

LODDON MALLEE NORTH



REGIONAL GROWTH PLAN

BACKGROUND REPORT

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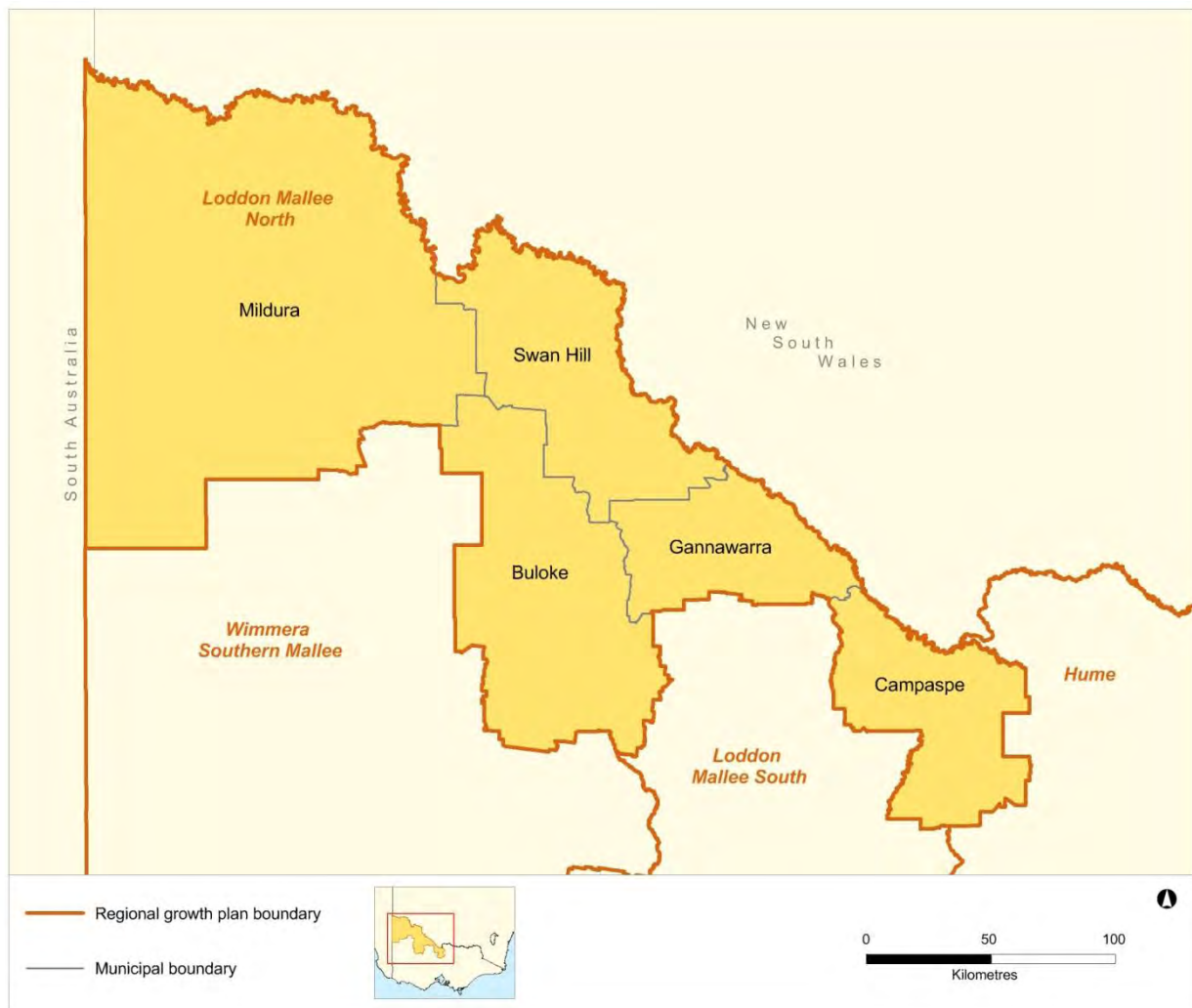
PART A: INTRODUCTION

1. Role and purpose

1.1 Purpose of background report

The Loddon Mallee North Regional Growth Plan has been prepared through a partnership between the councils of Buloke, Campaspe, Gannawarra, Mildura and Swan Hill (see Figure 1), and the state government. It is one of eight regional growth plans developed to respond to the land use and development challenges and opportunities associated with growth in regional Victoria.

