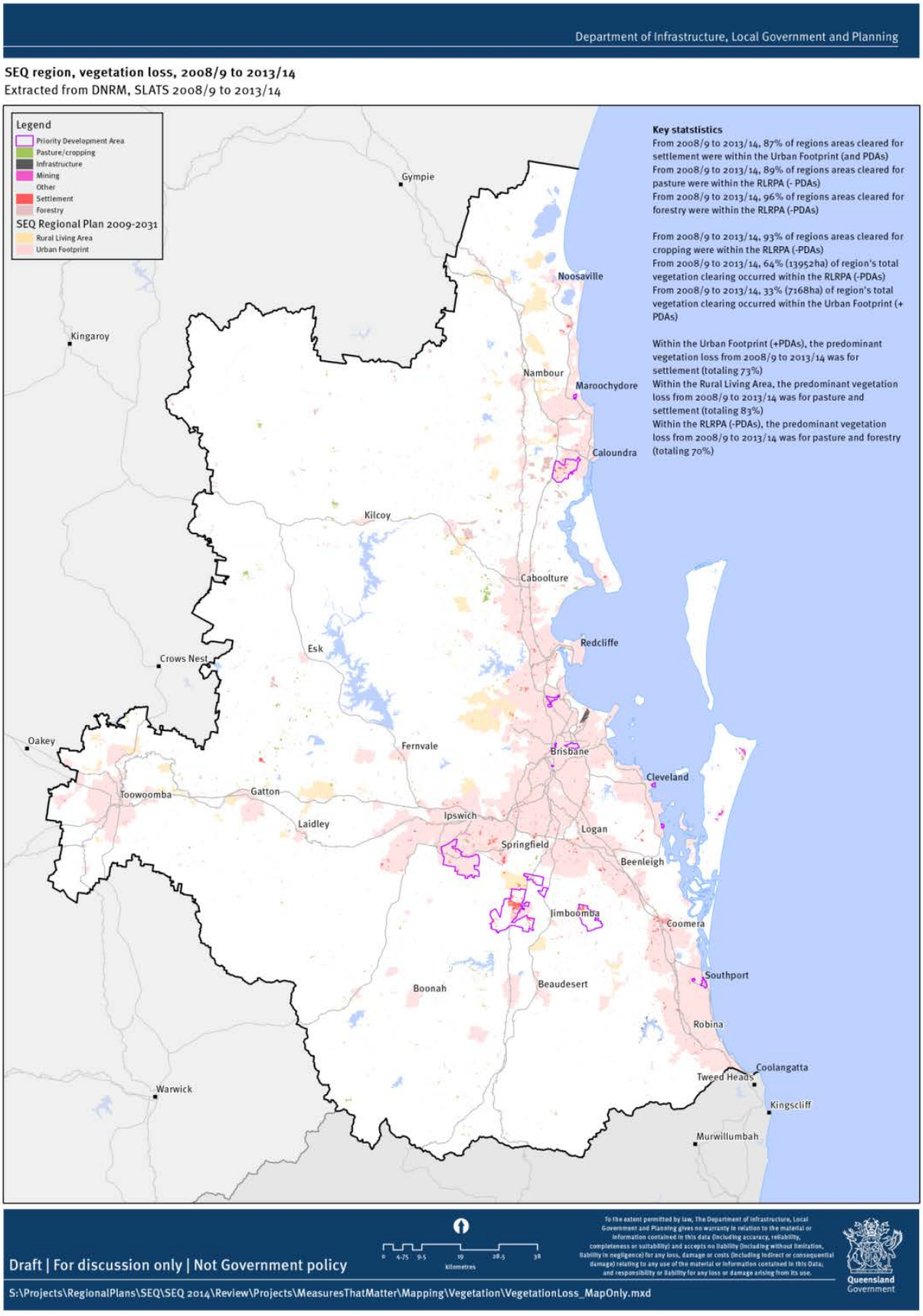


**Figure 2: Vegetation loss in SEQ 2008–2014**

## Waterway health

Community consultation and scientific evidence has established water quality objectives and ecosystem health values for SEQ.[32] Progress towards achieving and maintaining these objectives is reported every year through the Healthy Land and Waterways Report Card.[33] Since 2002, the region has averaged a grade of C for fair (see figure 3), which means:

- conditions meet some of the set ecosystem health values in most of the reporting regions
- some key processes are functional
- some critical habitats are impacted.

The 19 individual reporting catchments in SEQ have ranged from a grade of A, being excellent, where conditions meet all set ecosystem health values, to F, as a fail, where conditions do not meet set ecosystem health values.

Nonetheless, there have been significant advances in the management of waterways in SEQ due to regional planning, local government and community initiatives over the past few decades.[34,35] This has slowed the rate of growth of pollution loads.

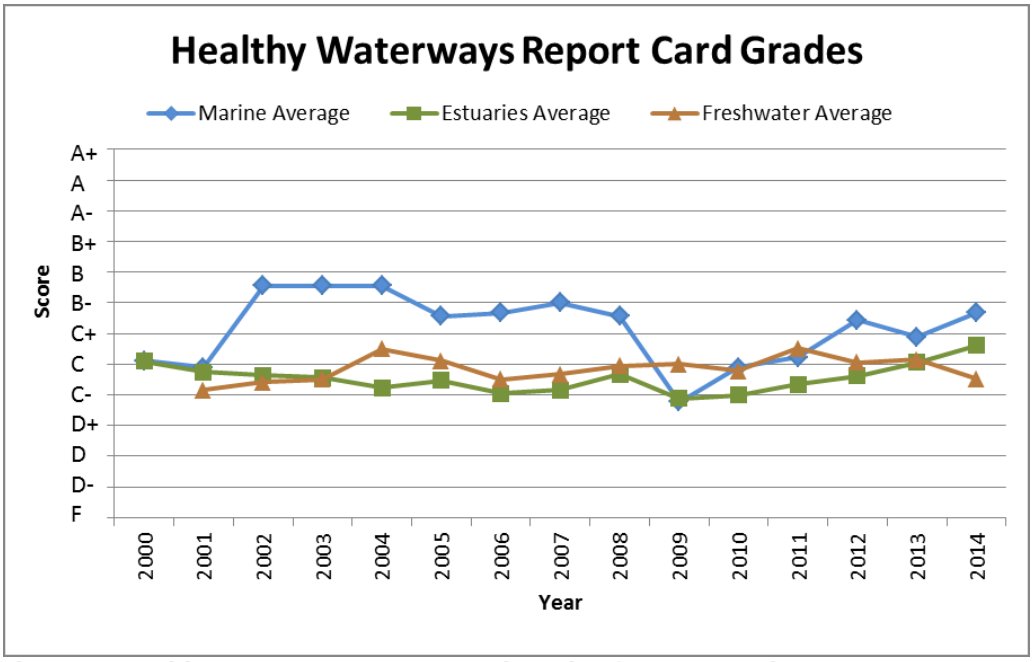


**Figure 3: Healthy Waterways report card grades for SEQ Region 2000–2014**

Evidence from the Healthy Waterways report card 2015 points to the middle Brisbane River (from the wall of the Wivenhoe Dam to the treatment plant at Mt Crosby), and the Logan, Albert, Lockyer and Bremer catchments as regional hot spots. The upper Brisbane River is a major drinking water catchment with very high recreational benefits, but very poor riparian extent and very poor stream health. In this and other priority catchments, poor catchment health and sedimentation present a risk to regional drinking water supplies, recreational activities, the tourism industry, environmental values and access for shipping at the Port of Brisbane.[36]

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[32] Department of Environment and Heritage Protection (2013) Healthy Waters Management Plan Guideline - under the Environmental Protection (Water) Policy 2009. Queensland Government, Brisbane.
[33] Healthy Waterways and Catchments Report Card at http://hlw.org.au/report-card
[34] SEQ Catchments (2014) enQuire Database http://enquire.net.au/
[35] Binney, J. and James, D. (2011) Sharing the load: A collaborative approach to investing in South East Queensland's waterways, Mainstream, Brisbane.
[36] SEQC (2015) Managing Natural Assets for a Prosperous South East Queensland: An Update to the South East Queensland Natural Resource Management Plan (2009-2031). SEQC Ltd., Brisbane.

# Policy directions in *ShapingSEQ*

Establishing and progressing regional strategies for sustainable communities and regional landscapes and natural assets is fundamental to achieving a sustainable region. This will continue the long-standing policy directions developed through the regional planning policy framework in SEQ since 1990. It has been recognised since the 1990's that population growth can enrich the region and stimulate the regional economy but if left unmanaged it can also place enormous pressure on our regional resources and challenge the capacity of our environment to cope with growth.

Informed by the preceding snap shot of trends in community health, affordable living and the health of natural assets, this section provides the evidence for the strategies in the sustain theme under the two interrelated and interdependent headings of sustainable communities and landscapes and natural assets.

Sustainable communities:
a) health and wellbeing
b) fairness
c) safety
d) affordable living
e) Aboriginal and Torres Strait Islander people.

Landscapes and natural assets:
a) biodiversity
b) inland waterways and coastal waters
c) natural economic resources
d) greenspace network
e) scenic amenity
f) interurban breaks
g) cultural heritage areas
h) Indigenous landscape values
i) climate change.

## Sustainable communities

Communities in the region are diverse and continually changing. People live in urban fringe locations, rural areas, suburbs, inner city locations and on islands. Changing community needs, the aging of the population, increasing multicultural diversity and changing lifestyle choices influence the need for and the placement of community services and housing needs. These factors can result in some people facing social, cultural and locational disadvantages.

SEQ's population is anticipated to grow substantially by 2041. Population change can impact different communities in different ways. It is critical to recognise diversity in the region's communities and provide the options and choices to meet different needs. Increasing population density can create opportunities for some sections of the community but amplify disadvantage and limit the choices of others. It is important that urban consolidation occurs in appropriate locations with good access to amenities and infrastructure.

For communities to be sustainable into the future, social and natural assets must be managed to provide benefits that meet the needs of present members of the community without compromising the needs of future generations.

The basic requirements for a sustainable community include high levels of:

- health and wellbeing
- fairness
- social cohesion
- safety
- affordable living.

Achieving high quality outcomes for these basic requirements will support a sustainable and healthy community.

## Health and wellbeing

The quality of life, safety and the health of the community is underpinned by many basic services and needs including having access to clean water and air, safe food, and housing. In addition to these basic requirements, the design of the urban environment can have a significant influence on community health by encouraging safe and active lifestyles, and a sense of belonging.[37] This can also have significant economic benefits with savings of $63 million per annum in health costs possible by ensuring urban areas are walkable, and there is enough space and programs to support physical activity such as walking, running, cycling and sports.[38]

International studies have shown good urban design and land use to be important for health at three levels[39]:

- the community level- proximity of residents to commercial opportunities and schools, connectivity of streets, population density and greenspaces.
- the street level- improved lighting, ease and safety of street crossing, pathway continuity, aesthetic enhancements.
- access to places for physical activity- access to physical activity facilities including trails and parks and reducing barriers to these including access, safety and affordability.

The National Heart Foundation has undertaken significant research into the impacts the built environment can have on the health and wellbeing of the community. Some of the findings include[40]:

- higher levels of walking for transport are found in walkable neighbourhoods, with higher-density mixed-use zoning, connected street networks and access to public transport
- providing diverse housing in walkable environments can help older adults to age in place. Safe neighbourhoods with connected street networks and local shops, services and recreational facilities are associated with more walking in older adults
- children are more likely to be physically active in more walkable neighbourhoods with access to recreation facilities nearby, and to walk to school in neighbourhoods with connected street networks.

Community and neighbourhood design impacts on local walking, cycling and public transport use, as well as on recreational walking and physical activity. Designing or re-shaping the built environment can support active lifestyles and improve community health.[41]

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[37] Byrne, J. and Sipe, N. (2010) Green and open space planning for urban consolidation – A review of the literature and best practice, Urban Research Program, Griffith University, Brisbane.
[38] Marsden Jacobs and Assoc. (2010) Managing What Matters, SEQ Catchments, Brisbane, Australia.
[39] Heart Foundation, Queensland Government and Local Government Association of Queensland (2010), Activity Healthy Communities a resource package for local government to create supportive environments for physical activity and healthy eating.
[40] National Heart Foundation (2009), Blueprint for an active Australia, second edition
[41] Kelly P, Kahlmeier S, Götschi T, et al. Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship. The International Journal of Behavioral Nutrition and Physical Activity. 2014;11:132. doi:10.1186/s12966-014-0132-x.

Health benefits that come from ensuring people have access to nature (particularly in urban areas) include:

- lowered risk of type 2 diabetes [42]
- reduced negative emotions and better energy levels, attention span and feelings of tranquillity[43][44]
- improved social cohesion through space for group activities, community and family events.[45]

Evidence shows a correlation between community health and wellbeing and urban design and land use planning.[46] Designing urban areas and creating a settlement pattern that promotes walkability and reduces vehicle dependence increases opportunities for more physical exercise as well as a more active lifestyle generally.

*ShapingSEQ* promotes more walkable, safe neighbourhoods, greater access to facilities and assets to promote outdoor recreation activities and provide equal opportunities for communities.

The live theme discusses in more detail how *ShapingSEQ* will influence the health and wellbeing of the community through housing and urban design.

## Fairness

Social and economic equity is a hallmark of a fair society where all individuals have access to education, training and employment, social infrastructure, health services, recreation and leisure opportunities, public transport and housing and social support. Social support is a product of high levels of social capital that helps to build cohesive communities. This in turn lays the foundation for a sustainable and productive society where individuals can realise their potential in the arts, sports and other economic and creative fields.

Many sections of the community can face social, cultural and locational disadvantages. These include:

- people on low incomes
- unemployed people
- people living in rural areas
- young people
- elderly people
- people from a culturally and linguistically diverse background
- people from an Aboriginal or Torres Strait Islander background
- people with disabilities
- people experiencing mental illness
- people who are homeless or at risk of homelessness.

Mental health may be affected by individual or societal factors, including economic disadvantage, poor housing, lack of social support and the level of access to, and use of, health services.[47]

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[42]Astell-Burt, T.,Feng,X.,Kolt,G.S. (2014a) Greener neighborhoods, slimmer people? Evidence from 246,920 Australians. Int.J.Obes.38 (1),156–159.

[43] Bowler, D., Buyung-Ali, L., Knight, T., and Pullin, A. (2010) A systematic review of evidence for the added benefits to health of exposure to natural environments. BMC Public Health, 10(1), 456.

[44]Maller, C., Townsend, M., Pryor, A., Brown, P., and St Leger, L. (2005) Healthy nature healthy people: 'contact with nature' as an upstream health promotion intervention for populations Australia Health Promotion International, Vol. 21 No. 1 doi:10.1093/heapro/dai032

[45] Maas, J., van Dillen, S. M., Verheij, R. A., and Groenewegen, P. P. (2008). Social contacts as a possible mechanism behind the relation between green space and health. Health & Place, 5(2), 586–589.

[46]Urban green spaces and health. Copenhagen: WHO Regional Office for Europe, 2016.

[47] WHO (2005) Promoting mental health: concepts, emerging evidence, practice : report of the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation and the University of Melbourne.

Addressing social disadvantage is a complex issue that requires a multi-faceted approach from all levels of government and the community. However, land use planning can help to address or avoid social disadvantage by providing choice and opportunities near where people live or work. People who live in the urban fringe and rural areas tend to have less access to the range of facilities and services than those who live in more urban areas.

Social capital is an important component of sustainable communities. It relates to how connected and involved communities are, how able they are to help themselves, and how much trust they have in governments and institutions.[48] Healthy, engaged people and communities will be crucial for a prosperous and sustainable future for SEQ.

The level of social capital in a community is largely dependent on the level of accessibility to social infrastructure and transportation (particularly public transport) networks. Sustainable communities require easy access to the necessary social infrastructure to meet health and community support needs, access to a full range of education, training and employment opportunities, to foster community participation and cultural expression, and support quality of life.[49]

A socially cohesive community is also a resilient community. Building resilient communities is important because they are more likely to adapt in positive and healthy ways to changes or challenges in natural, economic or social circumstances. Division between people or groups in communities reduces the diversity and strength of networks, weakens social cohesion, and limits the ability to adapt proactively to change and unexpected events.[50]

Connected communities are resilient communities because they are more likely to look after each other in times of crisis, such as flood, bushfire or an incident of violent extremism. These communities function reliably and well under stress. They successfully adapt, are self-reliant, and have high levels of social support, social cohesion and social capacity. These social support systems include:

- neighbourhood, family and kinship networks
- intergenerational supports
- good links between communities, institutions and services
- mutual self-help groups.[51]

A sense of integration within the community, and a willingness to support others contributes to individual wellbeing. Spending time outdoors and with others can strengthen intrinsic values (e.g. concern for nature and people) and encourage more active involvement in the community.

In SEQ, according to the Socio-Economic Indexes for Areas (SEIFA), 15.3 per cent of the population is in the most disadvantaged socioeconomic group and 24.2 per cent are in the least disadvantaged group (compared to 20 per cent and 20 per cent respectively for the rest of Queensland).[52] Figure 4 shows areas of social and economic advantage and disadvantage in SEQ, with an over-representation of disadvantage in the urban fringe and rural areas.

[48] Queensland University of Technology (2006) Strong Communities Handbook, QUT, Brisbane.
[49] Queensland Government (2007) Implementation Guideline No. 5 Social infrastructure planning, Brisbane.
[50] Queensland University of Technology (2006) Strong Communities Handbook, QUT, Brisbane.
[51] Victorian Government (2016) Strategic Framework to Strengthen Victoria's Social Cohesion and the Resilience of its Communities, Department of Premier and Cabinet, Melbourne.
[52]Smith, E., Lieske, S., Keys, N., and Smith, T. (2014) Socio-Economic Vulnerability in the East Coast Cluster Natural Resource Management Regions: Assessment Approach Interim Report May 2014, University of Sunshine Coast.

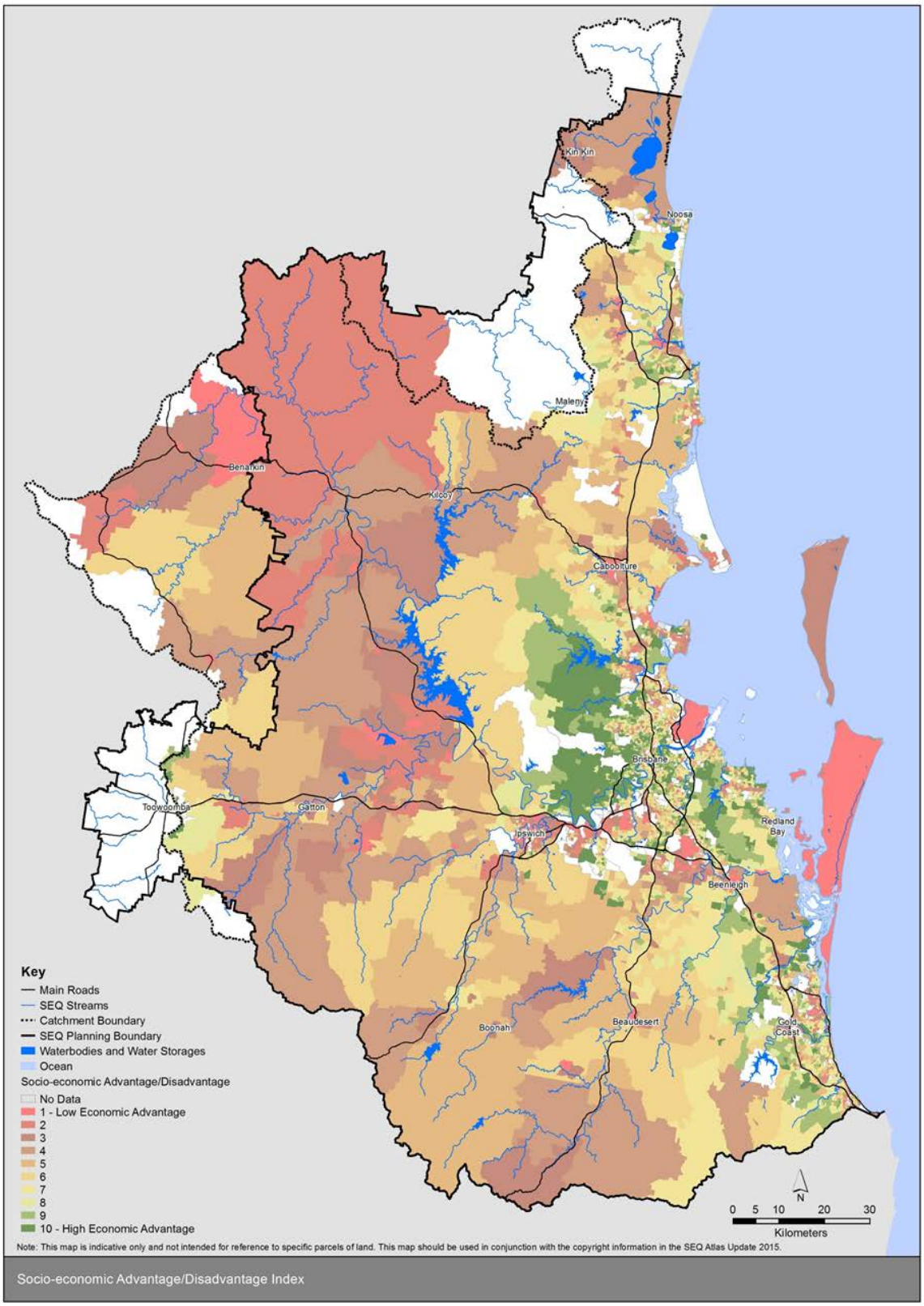


**Figure 4: Socioeconomic advantage/disadvantage in SEQ**[53]

[53] Smith, E, Lieske, S, Keys, N, and Smith, T. (2041) Socio-economic Vulnerability in the East Coast Cluster Natural Resource Management Regions, University of Sunshine Coast

Rural communities are responding to a range of social and economic challenges directly related to sustainability. This includes a change in demographics as young people from farming families seek careers elsewhere, pressure on agriculture from global competition, lack of services to build cohesion within these changing communities and the affordability of living in areas with cheaper housing but which are not connected to the services and opportunities a growing region creates.

SEQ also contains a large heterogeneous Indigenous population that is comprised of individuals and families drawn from communities across Australia. The Indigenous community experience high levels of social disadvantage due to historical and contemporary factors. The role that regional planning will play in progressing the aspirations of Aboriginal and Torres Strait Islander people in SEQ is discussed shortly.

Addressing social disadvantage is a key consideration in managing regional growth, its distribution, and in planning and investment in regional infrastructure networks. *ShapingSEQ* contains strategies that are aimed at increasing access and opportunities for more housing choice including providing affordable housing options close to centres, employment and public transport nodes.

*ShapingSEQ* promotes planning that avoids creating areas of future disadvantage by planning now to meet the basic needs of future communities. This includes factoring in access to education, training and employment, social infrastructure, health, recreation and leisure opportunities, public transport and housing early in the planning phase.

Creating physical links between, and access to, neighbouring communities will be one consideration in achieving greater social integration as part of transport and infrastructure planning. Considering the principles of access, equity, participation and inclusiveness in development and infrastructure planning will also aim to help prevent polarisation and displacement. It can also increase social diversity and social inclusion in new development.

Planning for the adequate provision of social infrastructure is a complex process requiring collaboration across a number of agencies, levels of government and the private sector depending on who has responsibility for specific items. Aspects of this complexity include the assessment of existing facilities and need for community profiling and understanding of locations relative to existing and planned populations (the locations of which in some cases are unknown at this stage, at the local level).

In the context of *ShapingSEQ's* emphasis on consolidation, the most pressing social infrastructure capacity issues are expected to be in schools and recreation/open space. These are the 'most local' social infrastructure facilities, more affected by the localised distribution of consolidation growth. Expansion growth can reasonably be expected to plan for such social infrastructure based on planned dwellings in relevant localities. Areas of consolidation however may need to be retrofitted with upgraded or expanded facilities, and any additional land costs for such facilities may be a challenge in some areas.

However, the detailed local planning for much of the additional consolidation required up to 2041 is yet to occur, as is infrastructure planning and yield assessments for several expansion growth areas. Therefore, *ShapingSEQ* does not provide a full assessment of social infrastructure needs but recognises the need for such facilities and the need for a process to plan the provision of social infrastructure that contributes to avoiding and addressing social and economic disadvantage. It relies on other infrastructure agencies, who are more suited to planning the delivery of social infrastructure. It is recognised that other drivers can be more important as determining factors than population growth.

## Affordable living

Affordable living considers the costs of purchasing or renting a dwelling as well as the costs of living in the dwelling, including costs associated with accessing jobs, services, open space, family and friends. *ShapingSEQ* takes a more considered and holistic approach to measuring and understanding affordability. Previous measures of affordability have only considered the costs to purchasing or renting a house, and while this is the most influencing factor, the costs associated with travelling to work also contribute to the total costs of living and sometimes these costs can be substantial.

*ShapingSEQ* considers the trade-offs with living in areas where the cost of housing is more affordable but incur higher journey to work costs and lengthy commutes. While households costs include a range of other expenses these two are generally paid more regularly and combined often form a substantial percentage of total household expenses.

To inform *ShapingSEQ*, work was undertaken to compare costs of living across some areas within the region. The analysis, based on the 2011 census data[54], showed that while houses on the outer fringe of urban areas offer more affordable housing options, the journey to work costs increase the total cost of living to more than 30% of total household incomes in some areas. In contrast, areas closer to centres offer less affordable housing options but have significantly lower journey to work costs making the total cost of living to as low as around 15% of total household incomes in some areas.

The analysis also highlighted that the life cycle of owning a home is another critical factor when considering affordability. For example, new or recent home owners irrespective of where they live will have higher costs of living simply because they are yet to pay down their mortgage substantially. People who are nearing or at the end of the life cycle of owning a home will have not only paid down their mortgage but also progressed their careers to be earning higher incomes. These factors combined significantly lower the overall cost of living and shows that the demographics of an area is another important consideration on the issue affordability.

*ShapingSEQ* assists to lower the costs of living by encouraging jobs close to where people live, promoting more housing close to jobs and supporting the delivery of critical transport infrastructure connecting the two. Figure 5 shows the median cost of living the northern, metro and southern sub regions of SEQ.

Understanding the true cost of living because of housing choice and location enables the community to make better informed decisions about where they want to live and what type of home they choose to live in.

[54] Most up to date census journey to work data available at the time of writing this paper.

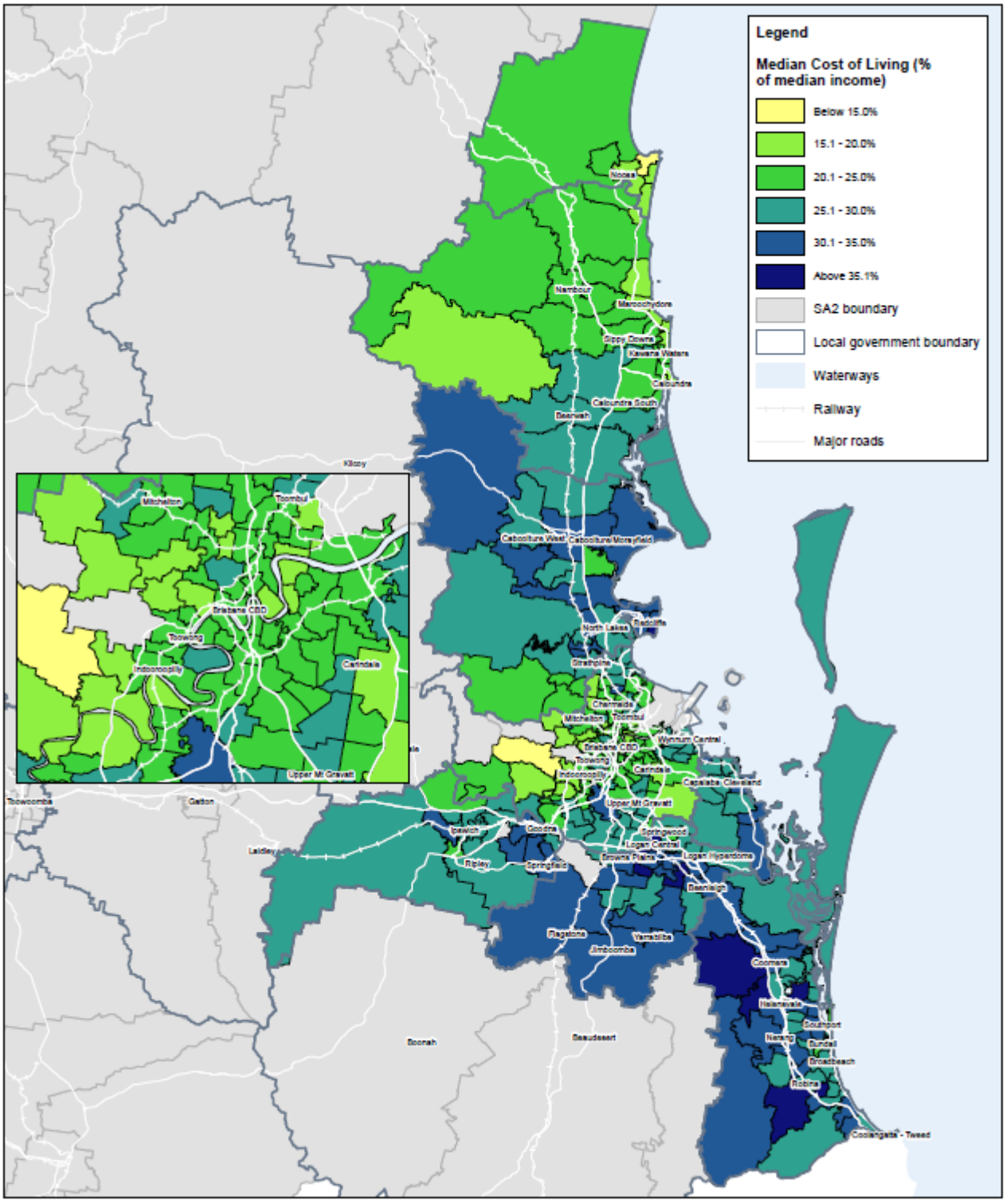


**Figure 5: Cost of living northern, metro and southern sub regions of SEQ (% of median income)**

Affordability calculators such as My Home My Suburb which is specific to SEQ can estimate the cost of living based on housing location and type.[55] This includes the cost of buying a house, time of travel to and from work, school, shops and facilities. A compact settlement pattern supported by local access to employment can contribute to lowering these costs by reducing travel time to work.