Figure 1: Loddon Mallee North Regional Growth Plan area



Source: Department of Transport, Planning and Local Infrastructure

The plan is supported by two other documents: this background report, and a consultation and engagement report, prepared following the receipt of public comment on the draft plan during June and July 2013.

This background report provides a summary of the supporting documentation and evidence on which the vision, principles and future directions of the plan are based. The structure of this background report reflects the plan itself. It presents the context of the Loddon Mallee North region and outlines a thematic overview of the evidence based on the themes of the plan, namely regional economy, environment and heritage, living in the region and infrastructure. It then provides an analysis of the settlement framework to inform the future directions of the plan.

1.2 Policy setting

Development of the plan has taken full consideration of other government policies, legislation and strategies, including regional catchment strategies, the Loddon Mallee Regional Strategic Plan - Northern Region and work undertaken on the draft Murray River Settlement Strategy.

Regional strategic plan

The Loddon Mallee Regional Strategic Plan – Northern Region was released in 2010, and includes seven strategic directions for managing future growth and change:

1. Balance our irrigation, amenity and environmental needs
2. Strengthen our settlements and communities, especially our small towns
3. Strengthen and diversify our economy
4. Improve our infrastructure
5. Improve education and training outcomes
6. Protect and enhance our natural environment
7. Resolve our cross-border issues.

The plan provides the land use planning context in which to achieve these strategic directions. It also identifies significant natural, cultural and economic assets that need to be protected or have potential for development to enhance and support growth, and broadly identifies land where future growth and related infrastructure can be accommodated across the region. The relationship of the plan with other plans and strategies is outlined in Figure 2.

Figure 2: How regional growth plans fit into the planning system

Regional planning

- Regional strategic plans: ‘Whole of government business’ shorter to medium term priorities and directions for regions
- Regional growth plans: Long term strategic direction for land use planning for regions

Local planning

- Council plans: ‘Whole of local government business’ shorter to medium term priorities and actions for municipalities
- Municipal strategic statements: Long term strategic direction for land use and development planning for municipalities

Murray River Settlement Strategy

The draft Murray River Settlement Strategy is being developed by state government in partnership with local governments in the Loddon Mallee North and Hume regions, and in consultation with the New South Wales and South Australian governments. Cross-border issues and opportunities are being addressed, and a framework for ongoing cooperation between New South Wales and Victoria is emerging for planning and information sharing. The draft Murray River Settlement Strategy will provide directions for sustainable settlement growth and change along the Murray River corridor. The plan has been prepared to be consistent with this strategy.

Vision for Victoria

In conjunction with the eight regional growth plans being developed across Victoria, the metropolitan planning strategy, *Plan Melbourne*, will manage Melbourne’s growth and change over the next 30 to 40 years. This suite of strategies will contribute to an overall vision for Victoria, providing a statewide blueprint for growth and development, building on the strengths of Melbourne and each region.

1.3 Summary of regional growth plan consultation

Preparation of the plan was overseen by a project steering committee, with more detailed technical input provided by a technical working group. These two groups were made up of local government, state agency and other authority representatives. Meetings and workshops with these two groups during 2011 and 2012 provided critical input into the plan and background documentation.

A number of stakeholder workshops were held in 2012 to consult with a wider range of regional stakeholders. These workshops resulted in the formation of a draft vision for the plan, a series of guiding objectives and a set of draft principles for growth. The guiding objectives (see Section 3.1) formed a decision-making filter for the development of the plan while the principles for growth (see Section 3.2) provide the focus for the key elements of the regional growth plan.

A strategic directions framework for the region including a draft vision and principles to underpin the plan was developed based on this work. The strategic directions framework was released for public consultation in early 2013 and feedback from that has been used in the development of the resulting plan. A more detailed description of the consultation has been provided in the consultation and engagement report.

2. Regional context

Place

Loddon Mallee North covers an area of 45,000 square kilometres, along 400 kilometres of the Murray River in north-western Victoria. Loddon Mallee North has unique and expansive cultural heritage assets and this cultural heritage is important to contemporary communities. The region is characterised by its environmental assets, such as the Murray River, wetlands and national parks. The human history of the region can also be traced back to the Murray River from the tens of thousands of years from Aboriginal peoples¹ through to our present day settlements.

The relatively recent history of the Loddon Mallee North is strongly tied to the economic development of Victoria with nationally significant historic Murray River trade in the 19th century and the evolution of massive irrigation schemes in the 19th and 20th centuries. Loddon Mallee North contains over 20 per cent of the state's agricultural land, with 2.8 million hectares, more than half of the total area of the region, held in 4471 agricultural holdings (Australian Bureau of Statistics, 2012). Expansive areas of public land cover much of the remainder of the region.

Mildura is the only regional city within the region, with regional centres at Echuca and Swan Hill. Other settlements that play a key role in the region include Kerang, Ouyen, Robinvale and Charlton.

People

The region had a total population of 134,400 people in 2011 (Victoria in Future, 2012). Mildura, including Irymple, Merbein, and Red Cliffs, is the largest city within the region, with a population of 47,529² people (Australian Bureau of Statistics, 2011). Overall, population growth in the region has been below the regional Victoria average, and there are significant variations across the region. The larger towns and cities on the Murray River attract most of the population growth. Mildura accommodates 41 per cent of the region's population and has the highest growth rate. In most areas away from the Murray River growth is slower or decreasing.

Growth

The Loddon Mallee North region is projected to experience modest population growth over the next 30 years. Therefore the plan's focus is on providing a land use framework that underpins economic growth and manages challenges arising from population change.

Diverse communities of interest

Regional towns initially developed along the Murray River, then along the railway lines, follow the major trading/transport routes of the 19th century. Key service towns also developed along the major highways between Melbourne, Adelaide and Sydney. As irrigation schemes developed and expanded near Echuca, Kerang and Mildura in the early 20th century, settlement spread. This resulted in a scattered settlement pattern, with clusters of settlements and communities of interest along the river, and dispersed towns along inland highways. A large proportion of the regional population lives along rivers and waterways, which could be increasingly problematic if flooding becomes more severe as a result of climate change.

Due to its borders with two other states and three Victorian regions Loddon Mallee North has significant cross-border relationships and networks. Most border towns along the Murray River service a wider population and are affected by change in New South Wales and/or South Australia (see Figure 3).

1 Throughout this document the term "Aboriginal" is used to refer to both Aboriginal and Torres Strait Islander people. Use of the terms "Koori", "Koorie" and "Indigenous" are retained in the names of programs and initiatives, and, unless noted otherwise, are inclusive of both Aboriginal and Torres Strait Islander peoples.

2 This figure is based on the ABS data for Mildura (RC) – Part A Statistical Division

Figure 3: Links to surrounding regions



Source: Department of Transport, Planning and Local Infrastructure

The region has a diverse community, including a large Aboriginal population. There are areas of significant disadvantage in many regional towns and centres. Maintenance and expansion of infrastructure is fundamental for social and economic viability. The lack of natural gas, drainage problems and flooding could impede growth in some areas.

Economy

There are 49,014 jobs in the region, and a gross regional product of \$6.58 billion (Regional Development Victoria, 2012). Jobs and revenue are predominantly derived from the agriculture, forestry and fisheries sector. The likely impacts of the Murray Darling Basin Plan on the Loddon Mallee North region are yet to be fully understood, although it is accepted that parts of the region will undergo structural adjustment that may result in land use change and/or other implications. Irrigation modernisation projects may provide the region with new efficiencies and productivity benefits and enable agricultural enterprises to maximise opportunities as land use adapts, and also present emerging opportunities and challenges for some communities.

Loddon Mallee North is a rich source of renewable energy options. This positions the region well for strengthening its economy and skills base. The region is also rich in mineral resources, particularly mineral sands. This is providing current and future economic security in some areas of the region, at least in the medium term.

Transport and movement

The Loddon Mallee North transport network underpins the regional economy. These important networks enable transport of goods and commodities from and through the region to domestic and international markets. Road, rail and air transport and Murray River crossings are not only important to the local community, but across the broader Murray Basin region. Key transport infrastructure includes the Calder, Mallee, Sunraysia, Northern, Murray Valley and Loddon Valley Highways, passenger and freight rail services and Mildura Airport.