[55] www.myhomemysuburb.com.au

*ShapingSEQ* promotes a compact settlement pattern with 60 per cent of new growth to be focused in existing areas with more access to employment and services. Figure 6 outlines a comparison between the costs of living between:

- city dwelling unit (inner 5km)
- middle unit and house (5-10km)
- fringe unit and house (10+ km).

The comparison shows that houses and units located on the fringe where access to local services and employment maybe less available, record higher living costs over time than those within the inner city.

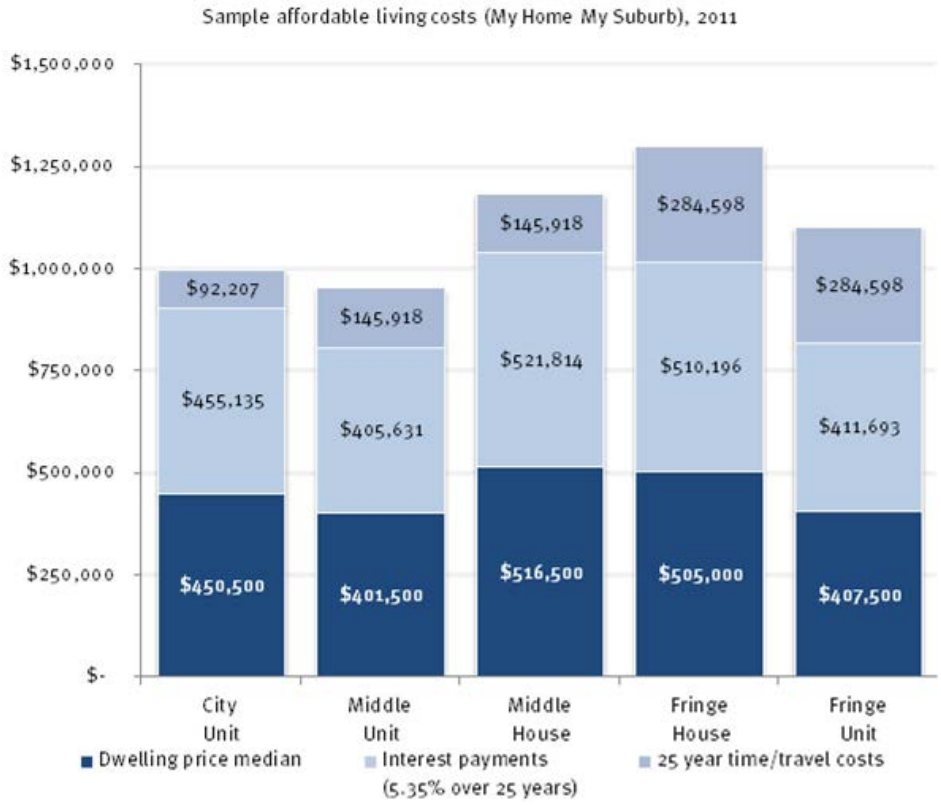


**Figure 6: Affordable Living Costs (My Home My Suburb)**

The delivery of affordable housing across Australia remains a complex component of the affordable living matrix. Recent research provides evidence to support an increase in resources for the delivery of affordable housing, be it direct through government, in partnership with the private sector, via planning requirements, or by the community housing sector.[56] The role that planning policies can play in supporting market activity to correct the balance between maximising investor return and delivering the best housing outcomes for residents, including lower-income households is the focus of national debate.

Over the next few decades there will be also be a need for an increase in the proportion of smaller households in SEQ, for young people entering the market, older people downsizing, and a projected increase in single-person households.[57]

[56]Rowley, S., Leishman, C., Baker, E., Bentley, R. and Lester, L. (2017) Modelling housing need in Australia to 2025, AHURI Final Report 287, Australian Housing and Urban Research Institute, Melbourne, http://www.ahuri.edu.au/research/final-reports/287, doi: 10.18408/ahuri-8106901.

[57] State of Queensland (2011) Queensland Government population projections to 2056: Queensland and statistical divisions 2011 edition. Queensland Government, Brisbane.

Access to power and water at a fair and reasonable cost will also play an important role in future planning and development. Technology for renewable and alternative energy sources, if made available at an affordable rate will enhance the sustainability of the region and needs to be equitable in delivery and operation.[58] Figure 7 shows the typical household energy expenditure by dwelling structure. Medium density housing is shown to be more energy efficient, which can significantly improve living affordability.

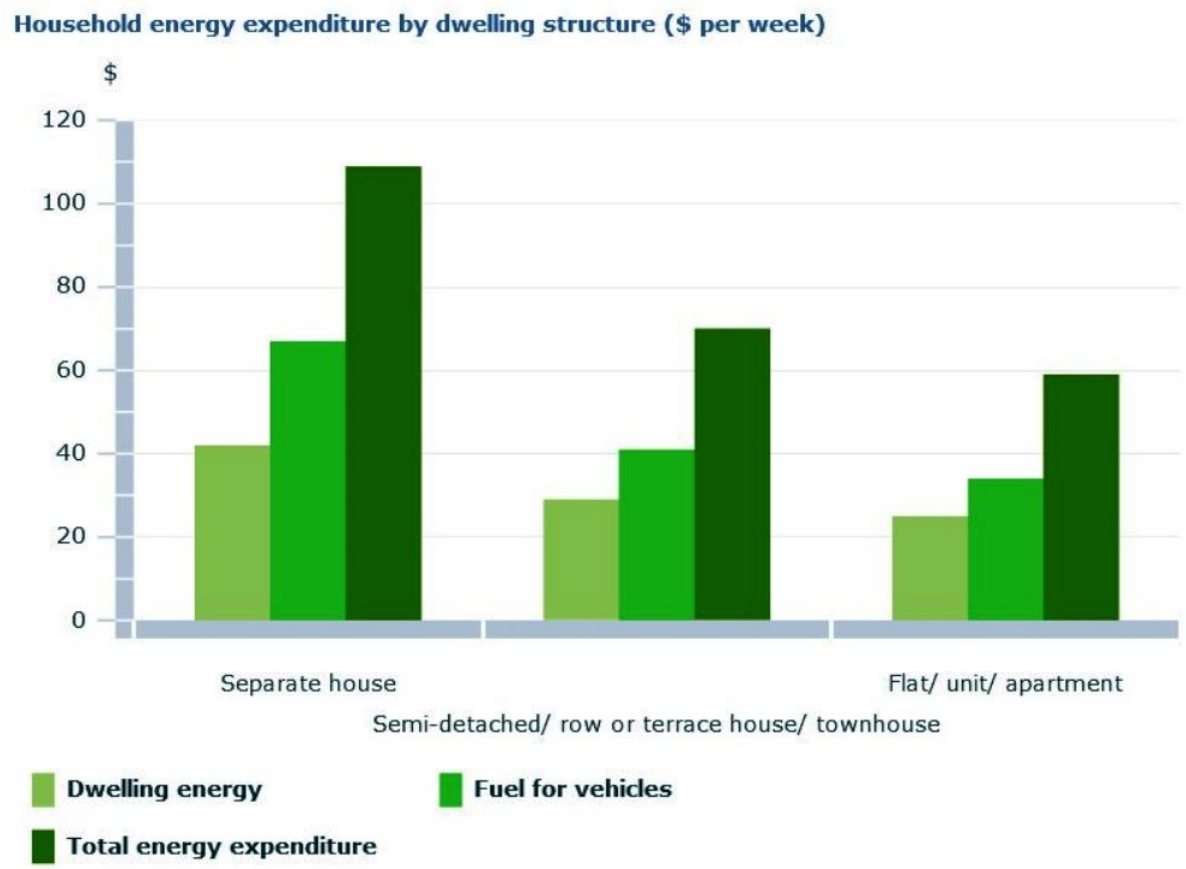


**Figure 7: Household energy expenditure by dwelling structure[59]**

Through the grow and live themes, *ShapingSEQ* promotes housing supply and type to meet the forecast demand to 2041. This will allow for a diversity of housing choice (including smaller more compact and liveable options) and housing to be fostered around centres that provide equitable access to jobs, education and services. *ShapingSEQ* supports opportunities for people to remain within a community through various stages of their life. This is particularly important for young people and those older in age that may require a smaller housing type but still need to be near amenities and services, in particular health, education and entertainment, as well as family and friends.

The Department of Housing and Public Works has prepared a 10-year housing strategy to support the provision of safe, secure and affordable housing options for all Queenslanders.[60] The strategy will guide the government in providing quality housing and homelessness services into the future.

[58] QCOSS (2011) Climate Change: Adaptation for Queensland Issues Paper, Queensland Council of Social Services, Brisbane.
[59] Australian Bureau of Statistics (2016) Household Energy Consumption Survey, Australia: Summary of Results, Commonwealth of Australia.
[60] Department of Housing and Public Works (2017) The Queensland Housing Strategy 2017-2027 www.qld.gov.au/housingstrategy

## Safety

To be active and healthy, communities need to feel safe and secure. Safety has a strong relationship with social cohesion. A cohesive and productive community with an explicit feeling of belonging creates harmonious and safe places for individuals and families. Places that acknowledge and accommodate sociocultural diversity and provide spaces for communities to interact are in the main more cohesive and safe.

Social exclusion can breed social alienation along with a plethora of potential social problems such as child abuse and neglect, early school leaving, mental health disorders, substance abuse and crime.[61] Planning can promote social interaction and play a role in building social cohesion as a cost-effective component of a strategy for addressing such issues.

The grow and live themes promote community safety by supporting a settlement pattern and the design of communities that acknowledge and appreciate diversity and provide interactive public and open spaces to cultivate a sense of place and community belonging. The regional settlement pattern will also integrate access to education, training and local economic development projects to promote employment and nurture individual aspiration as a foundation for productive and safe communities.

The design of buildings, spaces and precincts can also play a role in helping prevent anti-social or criminal behaviour.[62] Sustain supports the Queensland Government's Crime Prevention through Environmental Design guidelines that identify design strategies that include increasing the activation of public space, establishing casual surveillance, and careful building and landscaping to create visibility and avoid concealment points.[63]

The live theme also promotes good urban design that can improve quality of life and reduce crime rates. In addition, communities need to be safe from natural hazards and extreme weather events like bushfire, flooding, landslides, storm tide inundation and coastal erosion, all of which may affect parts of SEQ.

History shows that the region is vulnerable to extreme weather events. SEQ, like many parts of Australia, inherits a legacy of earlier land use commitments, which have placed development in hazardous areas such as floodplains and bushfire zones.[64] Additionally, the regional coastline has been extensively modified to accommodate intensive urbanisation, including large areas of canal estates.[65]

The location of existing infrastructure and settlements in areas highly exposed to the projected impacts of climate change places those buildings and assets, and the people who live or work in them, at increased risk of harm.[66]

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[61]Vinson (2004) and Woolcock, Renton and Cavaye (2003) in Strong Communities Handbook (2006) Queensland University of Technology, Brisbane.
[62] Kuo, F. and Sullivan, W. (2001) Environment and Crime in the Inner City: Does vegetation reduce crime? Environment and Behavior, Vol. 33 No. 3, May 2001 343-367
[63]Queensland Government (2007) Crime Prevention through Environmental Design (CPTED) www.police.qld.gov.au/programs/cscp/safetyPublic/Documents/CPTEDPartB.pdf
[64] McDonald J, Baum S, Crick F, Czarnecki J, Field G, Low Choy D, Mustelin J, Sanò M and Serrao-Neumann S (2010) Climate change adaptation in South East Queensland human settlements: Issues and context, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.
[65] Low Choy D, Baum S, Serrao-Neumann S, Crick F, Sanò M and Harman B (2010) Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.
[66] McDonald J, Baum S, Crick F, Czarnecki J, Field G, Low Choy D, Mustelin J, Sanò M and Serrao-Neumann S (2010) Climate change adaptation in South East Queensland human settlements: Issues and context, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.

Some specific areas within the Gold Coast, Brisbane, Logan, Moreton Bay and the Sunshine Coast have a medium, high and extremely high vulnerability to extreme rainfall.[67] Extreme rainfall leading to flooding events affecting these areas could also be intensified if there was a coincidence with coastal hazards, such as storm surges and king tides.[68] Catchments and communities in these areas may benefit from initiatives to improve resilience.

It is also important that community resilience is fostered to respond to events when they do occur. The SPP includes responses to these matters, including the need to avoid hazard areas, manage the risk in existing vulnerable areas, and to undertake risk assessments as part of planning responses.

It has been shown that social costs of disasters are larger than the financial costs, with increases in mental health issues, alcohol misuse, family violence, chronic disease and unemployment.[69]It is predicted that the total costs of disasters will rise to an average of $33 billion per year by 2050 unless steps are taken to increase resilience.[70]

To build resilience in the community, *ShapingSEQ* promotes disaster risk management planning to avoid or minimise impacts of extreme weather events on the community. Strategies also consider how to maintain and enhance the capacity of the region's natural assets to buffer the community, environment and economy from the extremes of weather and climate change.

## Aboriginal and Torres Strait Islander people

Approximately 40 per cent of Queensland's Aboriginal and Torres Strait Islander population live in SEQ. This figure includes those who identify as descendants of the region's original inhabitants (Traditional Owners) and those who have moved to the region (historical and contemporary residents).