3. Vision, guiding objectives and principles for growth

Vision for Loddon Mallee North

In 2041, Loddon Mallee North has built on its strengths to become a thriving Australian region. It has cultivated its environmental credentials to emerge as a prosperous place of choice for people to live, work, visit and invest. It has become renowned for:

- its produce and innovation in areas such as renewable energy
- custodianship of its distinctive environmental and cultural heritage assets
- being a key contributor to national pride in a healthy, iconic and celebrated Murray River.

3.1 Guiding objectives

1. Embrace our potential; protect and increase opportunities, create choice

Land use decisions made today need to position the region to reach its long-term potential: to be resilient economically and socially while reducing future conflicts or harm. This will also position the region well to identify and swiftly respond to opportunities as they arise. This means:

- avoiding decisions that may seriously or irreversibly reduce our long-term opportunities for growth and/or limit competitive advantage
- retaining long-term options so we can act swiftly to capitalise on opportunities as circumstances change.

2. Cultivate the region's network of small and larger towns

A distinct feature of much of the region is a historically complex web of small and larger towns, linked by transport infrastructure, including rail, and natural features, such as the Murray River. Supporting this network will further improve connections between centres, enabling collaboration and better quality of life for locals. This is especially true for smaller communities and twin towns, where collaboration and clustering can provide the critical mass to secure higher order services and functions, accessibility and increased lifestyle choices.

3. Conserve and improve the region's distinctive natural, rural and built environments

The region's distinctive natural environment, rural landscapes and cultural heritage assets are irreplaceable resources for the local and wider community. They also contribute to the uniqueness of the region. The region can value and conserve these assets by ensuring that:

- the distinctive natural environment and its iconic features, including the Murray River, are valued and conserved
- the region's distinctive natural and cultural heritage supports growth and builds identity, especially by attracting visitors to the region, and building our regional credentials as natural and cultural heritage custodians
- rural landscapes are actively supported and managed, even where they are not experiencing growth pressures but other change
- growth occurs with consideration for environmental assets and natural hazards, especially flooding
- strategically important rural land, including agricultural land, is identified and managed appropriately in terms of future land use.

4. Promote and sustain liveable, inclusive and fair communities

The region is responding to change all around. If managed well, change can provide benefits across the region for all communities so that quality of life and access to choice is not solely dependent on uniform population growth or high household incomes. This approach recognises the differing needs and capabilities within

current communities. It also ensures land use decisions are made to create an environment that supports socially inclusive and healthy communities.

5. Make it happen through collaborative action

The plan requires local and regional action to implement it in collaboration with other regional strategies, such as the Loddon Mallee Regional Strategic Plan – Northern Region. Each individual agency's role needs to be respected but it must also be recognised that to tackle harder regional challenges requires collaboration and action across all levels of government and diverse stakeholders.

3.2 Principles for growth

The principles for growth are summarised in section 10 of the plan. The following are some additional key supporting statements relating to each principle. These were identified through engagement with key stakeholders during plan development.

Regional economy

1. Align population and economic growth

- Support opportunities for economic growth and development of settlements coordinated with existing or proposed infrastructure and services.
- Support industrial growth by identifying and protecting an adequate supply of strategically significant employment land in centres with capacity for significant growth.
- Protect key regional assets to ensure future prosperity, including that arising from strategically important and regionally significant rural land uses.
- Support the transition of land from unproductive to productive uses where this can demonstrate an ongoing economic benefit to local communities.

2. Realise opportunities to strengthen and diversify the regional economy

- Protect strategically significant productive rural land uses.
- Support the transition of land from unproductive to productive uses where this can demonstrate an ongoing economic benefit to local communities.
- Support innovation, flexibility and value-adding in farming and alternative industries, such as renewable energy production.
- Facilitate economic diversity by enabling local governments to expediently respond to new opportunities.
- Encourage industrial and commercial development that is consistent with the role and function of settlements in the region.

3. Support and manage our rural landscapes

- Recognise the economic, ecological and amenity values of our natural and rural landscapes.
- Encourage economic activities that make sustainable use of natural resources and assets located on rural land.

Environment and heritage

4. Be custodians of the region's environmental and cultural heritage assets and minimise the region's exposure to natural hazards

- Identify, protect, manage and celebrate places and assets of regional, state or national value (natural and cultural).
- Understand and respond to the iconic significance of the Murray River, including its economic, environmental and cultural values.

- Advance the region's environmental credentials by embracing economic opportunities in the region that can capitalise on environment and heritage assets, while maintaining and enhancing those assets.

Living in the region

5. Protect and provide local sense of place

- Enhance localities by retaining distinct urban areas.

6. Develop a living network of towns

- Direct major population and housing growth to existing regional cities and centres where infrastructure and services can be used in the most efficient, cost effective and sustainable manner.
- Strategically focus growth and development to maximise regional economic benefits by leveraging Loddon Mallee North's five communities of interest: Mallee, Eastern Mallee, Gannawarra, Buloke and Campaspe.
- Recognise and consolidate Mildura's role as one of Victoria's key regional cities and support its ability to service its tri-state hinterland.
- Recognise and foster networks between smaller townships and communities so they can gain and maintain the critical mass to leverage access to regional services and investment, and support prosperity.
- Recognise and build on relationships between Loddon Mallee North and southern New South Wales, South Australia and adjoining Victorian regions.
- Encourage and foster networks between small towns and rural settlements to leverage access to regional services and investment to support prosperity.

Regional infrastructure

7. Enable healthy lifestyles

- Support opportunities for sustainable population renewal and equitable access to services in smaller communities.
- Anticipate and respond to changing community needs to support growth and demographic change.
- Align the growth of towns to investment in social, physical and transport infrastructure.
- Plan for rural settlements to address local challenges and opportunities and assist communities facing population decrease to be adaptable and resilient.
- Protect human life and minimise exposure to natural hazards, such as bushfire and flooding.

8. Strategically retain, renew and build infrastructure to support growth and enable healthy and supportive communities

- Capitalise on existing infrastructure and avoid duplication.
- Reduce reliance on central utility infrastructure by supporting local solutions.
- Encourage transport infrastructure and services to support regional and national links to markets and major cities in south eastern Australia.
- Support transport, infrastructure provision, land use and development that enable communities to have access to high quality education, health and other services.
- Direct development to locations that make the best use of existing infrastructure and minimise the need for infrastructure upgrades or expansion, unless the development provides significant net economic or community benefit.

- Support the timely provision of appropriate infrastructure to enhance existing industries and support establishment of new industries.
- Encourage social infrastructure that supports social inclusion and community cohesion, and also responds to the unique settlement pattern and future demographic trends of Loddon Mallee North.
- Manage water as an important environmental, social and economic asset.

PART B: BACKGROUND INFORMATION

4. Regional economy

4.1 Business and employment

The total gross regional product of Loddon Mallee North is \$6 billion, with Manufacturing; Agriculture, Forestry and Fishing; and Rental, Hiring and Real Estate Services the three highest contributing sectors (Figure 4). The region produces over 30 per cent of Victoria's grain and over 40 per cent of its fruit, as well as more than 80 per cent of its wine grapes. In 2010-11 agriculture was worth over \$1.9 billion, the highest value production of any region in Victoria, with fruit (including grapes) contributing \$867 million, ahead of the next largest contributor, cereals at \$666 million (Australian Bureau of Statistics, 2012b).

Figure 4: Industry output generated by gross revenue (\$million)

Output (\$M) – Loddon Mallee North

- Manufacturing: \$4,011.02
- Agriculture, Forestry and Fishing: \$1,939.39
- Rental, Hiring and Real Estate Services: \$1,130.22
- Construction: \$1,014.22
- Wholesale Trade: \$709.54
- Retail Trade: \$645.28
- Financial and Insurance Services: \$595.84
- Health Care and Social Assistance: \$538.89
- Transport, Postal and Warehousing: \$520.94
- Education and Training: \$414.70
- Public Administration and Safety: \$410.70
- Accommodation and Food Services: \$384.22
- Professional, Scientific and Technical Services: \$379.73
- Administrative and Support Services: \$288.97
- Electricity, Gas, Water and Waste Services: \$269.42
- Other Services: \$235.94
- Information Media and Telecommunications: \$200.39
- Mining: \$69.19
- Arts and Recreation Services: 56.11

Source: Regional Development Victoria, 2012

Major industries and businesses vary across the region, although agriculture-related industries generally dominate. Analysis of the largest employing sectors suggests there are three primary sub-economies within the region, which are all agriculture based: the irrigated horticulture and fruit processing economies of Mildura

and Swan Hill; the dry land farming of Buloke, rural Mildura and rural Swan Hill; and irrigated agriculture, including dairy processing, in Campaspe and Gannawarra.