With the increasing urbanisation of Indigenous peoples, SEQ is a region with a steadily growing Aboriginal population.[71] In addition to the global megatrends described in *ShapingSEQ*, another important driver of change relates to Indigenous peoples seeking better recognition and involvement in planning. Land use planning in SEQ can play an important role in integrating Indigenous rights, interests and aspirations by providing opportunities for Traditional Owners to be recognised and meaningfully involved.

The *Planning Act 2016* is the first planning legislation in Australia to explicitly acknowledge the importance of valuing, protecting and promoting Aboriginal and Torres Strait Islander knowledge, culture and tradition. The SPP acknowledges consultation with, and involvement of, Traditional Owners in planning processes is particularly important to empower the local community to identify and conserve Indigenous cultural heritage. *ShapingSEQ* progresses this acknowledgment by actively seeking input from Aboriginal and Torres Strait Islander people during the delivery of regional strategies and actions. This goal will be advanced by the conduct of two Aboriginal and

[67] Low Choy D, Baum S, Serrao-Neumann S, Crick F, Sanò M and Harman B (2010) Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.
[68] Rainless flood hints at Coast's Climate Future; defend adapt or retreat: stark choices Sunshine Coast Daily 26th August 2017.
[69]Deloitte Access Economics (2016) The economic cost of the social impact of natural disasters, Australian Business Roundtable for Disaster Resilience & Safer Communities.
[70] Ibid.
[71]Low Choy, D, Clarke, P, Jones, D, Serrao-Neumann, S, Hales, R and Koschade, O. (2013) Aboriginal reconnections: Understanding coastal urban and peri-urban Indigenous people's vulnerability and adaptive capacity to climate change, National Climate Change Adaptation Research Facility, Gold Coast.

Torres Strait Islander Forums per year to enhance the understanding of how the planning system can progress the aspirations of this community.

Country continues to have a role in the spiritual, social and economic future of Traditional Owners. *ShapingSEQ* acknowledges this spiritual and physical connection with strategies to engage Traditional Owners in the ongoing maintenance and enhancement of Country and the wellbeing of Traditional Owners.

Engagement with Indigenous people to identify and preserve indigenous landscape values based on mapping incorporated in *ShapingSEQ* also supports the state interest in these matters.

### Native Title

The Federal Court of Australia recognises that Aboriginal people and Torres Strait Islanders have rights and interests to land and waters that comes from their traditional laws and customs. Traditional Owners can have this connection to Country recognised under Australian law through the *Native Title Act 1993*. Current land owners who already have rights to the land keep those rights even if native title is determined.

Native Title exists over areas of SEQ. The latest information on determinations can be found at www.nntt.gov.au. A native title determination in July 2011 for Quandamooka (Moreton Bay) Country has meant that the Quandamooka community are active in land use planning negotiations and decision-making. This includes the development of a Strategic Plan 2014-2016[72] by Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC), Quandamooka Action Plan 2013 and co-management of the Naree Budjong Djara (Our Mother Earth) National Park on Minjerribah (North Stradbroke Island) with the Queensland Parks and Wildlife Services. QYAC is also working with the State Government on an Economic Transition Strategy for Minjerribah that seeks to transition the Island's mining based economy to a sustainable tourism based economy.

Traditional Owners whether they have native title or not, desire to have their interests and responsibilities acknowledged, respected, and progressed through planning processes. They have asked to be involved in land use planning that relates to areas and values of traditional cultural heritage significance.

Strategies in *ShapingSEQ* provide the opportunity for local and state governments to embrace current and future native title determinations and work with Traditional Owners to maintain and enhance the health of SEQ land and sea country and advance the aspirations of Aboriginal and Torres Strait Islander People.

## Regional landscapes and natural assets

SEQ is widely recognised for the quality and diversity of its natural assets. Environmental and natural resources underpin the region's liveability and form a substantial component of the economy. They also provide the life sustaining benefits provided by ecosystem services. Ecosystem services refer to the goods and services provided by the natural environment that benefit, sustain and support the well-being of people. These goods and services range from the air we breathe, to the water we drink, to the food we consume.

Residents and visitors value the combination of diverse and culturally significant landscapes that shape the region's economy, culture, liveability and lifestyles. The many qualities and values of the regional landscape contribute significantly to the reason so many people call SEQ home. These values include:

[72] Quandamooka Yoolooburrabee Aboriginal Corporation (2014) Strategic Plan 2014-2016, QYAC, Minjerribah.

- biodiversity
- rural production (including natural economic resources)
- climate change buffer and adaptation zones
- scenic amenity
- water quality
- landscape heritage (non-Aboriginal and Indigenous cultural heritage)
- water supply catchments
- outdoor recreation.

Any part of a landscape may have one or more of these values.[73] Areas of highest landscape value have a coincidence of different, high-quality values. The SEQ region is renowned for its multiple landscape values. These values have long been recognised and historically protected through regional plans in SEQ dating back to the 1990's.

The region's landscapes play an important role in accommodating a range of activities that may be difficult to locate in urban areas but are essential to the amenity and wellbeing of the large and growing regional population. They also contribute to an enhanced identity and sense of place for local communities and host regional biodiversity corridors important for climate change adaptation.

One of the consistent messages raised by companies is that Australia is a very attractive place for employees, and that this 'lifestyle dividend' allows them to maintain their investments by attracting highly-skilled and high quality workers.[74] This quality of life is recognised as one of the best in the world. This sees Australia not only attracting highly skilled and internationally mobile individuals, but also providing a compelling place for them to settle. Families are drawn to Australia's good healthcare system, strong schools, low crime rates and 'unblemished' physical environment. A recent study has quantified these 'lifestyle dividends' and concludes that they have been enormous for Australia.[75]

Strategies to maintain and enhance the value of regional landscapes and natural assets in providing this quality of life in SEQ are described in this section.

## Regional biodiversity network

Biodiversity is the natural variety of all the different plants, animals and micro-organisms on earth. It is critical for the life-giving services of clean air and water and provides the foundations for a thriving and healthy natural environment. *ShapingSEQ* subscribes to the definition of biodiversity as adopted in the SPP from Australia's Biodiversity Conservation Strategy 2010 – 2030[76] as follows:

Biodiversity, or biological diversity, is the variety of all forms of life. There are three levels of biodiversity:

- genetic diversity – the variety of genetic information contained in individual plants, animals and microorganisms
- species diversity – the variety of species
- ecosystem diversity (terrestrial, marine and freshwater) – the variety of habitats, ecological communities and ecological processes.

*ShapingSEQ* aims to identify and protect regional biodiversity through planning at a landscape scale

[73] Low Choy, D.C., (2008) The SEQ Regional Landscape Framework: Is Practice Ahead of Theory? in Urban Policy and Research, 26(1), Mar, pp 111-124.
[74]United States Studies Centre (2017) Indispensable Economic Partners - The US-Australia investment relationship, The University of Sydney, NSW.
[75] Ibid.
[76]Australia's Biodiversity Conservation Strategy 2010—2030 (www.environmentgov.au/node/14488)

to provide a network that can harbour the dependent and cascading levels of diversity required for a resilient region. Biodiversity is fundamental to the provision of ecosystem services which are essential for achieving the vision of *ShapingSEQ*. A change in or the loss of biodiversity directly influences the capacity of an ecosystem to produce and supply the services required to achieve the vision.

While Australia is one of the most biodiverse countries in the world, ranking fifth in the top 17 biologically diverse countries, over the 200 years of European settlement Australia has suffered the largest documented decline in biodiversity of any continent. The main threats to biodiversity are:

- loss, fragmentation and degradation of habitat
- the spread of invasive species
- unsustainable use of natural resources
- climate change
- inappropriate fire regimes
- changes to the aquatic environment and water flows.[77]

However, SEQ as a region ranks in Australia's top 15 national biodiversity hotspots meaning that SEQ contains a high level of largely intact native species and communities with a high diversity of locally endemic species.

Recent research identifies the importance of maintaining a regional remnant vegetation cover of above 35 per cent to ensure that biodiversity is not compromised leading to irreparable damage to the regional biodiversity network.[78] This is an ecological requirement to ensure the environment is buffered against large scale changes, which could have cascading impacts on health, safety and the economy. SEQ had 35.5 per cent remnant vegetation cover at 2014.[79] Planning and investment is required to protect, strengthen and connect this cover into the future. SEQ's current large regrowth areas (25.8 per cent of the region) should also be considered for the role they can play in enhancing and contributing to vegetation cover and biodiversity.

Strategies in *ShapingSEQ* require the consideration of the following components of the planning framework for biodiversity conservation. *ShapingSEQ* also acknowledges the significant role that the community and private landholders have played and will continue to play in natural asset management supported by government, industry and research organisations.

### Matters of national environmental significance

The Commonwealth government identifies matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999 (*the EPBC Act). The EPBC Act is the Australian government's principal piece of environmental legislation and seeks conservation of Australia's biodiversity by identifying and protecting native species and ecological communities. Plan making and development must acknowledge and reflect these matters. A report can be generated to determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in an area of interest by visiting www.environment.gov.au/epbc/protected-matters-search-tool.

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[77] Australian Government, Department of the Environment and Energy, www.environment.gov.au/biodiversity/conservation accessed 28/9/2016

[78] Doerr, VAJ, Williams, KJ, Drielsma, M, Doerr, ED, Davies, MJ, Love, J, Langston, A, Low Choy, S, Manion, G, Cawsey, EM, McGinness, HM, Jovanovic, T, Crawford, D, Austin, M and Ferrier, S. (2013), Designing landscapes for biodiversity under climate change: A validation. The architecture of resilient landscapes: scenario modelling to reveal best-practice landscape design principles. National Climate Change Adaptation Research Facility, Gold Coast.

[79] SEQC (2015) South East Queensland Natural Assets Status Report: Evaluation of progress against the 2009-2031 South East Queensland Natural Resource Management Plan Targets -June 2015, South East Queensland Catchments Ltd., Brisbane.

### Matters of state environmental significance

Matters of state environmental significance (MSES) are values protected under Queensland legislation and defined in the SPP. Biodiversity in Queensland is unique and irreplaceable and makes a valuable contribution to the economy and the health and wellbeing of our communities. Biodiversity is a state interest under the SPP and therefore must be addressed through a regional plan. The SPP interactive mapping system shows these values and areas where possible.

### Matters of local environmental significance

Local governments can also identify areas or values as matters of local environmental significance (MLES) that are deemed important for the local community and environment. MLES can only be identified for an area or value if the area or value is not already defined as MSES or MNES.

### Regional biodiversity values

In SEQ, biodiversity values protected by MSES have been further enhanced by mapping undertaken by Department of Environment and Heritage Protection (EHP). EHP has mapped these values using the latest terrestrial and aquatic biodiversity assessments. As discussed previously, the SPP identifies biodiversity as a state interest and, through a regional plan, allows for the refinement of biodiversity values at a regional level. Using the mapping dataset from EHP, *ShapingSEQ* identifies the biodiversity values relevant to SEQ and associated priority corridors.

To avoid the inherent conflicts between urban development and regional biodiversity values, these values are only mapped in the RLRPA and the RLA. This will enable the most efficient and effective use of resources to protect regional biodiversity values and maximise long term strategic conservation outcomes for SEQ.

The dataset has also been overlayed with other state government datasets (i.e. important agricultural areas) and strategic framework maps of local planning schemes to help inform biodiversity priorities for the region.

The overarching themes of the biodiversity values mapping include:

- large tracts of vegetation
- terrestrial connectivity
- areas of high species richness and diversity
- areas of ecosystem representation and uniqueness
- climate adaptation zones and refugia
- aquatic connectivity.

These themes are further described in Appendix A. These values are critical at a regional scale for enabling the protection of ecosystem processes and biodiversity. Areas containing these values are important as they contribute to an ecologically sound and resilient regional network of habitats and corridors.

Regional biodiversity values are to be investigated and refined by local government for protection as matters of local environmental significance (MLES). This is in addition to protecting those areas identified as having MSES. An online mapping database and related information will be provided to assist local government to carry out the assessment of regional biodiversity values.

### Regional biodiversity corridors

Regional biodiversity corridors provide an integrated network of habitat areas across multiple local government areas, which enable resident or migratory wildlife species to move, especially in response to pressures such as climate and land use change. Regional waterways and wetlands also provide a network which connects landscapes across local government areas.

The condition, size and connectedness of bushland in the region is important for the maintenance of biodiversity and ecological functions. Regional biodiversity corridors often include MSES and regional biodiversity values but are identified and managed separately in recognition of the vital role they play in building resilience in the habitat network and in supporting adaptation.

Areas within identified biodiversity corridors may not have well developed tree cover or are nurturing areas of regrowth. These more open or grassland areas are required to provide permeable landscapes for particular species. Unvegetated or degraded areas may also require targeted investment to uplift the functionality of the corridor.

These landscape areas will also be managed sustainably to provide recreational opportunities, scenic amenity, good quality water and air, a buffer for the community from the extremes of flooding and storms, for carbon farming and the preservation of cultural heritage values. These benefits are important to the economy and the health of SEQ residents.

Any further fragmentation of these connections can impact on the health of these assets by making them, and the people, plants and animals that rely on them, more susceptible to fire, pests and disease and the full effects of extreme weather events.[80] Any major change in land use in any part of an identified regional biodiversity corridor can impact on the values of that corridor.

State government agencies will work with local government and other stakeholders to focus coordinated planning, management and investment, including offset delivery, in regional biodiversity corridors to maintain and enhance the contribution these corridors make to the biodiversity network.

## Koala habitat

Existing koala conservation policy and regulations have not halted the continued decline of koala numbers in SEQ. There is statistical evidence of a decline in koala population densities of around 80% in the Koala Coast and 54 per cent in Pine Rivers between 1996 and 2014 – despite current protection measures.[81] This has been identified by experts and the community as a major concern, primarily in urban areas.[82] In response to these concerns and to investigate innovative ways to protect this iconic animal, the government convened an expert panel to review the existing framework and identify strategies to improve koala conservation in SEQ. An interim report providing recommendations for strategies to ensure the long-term survival of koalas in the wild in SEQ was released in early 2017, with the final report due in late 2017.[83]

The interim report highlights the threat development activities (including construction and operation) in SEQ will continue to have on koala habitat and koala populations. One of these impacts is related to major road infrastructure – both existing roads with 'hot spots' for koala deaths (with records often maintained by local governments), and new roads in expansion areas. Consultation undertaken by the panel indicates that more consideration needs to be given to both retrofitting existing roads and to ensuring appropriate avoidance, minimisation and (as a last resort) mitigation measures are undertaken for other major road infrastructure. The connect theme promotes the importance of considering wildlife movement solutions in the planning and delivery of infrastructure.

It is anticipated that the final recommendations made by the expert panel will provide the basis for a

[80]Department of Environment and Heritage Protection (2012) Natural assets for flood and cyclone resilience, Queensland Government, Brisbane.
[81] Rhodes, J. R., Beyer, H. L., Preece, H.J. and McAlpine, C.A. 2015. South East Queensland Koala Population Modelling Study. UniQuest, Brisbane, Australia.
[82]Department of Environment and Heritage Protection (2017) Consultation Report on Koala Management in South East Queensland, Queensland Government.
[83] Koala Expert Panel Interim Report 2017

holistic koala conservation strategy in SEQ that will require input and support from all levels of government, industry and the community. *ShapingSEQ* currently maps a regional biodiversity network that includes areas of koala habitat and important corridors that support a regional network of connected habitat.

### Inland waterways and coastal waters

The availability of clean, fresh usable water underpins SEQ's economic, environmental and social sustainability. Good quality water is important for agricultural production, stock watering, the environment, and water treatment facilities to supply potable water for human consumption. Water cannot be managed in isolation, and ongoing improvements in land management and urban development practices are vital for maintaining water quality.

Water quality and ecosystem health across the region has been variable since reporting by the annual Healthy Waterways Report Card began in 2000 – averaging a grade of C (fair) and varying from A to F across all the catchments in the region. Sediment and nutrient loads continue to create significant impacts, such as toxic algal blooms in coastal and inland waters. These impacts can result in substantial losses of income for industry (e.g. fisheries and tourism) and substantial remediation costs. It is estimated that there are over 465,800 tonnes of sediment, 5,850 tonnes of nitrogen and 730 tonnes of phosphorus released into the waterways annually.[84] Erosion from gullies and creeks dominate the supply of sediment to waterways.

Investigations into institutional and implementation arrangements for catchment planning and management from a landscape-scale perspective are required to link the ecology and hydrology of cities to the broader region. A regional landscape approach to water management can more efficiently accommodate urban and peri-urban growth that is water sensitive and adapted to a changing climate.[85] This would focus regional management on water sensitive practices that link urban areas to rural catchments.

Integrated catchment management can promote collaboration between the community, government, service providers and industry to enable the sustainable management of waterways and floodplains. The Resilient Rivers Initiative is a regional collaboration between local and state government, water utilities, industry and key non-government organisations to improve the health and resilience of SEQ's catchments, rivers and Moreton Bay.[86]

The goals of the Resilient Rivers Initiative will be achieved through the progressive development of catchment action plans across the region and by implementing the high priority works in these plans. Agreed targets and priority areas for investment will be established for each catchment action plan, which will be underpinned by the best available science and assessment of the known risks.

### Moreton Bay and coastal areas

Of particular importance is the maintenance of Moreton Bay as an internationally recognised wetland under the Ramsar convention[87] and the maintenance of SEQ's internationally acclaimed sandy beaches.

Moreton Bay is one of Australia's largest estuarine bays and includes the Pumicestone Passage and islands of Moreton, North and South Stradbroke, Bribie and Southern Moreton Bay Islands. The

[84] MJA (2011) The future of our bay. Marsden Jacob Associates, Brisbane.
[85] Cooperative Research Centre for Water Sensitive Cities (CRCWSC) (2016) Catchment-scale landscape planning for water sensitive city-regions in an age of climate change. Monash University, Clayton, Victoria.
[86] COM SEQ (2015) South East Queensland Resilient Rivers Initiative Regional Strategy 2015–2025, Council of Mayors SEQ, Brisbane.
[87] Information Sheet on Ramsar Wetlands: Moreton Bay Queensland www.ramsar.org

Moreton Bay Marine Park is the most visited park in Queensland (Table 1).[88]

Table 1: Annual estimated visits to the top five parks in Queensland

| **Top five parks in Queensland** | **Annual estimated visits** |
|---|---|
| Moreton Bay Marine Park (Moreton Bay) | 12.4 million |
| Great Barrier Reef Marine Park | 8 million |
| Great Sandy Marine Park | 3.7 million |
| Noosa National Park (Sunshine Coast) | 2 million |
| Tamborine National Park (Gold Coast) | 1.7 million |

The Bay and the islands are made up of a diversity of ecosystems including open ocean, sandy beaches, rocky shores, coral reefs, seagrass and sponge beds, mangrove forests, saltmarshes, mudflats and sandbanks. It is one of Australia's top 12 shorebird habitats with thousands of migratory wader birds flocking to roost each year between September and April. Seagrasses are also critical habitat for iconic species such as sea turtles, dugongs[89] and wader birds.[90][91]

SEQ's coastline and beaches recycle nutrients, contribute to a stable foreshore, provide natural protection from storms and flooding, provide irreplaceable habitat and fisheries resources, and foster many and varied recreational opportunities. The coastline also offers very high amenity and is a desirable place to live and visit.

Managing land use to protect the scenic, recreational and natural values of waterways, the Bay and coastal areas remains a priority for *ShapingSEQ*.

Regional strategies in the sustain theme aim to protect and manage catchments to ensure the quality and quantity of water in our waterways, aquifers, wetlands, estuaries, Moreton Bay and oceans meets the needs of the environment, industry and community. Coordinated planning and action between government, infrastructure providers, natural resource management bodies, research organisations and the community is promoted.

Innovation in water cycle management is also encouraged to increase the efficient use of water and sustainably protect water catchment areas, waterways, aquifers, wetlands, estuaries, Moreton Bay and oceans from the effects of growth and development.[92]

Coastal areas will continue to be protected by the SPP and *Coastal Management Act 1995*.

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[88]Department of National Parks, Recreation, Sports and Racing (2012). Queensland Parks and Wildlife Service Community Survey 2012. Data only considers domestic visitors.
[89]Lanyon, J.M. (2003). Distribution and abundance of dugongs in Moreton Bay, south-east Queensland. Wildlife Res. 30: 397-409.
[90]Geering, A., Agnew, L. and Harding, S. (2007). Shorebirds of Australia. CSIRO Publishing, Collingwood, Victoria.
[91] Bamford, M., Watkins, D., Bancroft, W., Tischler, G. and Wahl, J. (2008). Migratory shorebirds of the East Asian - Australasian Flyway: Population estimates and internationally important sites. Wetlands International, Oceania.
[92]Cooperative Research Centre for Water Sensitive Cities, Catchment scale landscape planning for water sensitive city-regions in an age of climate change (Project B1.2)
www.watersensitivecities.org.au/content/project-b1-2/

## Natural economic resources

Natural economic resources in SEQ include:

- agricultural land
- key resource areas
- fish habitat areas
- forestry
- water resource catchments (including aquifers).

These resources underpin the region's major economic activities, and support a diverse range of industries that rely on their quality and accessibility. These natural resources provide a wide range of ecosystem services to the community such as scenic amenity and recreational opportunities.

Some of these natural resources are non-renewable. The regional planning framework in SEQ has always sought to sustainably manage the region's natural economic resources to ensure future generations enjoy their benefits. *ShapingSEQ* continues to promote these outcomes.

## Agricultural land

One of the most important natural economic resources in the region is agricultural land. SEQ's ability to maintain agricultural productivity and competitiveness is reliant on maintaining highly productive soils and agricultural lands that are close to markets, supply chains, processors and the labour required to underpin production. Declines in the extent and condition of agricultural land will have direct negative impacts on productivity.

Important agricultural areas (IAAs) are areas identified in the Queensland Agricultural Land Audit 2013 as having all the requirements for agriculture to be successful and sustainable. IAAs are part of a critical mass of land with similar characteristics, and are strategically significant to the region or the state.[93]ALC Class A and Class B land constitute the most productive agricultural land in Queensland, with soil and land characteristics that allow successful crop and pasture production.

*ShapingSEQ* protects IAAs and ALC Class A and B land to provide the region with the capacity to provide an affordable supply of fresh food, food security and export earning potential now and into the future (Figure 8).

[93]State of Queensland (2013) Queensland Agricultural Land Audit, Queensland Government, Brisbane.


**Figure 8: Agricultural land in SEQ**

The potential loss of agricultural land to urban development or from other irreversible uses continues to be a significant discussion point for SEQ. While cropping land has been the focus of policies, grazing land and land considered marginal for commercial agriculture but which provide water quality and biodiversity benefits, are the most at risk from land use change.[94] Some of this land is recognised for protection in *ShapingSEQ* for their contribution to the region's biodiversity.

[94] SEQ Catchments (2016) Managing Natural Assets for a Prosperous South East Queensland: An Update to the South East Queensland Natural Resource Management Plan (2009-2031), SEQC, Brisbane.

Other factors that could impact on the productivity of primary industries include:

- declining soil health and increasing salinity
- soil erosion
- weed and pest animals, pathogens and disease.

Increased variability in rainfall and drought patterns as predicted under climate change scenarios will exacerbate the impact of these factors on sustainable land management. A modest decline of two per cent in primary production attributable to these factors could cost the sector almost $500 million over the next 20 years.[95] A reduction in the capacity to produce food and fibre could also impact heavily on the social and economic sustainability of SEQ's rural towns and communities and reduce the region's resilience to a changing climate, peak oil and potential global food shortages.

Access to adequate supplies of water which will be exacerbated by climate change and extreme events like droughts is also a significant issue for irrigators in SEQ. In a trend that is expected to accelerate, major horticultural growers are diversifying their production base beyond SEQ to take advantage of more secure access to water in other regions.[96] At the same time, industry continues to invest in research and implementation of water use efficient practices to sustain supply and explore alternative sources such as recycled wastewater.

Agriculture and agricultural development opportunities are promoted and enhanced through strategies in Prosper. The productive capacity of agricultural land is also championed through the SPP by the avoidance of impacts that exacerbate or create land management issues such as salinity and water logging.

### Key resource areas

Extractive resources (resources not extracted under a resource act[97]) in SEQ are critical to supporting the region. The SPP requires local governments to acknowledge and protect areas that supply extractive resources such as sand, gravel, rock, clay and soil known as key resource areas. Key resource areas are essential to the health of the construction industry and the delivery of infrastructure. Given the high-volume, low-value nature of key resource area products, it is generally necessary to source extractive resources close to markets.

### Forestry

According to the Agricultural Land Audit, SEQ is an important forestry production and timber processing region.[98] The region accounts for approximately 15–20 per cent of Queensland's plantation softwood forestry production and around 20 per cent of native hardwood forestry production for the Queensland timber processing industry.

Forestry production predominately comes from timber resource areas (native and plantation) on state-owned lands administered under the *Forestry Act 1959*, native forest practice notification areas on private (freehold) land under the *Vegetation Management Act 1999* and plantation forestry areas on private land. Most of this land is also grazed and generally managed as silvopastoralsystems – production systems that combine forestry and grazing in a mutually beneficial way.

Figure 9 shows the location of state forest areas in SEQ.

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[95] Marsden Jacobs and Assoc. (2010) *Managing What Matters* SEQ Catchments, Brisbane.
[96] QFF (2008) Sustainable Agriculture Futures Strategy for South East Queensland, Queensland Farmers Federation, Brisbane.
[97] A resource act includes *Geothermal Energy Act 2010, Greenhouse Gas Storage Act 2009, Mineral Resources Act 1989, Petroleum Act 1923* and *Petroleum Gas (Production and Safety) Act 2004*
[98] State of Queensland (2013) Queensland Agricultural Land Audit, Queensland Government, Brisbane.

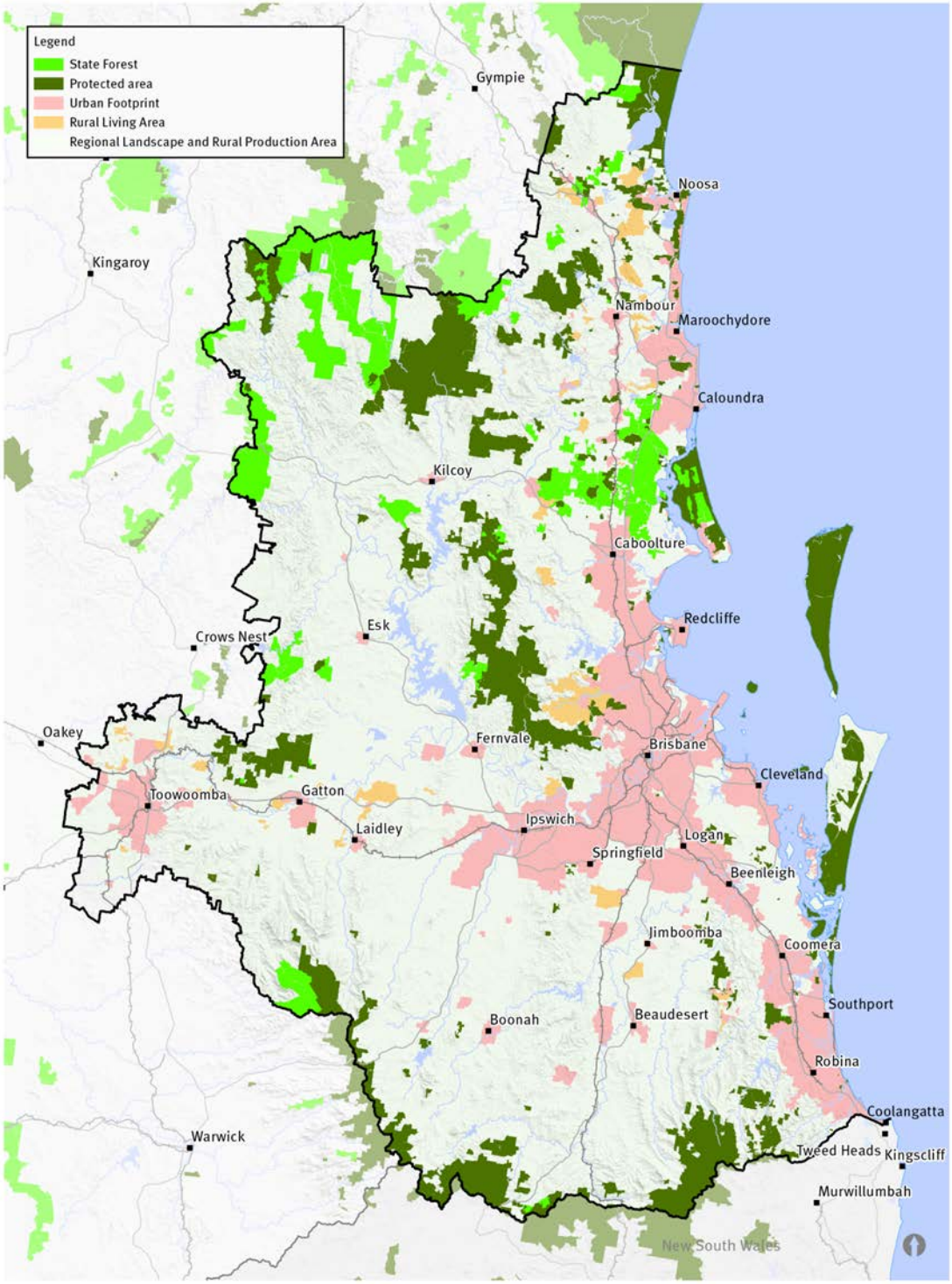


**Figure 9: Protected and state forest areas**

Native forestry, which is mostly hardwood in the SEQ region, produces a number of forest products including sawlogs, poles, bridging girders, fencing timbers and craftwood for a broad range of appearance, construction and mining purposes. Hardwood timbers for fencing are an important resource for grazing and other agricultural land uses.

The key commercial native forestry tree species in SEQ include spotted gum, forest red gum, grey gum, ironbark, blackbutt, stringybark and rose gum.

The region's softwood plantation estate, just under 40 000 hectares, is mostly made up of exotic softwood pine located around Caboolture, Beerburrum and Beerwah, with some smaller areas scattered along the more coastal areas. Other softwood plantation areas are predominately native hoop pine in the Yarraman, Kilcoy and Nanango areas.

### Fish habitat areas

By volume and value per unit area, Moreton Bay is the most important commercial fishery in the state. Most of the commercial fishing production within Moreton Bay is sold domestically, much of it in the greater Brisbane area making the fishery worth $24 million to the SEQ economy per annum.[99]

This commercial fishery is the central component of a lucrative seafood supply chain. Any impact on the sustainability of the commercial fishery has flow on effects to a range of businesses that have forward and backward linkages with the commercial fishing sector.

Recreational fishing is one of the most economically and socially important leisure activities in SEQ involving people from all parts of society. An estimated 475,000 people in SEQ participate in recreational fishing each year (15.5 per cent of SEQ residents regularly fish). These results in an annual total expenditure by SEQ resident anglers of approximately $194.2 million; 98 per cent of this expenditure occurs in the coastal local government areas.[100]

Fish habitat areas play a central role in the life cycle and food chain for key commercial and recreational species. These areas are selected inshore and estuarine fish habitats that are to be protected to sustain local and regional fisheries. All habitat types (e.g. vegetation, sand bars and rocky headlands) within a declared Fish Habitat Areas are protected under the *Fisheries Act 1994* from direct physical disturbance and coastal development.

*ShapingSEQ* acknowledges fish habitat areas to reflect the importance of these areas to the region's economy and marine environment. The SPP promotes the establishment of a buffer zone between areas hosting FHAs and areas of development.

### Water resource catchments

*ShapingSEQ* defines water resource catchments as catchments (including aquifer recharge areas) that supply water for human consumption, intended primarily for drinking, whether or not the water is used for other purposes.

Promoting the sustainable management of these catchments and management that avoids the infusion of sediment and other pollutants into drinking water supply dams and aquifers is critical to ensuring a safe, secure and cost effective drinking water supply. This can provide significant savings in water treatment costs and extend the life of dams and supply infrastructure.

## Regional landscape values

Regional landscape areas have a high confluence of multiple regional landscape values, ecosystem services and therefore community benefits.

These areas include:

- regional greenspace
- scenic amenity areas
- inter-urban breaks
- landscape heritage areas

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[99] Growcom, Queensland Conservation Council and SEQC (2013) Moreton Bay Priority Catchment Sediment Reduction Scheme - Return on Investment Analysis, Brisbane, Australia.
[100] Marsden Jacobs and Assoc. (2010) Managing What Matters, SEQ Catchments, Brisbane.

- Indigenous landscape values.[101]

### Regional greenspace

Greenspace comprises those particular areas of land and/or water which are accessible for outdoor recreation, sport and leisure including:

- national parks
- conservation parks
- state forests
- major water storages and associated lands
- local government parks and reserves
- recreation trails and pathways
- beaches and foreshores
- navigable rivers and bays
- private lands where access for outdoor recreation and sport is permitted by the landowner e.g. private golf courses, commercial off-road vehicle parks, some commercial tourism facilities.

Tourism and recreation are important to SEQ's lifestyle, image and economy and rely on a healthy network of greenspace. Beaches, the coastline and the Bay play a major role in attracting tourists and providing recreational opportunities. So too, do the natural and rural landscapes of the hinterland and interurban breaks. Tourism is discussed further in the Prosper background paper.

In terms of tourism that depends directly on natural areas, in 2012–13 more than three million visitors to Brisbane, the Gold Coast and Sunshine Coast participated in nature-based experiences, including visits to national parks, botanical gardens, wildlife parks/zoos/aquariums, whale/dolphin watching, bushwalking, snorkelling, and scuba diving.[102] If nature-based tourism was 20 per cent lower in 2031 because of a decline in resource condition (broadly consistent with studies undertaken elsewhere[103]), the estimated cost to the sector would be almost $8 billion.[104]

The area of outdoor recreational space (public or private) needs to increase to accommodate projected population growth.[105] The value of natural open spaces to residents, both as recreational spaces and in defining the character of their neighbourhood, is important.

*ShapingSEQ* provides strategies to enhance the quality of natural assets for recreation and tourism. Land use planning that supports the provision and management of recreation on public and private land and promote recreational opportunities that complement agricultural and natural area values (e.g. regional food trails, scenic driving and motorbike tours) is also supported.

### Scenic amenity

Scenic amenity is the measure of a landscape's scenic qualities, and is a function of preference (i.e. relative preference for different landscape features) and visual exposure (i.e. relative visibility from public viewing locations such as roads and lookouts).[106] Natural assets that provide amenity are

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[101] Low Choy, D.C., (2008) The SEQ Regional Landscape Framework: Is Practice Ahead of Theory?, in Urban Policy and Research, 26(1), Mar, pp 111-124.
[102] TEQ (2013) Tourism Profiles, Tourism and Events Queensland, Brisbane. Available at: www.teq.queensland.com/en-AU/Research-and-Insights/Domestic-Research/Tourism-Profiles
[103]Marsden Jacobs and Assoc. (2008) Economic value of the dive industry in the Great Barrier Reef, Marsden Jacobs and Associates, Brisbane.
[104] Marsden Jacobs and Assoc. (2010) Managing What Matters. SEQ Catchments, Brisbane.
[105]SEQC (2015) South East Queensland Natural Assets Status Report: Evaluation of progress against the 2009-2031 South East Queensland Natural Resource Management Plan Targets—June 2015, South East Queensland Catchments Ltd., Brisbane.
[106]State of Queensland (2007) SEQ Regional Plan 2006-2026 Implementation Guideline No.8 Identifying and protecting scenic amenity values, Department of Infrastructure, Brisbane.

important for physical and mental health and as a source of inspiration for art, folklore, national or state symbols, architecture, and personal or group motivation.[107] Scenic amenity and landscape character underpin SEQ's lifestyle and identity, and support a wide range of recreational and tourism activities.

*ShapingSEQ* protects regionally significant scenic amenity. However, strategies for the management of neighbourhood and private landscape values (particularly in the Urban Footprint) in the face of potential change and development pressure will need to be considered in further detail by planning schemes to address these issues at a more local scale.[108]

### Interurban breaks

The preservation and management of interurban breaks has been a priority for the SEQ regional plan and regional planning strategies since the 1990s. Regionally significant interurban breaks accommodate habitat, farmland, mountains, waterways and floodplains, and a range of other values. They define major urban areas, breaking the visual impact of development and prevent the impression of urban sprawl, particularly along the coast. They provide the opportunity for linkages between areas with high scenic amenity or recreational values (e.g. between the Glasshouse Mountains and Pumicestone Passage), or contain important natural resources (e.g. forestry and farmland). Interurban breaks also align closely with recognised regional biodiversity corridors.

The 2009 regional plan nominated five interurban breaks (**Figure 10**). *ShapingSEQ* has identified two of these interurban breaks as regionally significant as they perform the defined functions listed above in particular the differentiation of major urban areas. The remaining three areas are recognised for their role in supporting regional biodiversity corridor values, scenic amenity and recreational opportunities.

The two regionally important interurban breaks are:

- The large Moreton Bay–Sunshine Coast interurban break that includes rural land, natural areas and forestry, and provides opportunities to create linkages between the Glasshouse Mountains and Pumicestone Passage. This break requires further investigation and definition to ensure coordinated management into the future.
- The Logan–Gold Coast interurban break that, although narrow, is focussed on the Pimpama River and Hotham Creek and provides an environmental corridor linking the Darlington Range to Southern Moreton Bay.

The following areas possess multiple values adjacent to major urban areas including the provision of regional biodiversity corridors:

- Mount Coot-tha–Mount Glorious–Lake Wivenhoe contains natural areas with outdoor recreation opportunities, valuable habitat and high scenic amenity.
- Brisbane–Logan–Redland that incorporates areas with significant biodiversity values including important koala habitat, as well as significant outdoor recreation opportunities.
- Brisbane–Logan–Ipswich focused on the Flinders Peak–Greenbank environmental corridor, which provides outdoor recreation opportunities, and contains valuable habitats including rocky hills, wetlands, eucalypt forest and areas with high scenic amenity values.

[107] SEQC (2010) SEQ Ecosystem Services Framework SEQ Catchments Ltd., Brisbane. www.ecosystemservicesseq.com.au

[108] AILA (2016) Comments on SEQ Regional Plan 2006–2026 Implementation Guideline No.8: Identifying and protecting scenic amenity values, Australian Institute of Landscape Architects, Brisbane.

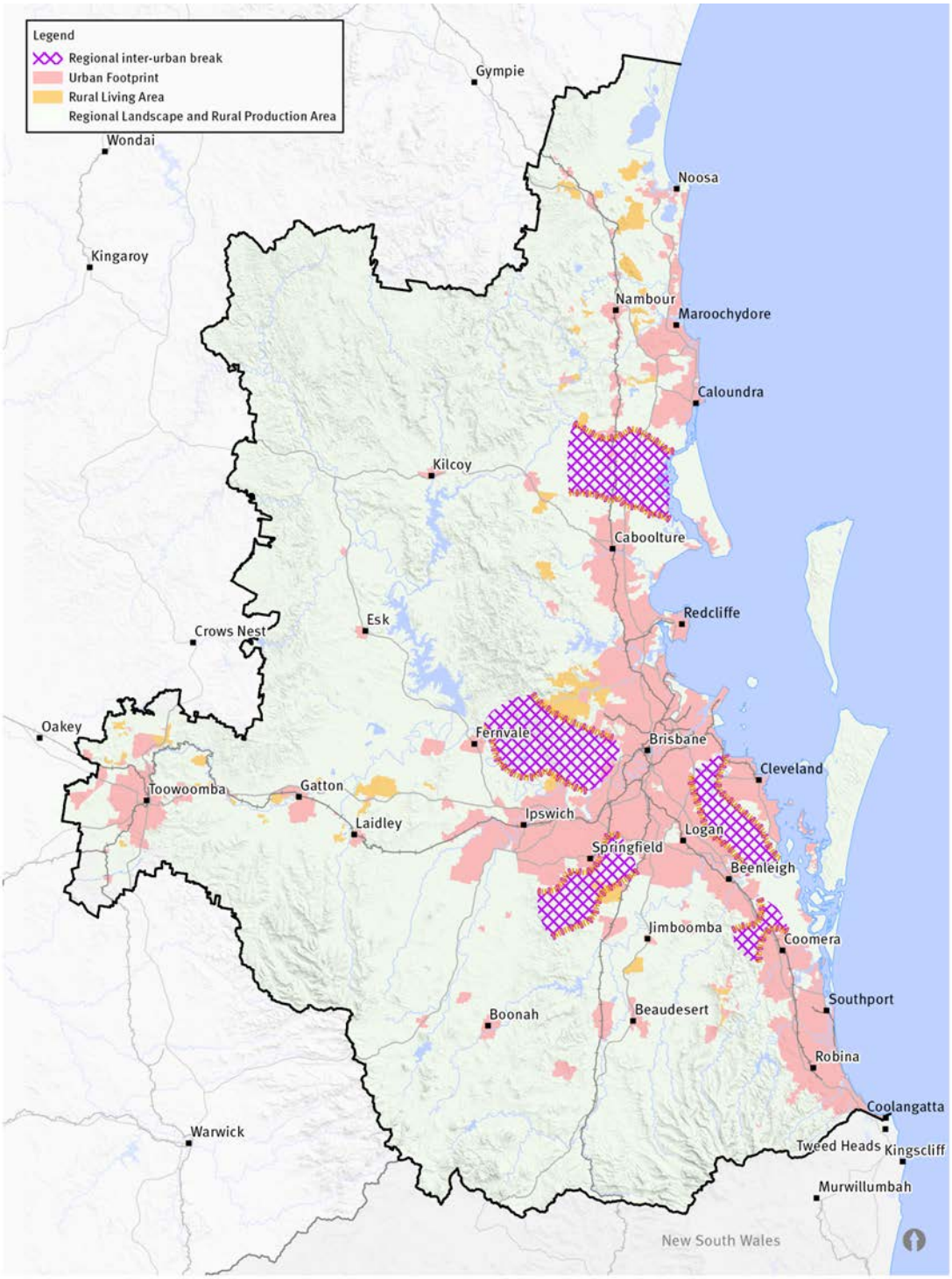


**Figure 10: Inter-urban breaks identified in previous regional plan**

Moreton Bay Regional Council (MBRC) and Sunshine Coast Council (SCC) have undertaken substantial work identifying the values and extent of the northern inter-urban break. Actions in *ShapingSEQ* support the state government working with these councils and other key stakeholders to clearly define the boundaries of the break and to protect it for the long-term.

## Landscape heritage areas

SEQ's rich and varied landscape heritage includes both Aboriginal and non-Aboriginal connections with natural, rural, productive and scenic landscapes. This connectivity helps create the special

character, culture and sense of place of SEQ.

Landscapes that are important for preserving non-indigenous sociocultural and historic connections are included on the Queensland Heritage Register. Heritage values are considered under the SPP. For more information on heritage sites listed on the register visit www.qld.gov.au/environment/land/heritage/register/. The register does not include places of Indigenous cultural heritage values.

### Indigenous landscape values

Matters of Aboriginal cultural heritage are protected, recognised and managed under the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003* (CHAs). The CHAs define Aboriginal or Torres Strait Islander cultural heritage as anything that is:

- a significant Aboriginal or Torres Strait Islander area in Queensland; or
- a significant Aboriginal or Torres Strait Islander object in Queensland; or
- evidence of archaeological or historic significance, of Aboriginal or Torres Strait Islander occupation of an area of Queensland.

An area or object is significant because of either or both of the following:

- Aboriginal or Torres Strait Islander tradition
- the history including contemporary history of any Aboriginal or Torres Strait Islander party for the area.

The CHAs:

- provide blanket protection of areas and objects of traditional, customary, and archaeological significance
- recognise the key role of Traditional Owners in cultural heritage matters
- establish practical and flexible processes for dealing with cultural heritage in a timely manner.

The CHAs require anyone who carries out a land-use activity to exercise a duty of care. The duty of care applies to any activity where Aboriginal or Torres Strait Islander cultural heritage is located. This includes cultural heritage located on freehold land and regardless of whether or not it has been identified or recorded in a database.

In SEQ these values have been further defined. Indigenous landscape values have been mapped with appropriate permission to show boundaries, pathways, totemic and iconic species, food and medicinal species, spiritual landscapes, women's and men's places, ceremonial places, battle sites, meeting and keeping places, healing places, mission sites, habitation sites and water places.[109]

Participants at the Aboriginal and Torres Strait Islander and Traditional Owner workshops for *ShapingSEQ* supported the inclusion of this map to promote the reflection of Indigenous values in regional planning.

## Climate change

While it is recognised that climate change is a global issue, the potential consequences of failing to consider climate change in land use planning is of particular concern for the region given SEQ contains the majority of the state's population and economic assets.

The Intergovernmental Panel on Climate Change (IPCC) has identified SEQ as a climate

[109] Low Choy, D.C., Wadsworth, J. and Burns, D. (2010) Seeing the Landscape through New Eyes: Identifying and incorporating indigenous landscape values into regional planning processes, in Australian Planner, Vol 47, September 2010, pp 178-190.

vulnerability 'hot spot'.[110] Climate change thus poses important challenges for the region in coping with the likely direct impacts from extreme events while reducing greenhouse gas emissions. According to the World Meteorological Organization (WMO), 2015 was recorded as the hottest year on earth since record-keeping began. This has potential impacts on future liveability, agricultural productivity and contributes to a heightened risk of extreme weather events.

In December 2015 at the 21st United Nations Framework Convention on Climate Change in Paris, the international community including Australia accepted unanimously that climate change is real and that urgent action is required to reduce global carbon emissions.

In SEQ, the most likely overall indicative climate change scenario is one that is hotter (1.5 to 3.0°C warmer), and drier (five to 15 per cent reduction in rainfall). This is possible by 2050 and would result in Brisbane's climate being more like that of Bundaberg and Sydney's future climate being more like that of Brisbane.[111] In the near future (2030), the projected range of sea level rise is 0.08 to 0.18 metres above 1986–2005 levels and for the far future (2090) it is in the range of 0.30 to 0.88 metres.[112]

*ShapingSEQ* adopts a holistic approach to planning and managing for climate change that is integrated across all themes and embedded in the commitment to a compact settlement pattern, sub-tropical design principles and natural hazard risk management.

In 2017, the government released the Queensland Climate Adaptation Strategy (Q-CAS) which provides a framework for managing the risks and harnessing the opportunities of a changing climate. Q-CAS describes pathways to ensure that climate change is considered in state and regional planning instruments.[113]*ShapingSEQ* supports regional climate adaptation measures by guiding an urban form that minimises the region's vulnerability to the impacts of climate change and extreme events. Strategies work across the themes of *ShapingSEQ* to address social and economic disadvantage and enhance environmental sustainability to reduce the vulnerability of at risk communities. Disaster risk management planning and adaptation will also play a role in avoiding impacts on the community and reducing recovery times.

*ShapingSEQ* promotes strategies that enhance the role of natural assets in protecting the community and infrastructure against natural hazards and extreme events. The compact settlement pattern promoted by *ShapingSEQ* will also help to minimise any extra stress on ecosystems and regional landscapes that could jeopardise the ability of flora and fauna to adapt to climate change and therefore potentially reduce the number of local and/or global extinctions.[114]

The role tree cover and healthy waterways play in reducing the urban heat island effect and in dissipating the energy of floods will be enhanced as part of the sustain theme and as part of green infrastructure planning in urban design through the live theme.

Although Queensland emissions represent only a small proportion of global emissions, our per capita emissions are amongst the highest in the world.[115] Moving to a low carbon future is essential

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[110] IPCC (2007) Climate Change 2007: Working Group II: Impacts, Adaptation and Vulnerability. Intergovernmental Panel on Climate Change, Geneva, Switzerland.
[111] Dowdy, A. et al. (2015), East Coast Cluster Report, Climate Change in Australia Projections for Australia's Natural Resource Management Regions: Cluster Reports, eds. Ekström, M. et al., CSIRO and Bureau of Meteorology, Australia.
[112] Ibid.
[113] State of Queensland (2017) Queensland Climate Adaptation Strategy 2017–2030, Department of Environment and Heritage Protection, Brisbane www.qld.gov.au/environment/climate/adapting
[114] Ibid.
[115] State of Queensland (2016) Advancing Climate Action in Queensland, Department of Environment and Heritage Protection, Brisbane.

to ensure the long-term prosperity of the state. *ShapingSEQ* supports Q-CAS in the lowering of greenhouse gas emissions by promoting an efficient regional settlement pattern that reduces the dependence on cars.

*ShapingSEQ* also promotes regional and local strategies that encourage the use of renewable energy and biofuels, reduce greenhouse gas emissions and facilitate the transition to a low carbon future.

## Community and infrastructure

Climate change will impact on vulnerable members of society disproportionately—the poor, the very old, the very young and the sick are most at risk. It is critical to address the underlying causes of vulnerability, including the structural inequalities that create and sustain poverty and constrain access to resources.

A spatial vulnerability assessment conducted for SEQ based on socioeconomic factors (Figure 11) indicates a number of localities with extreme vulnerability to the impacts of heatwaves and extreme rainfall. *ShapingSEQ* strategies for health and wellbeing, fairness, social cohesion, safety and affordable living will contribute to addressing some of these factors and reducing the vulnerability of these communities.

Rural communities are vulnerable to the impacts of climate change because they have a higher dependence on environmental resources for their livelihood generally and also tend to have higher proportions of older and unemployed people than urban populations. Prolonged extreme weather events including both drought or flooding, can have substantial and long-term economic impact for rural communities, particularly when there are limited alternatives to earn a livelihood.

An agriculture sector adaptation plan has been developed under Q-CAS which aims to identify risks associated with climate change within the agriculture sector in Queensland.[116] The overarching objective is for government and industry stakeholders to identify climate adaptation needs, opportunities, existing adaptation activities and solutions, along with knowledge and practice gaps. The desired outcome of this plan is for Queensland agriculture to be a successfully adaptive industry that can sustain production levels into the future by being less vulnerable to production losses caused by climate change hazards.

Unfortunately, it is impossible to quarantine communities from change and extreme events, but it is possible to enhance the ability of communities to recover from shocks and return to a functional state within a reasonable timeframe.[117] Strategies that foster landscape and community resilience are needed to enable the economy, environmentand society to recover more rapidly from shocks like cyclones, floods, droughts and fires and other extreme weather events.[118] [119] [120] [121]

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[116] State of Queensland (2017) Agriculture Sector Adaptation Plan, Department of Environment and Heritage Protection, Brisbane.

[117] Walker, B., Holling, C. S., Carpenter, S. R., and Kinzig, A. (2004) Resilience, adaptability and transformability in social–ecological systems. Ecology and Society 9(2): 5. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art5

[118] Partnership for Environment and Disaster Risk Reduction (PEDRR) (2010) Demonstrating the Role of Ecosystems-Based Management for Disaster Risk Reduction. Partnership for Environment and Disaster Risk Reduction.

[119] State of Queensland (2012) Natural assets for flood and cyclone resilience, Department of Environment and Heritage Protection, Brisbane.

[120] Dudley, N., S., Stolton, A., Belokurov, L., Krueger, N., Lopoukhine, K., MacKinnon, T., Sandwith and. Sekhran, N. [editors] (2010); Natural Solutions: Protected areas helping people cope with climate change. IUCNWCPA, TNC, UNDP, WCS, The World Bank and WWF, Gland, Switzerland, Washington DC and New York, USA.

[121] Hey, D., Kostel, J. and Montgomery, D. (2009). An ecological solution to the flood damage problem. In R.

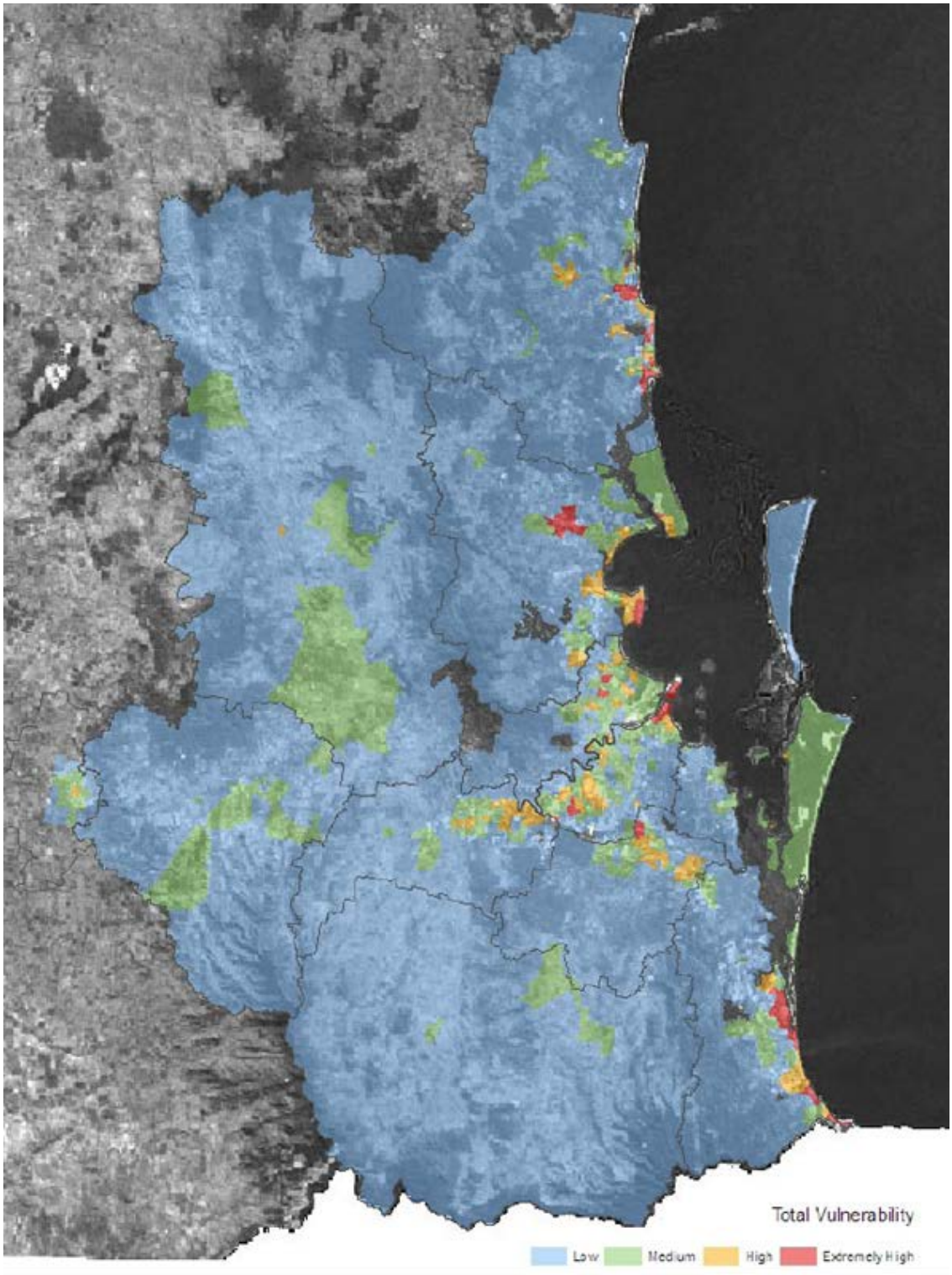


**Figure 11: SEQ social and economic vulnerability to extreme heat, rainfall and coastal hazards**[122]

E. Criss & T. M. Kusky (Eds.). Finding the balance between Floods, Flood Protection, and River Navigation. Saint Louis: Saint Louis University, Centre for Environmental Sciences.

[122]Low Choy D., Baum S., Serrao-Neumann S., Crick F., Sanò M.& Harman B. (2010) Climate Change Vulnerability in South East Queensland: A Spatial and Sectoral Assessment, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.

Following the devastating flood events of 2011, the Queensland Floods Commission of Inquiry required that Brisbane City Council, Ipswich City Council and Somerset Regional Council and the Queensland Government should ensure that, as soon as practical, a flood study of the Brisbane River catchment is completed.[123]

The purpose of the Brisbane River Catchment Floodplain Management Study is to provide an up-to-date, consistent and agreed set of hydrological and hydraulic models for the Brisbane River catchment. The flood study hydraulics report and the technical summary report were finalised in early 2017. The modelling outputs of the flood study will be used in the floodplain management studies that will investigate the options for responsive land use planning, mitigation and infrastructure works, and disaster response management. The options will be assessed using cost benefit analysis, and provide the basis for recommended options for coordinated floodplain management plans, anticipated to be completed in 2018.[124]

A major impact of a changing climate is increased erosion of sandy shorelines, largely driven by predictions of stronger storm events. Analysis conducted in 2010 estimated that about 227,000 persons in SEQ were at risk of inundation from a 1-in-100-year storm tide. Without considering a future increase in population in SEQ, sea level rise could see this number increase to 245,100 persons by 2030 and 273,000 persons by 2070.[125] Commercial development, social infrastructure, coastal infrastructure, and substantial parts of transport networks are also potentially exposed.[126]

A regional integrated catchment approach to flood management is promoted by *ShapingSEQ*, where natural assets are maintained and enhanced for the multiple roles they play in flood mitigation and buffering the community against extreme events.

Evidence shows a significant increase in observed fire weather trends for the period 1973 to 2010 in SEQ.[127] There is a high confidence that climate change will result in a harsher fire-weather climate in the future. Fire also plays a role in affecting air quality, human health, the health of our soil, and soil erosion. Increased erosion from bare soil exposed to more frequent extreme events could jeopardise the supply of clean water to urban centres.

Communities on the urban periphery are particularly vulnerable to bushfire hazards both as a consequence of proximity to the more hazardous areas, and because of the newness of the community and an often subsequent lack of fire awareness. A coordinated approach to understanding and planning for fire management across the region can minimise such risks.

Climate change is expected to result in changes to existing health issues, rather than lead to the emergence of new issues. There is a need to concentrate on known health burdens that are likely to be exacerbated by climate change impacts.[128]

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[123] Queensland Floods Commission of Inquiry (2012) Queensland Floods Commission of Inquiry Final Report www.floodcommission.qld.gov.au

[124] State of Queensland (2016) Queensland Reconstruction Authority, Queensland Government, Brisbane www.qldreconstruction.org.au

[125] Wang X., Stafford-Smith M., McAllister R., Leitch A., McFallan S. and Meharg S. (2010) Coastal inundation under climate change: a case study in South East Queensland. Report prepared for the South East Queensland Climate Adaptation Research Initiative, CSIRO, Canberra.

[126] Roiko A., Mangoyana R., McFallan S., Oliver J., Carter R., Matthews J. and Smith T. (2010) Socio-economic Trends for South East Queensland and Directions for Climate Change Adaptation, Sustainability Research Centre, University of the Sunshine Coast, Sippy Downs, Qld, Australia.

[127] Clarke, H., Lucas, C. and Smith, P. (2013) Changes in Australian fire weather between 1973 and 2010. International Journal of Climatology, 33, 931-944.

[128] Low Choy, D. Serrao-Neumann, S., Crick, F., Schuch, G.,Sanò M., van Staden, R.,Sahin, O., Harman B. and Baum, S. (2012) Adaptation Options for Human Settlements in South East Queensland–Main Report, South East Queensland Climate Adaptation Research Initiative, Griffith University.

The main health risks from climate change include:

- heat waves and heat related deaths and hospitalisation rates (and reduced quality of life and workforce productivity for people who cannot reduce their heat exposure)
- more injuries and deaths from extreme weather events, and indirect effects such as increased incidence of infectious and contagious diseases and mental health issues
- more outbreaks of mosquito and water borne disease, due to warmer and wetter conditions, and following flood episodes
- effects on air quality, because hotter conditions can create more smog or dust storms and drier conditions can cause more particle pollution from fires and dust storms
- altered food production affecting food pricing and availability.[129]

The urban heat island effect caused by the lack of tree cover and impermeable surfaces exacerbates the impacts of heat waves and flooding. Studies completed in Brisbane found that residential tree cover in established areas cooled surface temperatures by up to five degrees celsius.[130] The live theme promotes strategies that incorporate the function of green infrastructure in mediating temperature.

Strategically vegetated catchments can also store flood water decreasing flood damage while providing additional services such as groundwater for irrigation and ecological benefits.[131] Studies have also shown that during large floods, this natural flood storage can reduce floods by 64 per cent with an estimated net social benefit value of US$500 million.[132]

The location of existing infrastructure in areas highly exposed to the projected impacts of climate change places those buildings and assets, and the people who live or work in them, at increased risk of harm.[133]

The equitable provision of infrastructure will also become a greater challenge, with climate change impacting upon water and energy security and cost. Houses may need to be retrofitted to withstand higher temperatures and extremes, which may challenge the financial capability of homeowners. Cheaper housing is often located in areas vulnerable to climate extremes. If these extremes become more common or more severe, such locations may no longer be safe.

The government under the umbrella of Q-CAS has released a sector adaptation plan for built environment and infrastructure with the objective that government and the sector work together to create an environment supportive of behaviour that safeguards the prosperity of the built environment and infrastructure sector and Queensland as a whole from the impacts of climate change.[134]

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[129] NCCARF (2012) Climate change impacts factsheet 8: Health. National Climate Change Adaptation Research Facility, Southport.
[130] Hall, T. (2010) Residential density, layout and design: the unmet sustainability challenges, in B Gleeson and W Steele, (eds) A climate for growth, University of Queensland Press, 2010.
[131] Department of Environment and Heritage Protection (2012) *Natural assets for flood and cyclone resilience:* Queensland Government, Brisbane.
[132] Hey, D., Kostel, J. and Montgomery, D. (2009). An ecological solution to the flood damage problem. In R. E. Criss & T. M. Kusky (Eds.). *Finding the balance between Floods, Flood Protection, and River Navigation*. Saint Louis: Saint Louis University, Center for Environmental Sciences.
[133] McDonald J., Baum S., Crick F., Czarnecki J., Field G., Low Choy D., Mustelin J., Sanò M and Serrao-Neumann S. (2010) Climate change adaptation in South East Queensland human settlements: Issues and context, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University.
[134] State of Queensland (2017) Built Environment and Infrastructure Sector Adaptation Plan, Department of Environment and Heritage Protection, Brisbane.

## Natural assets and biodiversity

Climate change is projected to have significant impacts on terrestrial biodiversity, potentially dramatically altering the suitability of environments and habitats for the majority of species. These changes will be ecologically very significant, and will result in many novel environments quite unlike those currently occurring anywhere on the continent, and the disappearance of many environments currently occupied by Australian biodiversity.

Changing temperature, moisture availability, increase in pest species and fire regimes is likely to lead to changes in vegetation structure. Increases in fire weather across much of Australia are very likely, which could have significant impacts on composition, structure, habitat heterogeneity and ecosystem functions.

Protecting and strengthening regional biodiversity corridors that contain refugia and climate adaptation zones will assist with enhancing the resilience and adaptive capacity of the region to the impacts of a changing climate. These are areas in the landscape that are buffered from extreme weather and the impacts of climate change by features such as dense leaf cover, hills and gullies. Adaptation zones will face the least long-term change in climate and allow for plants and animals to move between areas as these changes occur. They are predicted to be stable, accessible and large enough to sustain viable populations of the species residing within it. The majority of these areas occur in landscape corridors which also support other ecosystem functions and services.

Wetlands also provide supporting habitat (and refugia) for many species, a role which will become more critical under projected increases in climate variability. The high diversity of plants and animals adapted to living in wetlands also provides biological control of pests in surrounding environments including farmland. In addition, wetlands can play a major role in mitigating the impacts of flooding by retaining and slowly releasing floodwaters.

SEQ's richness in natural assets and biodiversity will become increasingly attractive for tourists in the future.[135] As a result, the numbers of visitors seeking nature-based experiences is expected to increase, requiring the more effective and holistic management of natural assets for tourism outcomes. Tourism is particularly vulnerable to increases in the occurrence of extreme events such as droughts, bushfires, cyclones and floods.[136] These lead to dramatic declines in visitation at the time of, and immediately following the disaster, as demonstrated by reduced tourist numbers to Queensland after the flood and cyclone events of the 2010–2011 summer.

The pressure on biodiversity and natural habitats as a result of a changing climate and human activity across the globe will increase the value of healthy natural areas and habitats to tourism and related industries such as the retail and service sectors.[137] This will in turn require the sustainable management of natural assets and biodiversity for their existence value and contribution to the region in the long term.

[135]Hajkowicz, S., Cook, H., and Boughen, N. (2013) The Future of Tourism in Queensland—Megatrends creating opportunities and challenges over the coming twenty years CSIRO, Canberra.
[136]NCCARF (2012) Climate change impacts factsheet 9. Tourism. National Climate Change Adaptation Research Facility, Southport.
[137] Hajkowicz, S., Cook, H., and Boughen, N. (2013) The Future of Tourism in Queensland - Megatrends creating opportunities and challenges over the coming twenty years CSIRO, Canberra.

# Conclusion

*ShapingSEQ* sets out the long-term vision for the sustainable management of growth of the region and will establish a regional and sub-regional framework to achieve this long-term vision. This paper has provided the basis for the development of the sustain policy framework of *ShapingSEQ*. SEQ offers an enviable lifestyle because it's affordable (in comparison to other capital city regions), healthy, and socially cohesive and communities live amongst a unique and biologically diverse natural environment.

SEQ is the most socially, economically and environmentally diverse region in the state and one of the most biodiverse metropolitan areas in the world. Our regional landscapes and natural assets perform a wide range of functions that are essential for long-term economic, social and environmental sustainability, liveability, and for providing a competitive advantage in the global economy. This will become even more valuable as climate change impacts more heavily in comparative terms on natural assets and liveability in other regions of the world.[138] Maintaining flora and fauna for their existence sake beyond any benefits they may provide to the economy or society is also a priority.

[138]Hajkowicz, S., Cook, H., and Boughen, N. (2013) The Future of Tourism in Queensland—Megatrends creating opportunities and challenges over the coming twenty years CSIRO, Canberra.

# Appendix A: Regional landscape and natural asset values

The following table outlines the natural assets and landscape values considered to be priorities for the region.

| Landscape area or natural asset | Definition |
|---|---|
| **Indigenous landscape values**<br>Landscape areas that hold cultural, spiritual and environmental significance for Indigenous peoples and Traditional Owners. | |
| Indigenous landscape values | Boundaries, pathways, totemic and iconic species, food and medicinal species, spiritual landscapes, women's and men's places, ceremonial places, battle sites, meeting and keeping places, healing places, mission sites, habitation sites and water places that can be mapped with the appropriate permission. Additional cultural resource values to be identified and managed in consultation with appropriate Traditional Owners and through the Cultural Heritage Database (www.datsip.qld.gov.au). Landscapes that contain these elements are often overlapped by contemporary non-indigenous (European) landscape planning or require additional consideration. |
| **Regional biodiversity network**<br>Natural assets that contribute to the maintenance of ecological processes and biodiversity at a regional scale are critical for the environment, society and economy. The relationship between these assets form an important ecological network that contain matters of state environmental significance as well as regional biodiversity values, reflecting SEQ's status as a highly biodiverse metropolitan region. The natural assets that make up this network consist of the following components. | |
| Matters of state environmental significance | As defined in the State Planning Policy.<br><br>Note: Where possible, MSES is indicatively shown on the SPP Interactive Mapping System. |
| Regional biodiversity values | Regional biodiversity values have been mapped in SEQ and identify:<br>• large tracts of vegetation<br>• terrestrial connectivity<br>• aquatic connectivity<br>• areas of high species richness and uniqueness<br>• areas of ecosystem representation and uniqueness<br>• climate adaptation zones and refugia.<br><br>These values are critical at a regional scale for enabling the protection of interacting ecosystem functions and their associated species and diversity. These values are to be investigated and refined by local government for protection as matters of local environment significance (MLES). This is in addition to protecting those areas identified as having MSES. These areas are important as they contribute to an ecologically sound and resilient regional network of habitats and corridors.<br><br>RBVs are not identified in the urban footprint or in expansion areas or potential future growth areas only in the RLRPA and RLAs. |

| Landscape area or natural asset | Definition |
|---|---|
| Regional biodiversity corridors | Regional biodiversity corridors connect or improve connectivity through targeted rehabilitation of natural assets, including between existing areas of MSES and regional biodiversity values.<br><br>These corridors are to be investigated and refined by local government for consideration as MLES.<br><br>Corridors are not identified in the urban footprint or in greenfield growth areas or potential future growth areas only in the RLRPA and RLAs.<br><br>However, where corridors are mapped within the Urban Footprint they follow existing natural landforms such as waterways e.g. Pine River to Hays Inlet. |
| **Regional biodiversity values are further defined below** | |
| Large tracts of vegetation | Large intact areas of high ecological integrity which contain many ecosystem functions contributing to the region's ongoing biodiversity.<br><br>Benefits: large viable areas of vegetation sustain viable populations of native flora and fauna, buffer the region from extreme events and the impacts of climate change. |
| Terrestrial connectivity | Vegetation that allows for the interaction between large intact areas.<br><br>Benefits: allows for movement, breeding opportunities and genetic diversity of the fauna and flora within the large intact areas. Includes proximity and stepping stone vegetation. |
| Areas of high species richness and diversity | Areas that support a broad range and large populations of the region's species.<br><br>Benefits: maintenance of unique ecological and often highly biodiverse environments. |
| Areas of ecosystem representation and uniqueness | Areas that support a broad representation of the region's ecosystems, all with their own different set of functions that contribute to overall regional biodiversity.<br><br>Benefits: biodiversity provides resilience and economic opportunities for tourism and pharmaceutical and other industries. |
| Climate adaptation zones and refugia | Large tracts and corridors that contain refugia, i.e. areas in the landscape buffered from extreme weather by features such as dense leaf cover, hills and gullies, and permanent water bodies.<br><br>Benefits: enhanced resilience and capacity to adapt to climate change impacts. |
| Aquatic connectivity | Aquatic areas that have appropriate connectivity between other wetlands.<br><br>Benefits: habitat, refugia, water purification and groundwater recharge for the environment and other uses such as agriculture. |

| Landscape area or natural asset | Definition |
|---|---|
| **Regional landscape values**<br>Areas with the highest confluence of multiple regional landscape values and ecosystem services. | |
| Scenic amenity areas | Landscape areas identified by the SEQ regional amenity methodology as having scenic amenity value.<br><br>Benefits: Physical and mental health and wellbeing, tourism, sense of place and community cohesion. |
| Inter-urban breaks | Non-urban areas that differentiate major urban development areas.<br><br>Benefits: enhanced community and sub-regional identity and sense of place, definition of landscape corridors, agriculture, forestry, potential provision of land for public recreation and other ecosystem services close to population centres. |
| Culturally significant places | Places which are important for preserving non-indigenous sociocultural and historic connections. These include those places listed on the Queensland Heritage Register and considered under the SPP. For more information on heritage sites listed on the register visit www.qld.gov.au/environment/land/heritage/register |
| Regional greenspace network | Publicly owned or managed land that the community generally has a legal right to access.<br><br>Benefits: improved community health and wellbeing through physical activity, direct experience of landscapes and nature, social interaction, increased employment and liveability. |
| **Natural economic resources**<br>Landscape areas that support agriculture, rural industries, forestry, fisheries, extractive resources and minerals. | |
| Agricultural land | Important agricultural areas, including Agricultural Land Classification (classes A and B). This mapping supports and strengthens the state interest for agriculture, particularly the guidelines to avoid or mitigate irreversible impacts. |
| Key resource areas | Extractive resources such as sand, gravel, rock, clay and soil. This supports the state interest in mining and extractive resources. |
| Fish habitat areas | Selected inshore and estuarine fish habitats to be protected to sustain local and regional fisheries. All habitat types (e.g. vegetation, sand bars and rocky headlands) within a declared Fish Habitat Areas are protected equally from direct physical disturbance and coastal development. This supports and strengthens the *Fisheries Act 1994*. |
| Forestry | Includes state forest and timber reserve areas, and other state land available for the supply of timber and other forest products. |
| Water resource catchments | Catchments (including aquifer recharge areas) that supply water for human consumption, intended primarily for drinking, whether or not the water is used for other purposes. |

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