Intensive animal industries are expanding in Loddon Mallee North. The Charlton Feedlot in Buloke Shire is one of the largest feedlots in Victoria, and the largest employer within the shire. There are also broiler farms in the district, with Buloke and Campaspe shires part of the Northern Poultry Cluster, developing the poultry industry across the region.

Manufacturing is a significant industry across the region, with food manufacturing comprising 65 per cent of manufacturing in 2011. The primary subsectors of the manufacturing industry are meat processing in the local government areas of Swan Hill, Campaspe, Buloke and Gannawarra; wine production in Swan Hill and Mildura; cheese and dairy products in Campaspe and Gannawarra; fruit and vegetable processing in Mildura and Campaspe; and other food products, including a number of baked goods businesses, in Buloke Shire.

Other businesses in the region provide support to agricultural production, including resident and tourism services, as well as transport and logistics. In the smaller urban centres, businesses are primarily servicing local needs and the immediate hinterland. They are therefore strongly reliant on agricultural production and households employed in agriculture.

Beyond agriculture and its related industries, healthcare, education, retail trade and tourism, including hospitality, comprise a significant proportion of the regional economy.

Employment

Currently the largest employment sectors are agriculture and retail (Table 1). Other employment sectors are expected to grow, most notably health, education, tourism, manufacturing and construction (Figure 5).

Table 1: Largest employing industry (by percentage share of workforce)

Agriculture, Forestry and Fishing

- Swan Hill (RC)% - 18.90
- Mildura (RC)% - 11.38
- Gannawarra (S)% - 24.47
- Campaspe (S)% - 13.23
- Buloke (S)% - 30.89
- Total % - 15.26

Retail Trade

- Swan Hill (RC)% - 11.57
- Mildura (RC)% - 13.94
- Gannawarra (S)% - 11.89
- Campaspe (S)% - 11.71
- Buloke (S)% - 7.89
- Total % - 12.40

Health Care and Social Assistance

- Swan Hill (RC)% - 12.14
- Mildura (RC)% - 12.15
- Gannawarra (S)% - 10.74

- Campaspe (S)% - 12.42
- Buloke (S)% - 11.99
- Total % - 12.10

Manufacturing

- Swan Hill (RC)% - 9.39
- Mildura (RC)% - 7.88
- Gannawarra (S)% - 7.96
- Campaspe (S)% - 14.87
- Buloke (S)% - 5.00
- Total % - 10.08

Education and Training

- Swan Hill (RC)% - 7.76
- Mildura (RC)% - 8.56
- Gannawarra (S)% - 5.67
- Campaspe (S)% - 6.97
- Buloke (S)% - 8.57
- Total % - 7.71

Construction

- Swan Hill (RC)% - 6.65
- Mildura (RC)% - 6.83
- Gannawarra (S)% - 7.01
- Campaspe (S)% - 8.16
- Buloke (S)% - 5.71
- Total % - 7.15

Accommodation and Food Services

- Swan Hill (RC)% - 5.94
- Mildura (RC)% - 7.51
- Gannawarra (S)% - 4.83
- Campaspe (S)% - 6.80
- Buloke (S)% - 3.76
- Total % - 6.63

Public Administration and Safety

- Swan Hill (RC)% - 5.33
- Mildura (RC)% - 5.55
- Gannawarra (S)% - 5.28
- Campaspe (S)% - 3.90

- Buloke (S)% - 5.75
- Total % - 5.01

Transport, Postal and Warehousing

- Swan Hill (RC)% - 4.74
- Mildura (RC)% - 4.93
- Gannawarra (S)% - 4.58
- Campaspe (S)% - 4.00
- Buloke (S)% - 6.50
- Total % - 4.67

Other Services

- Swan Hill (RC)% - 3.54
- Mildura (RC)% - 3.72
- Gannawarra (S)% - 3.78
- Campaspe (S)% - 3.93
- Buloke (S)% - 3.27
- Total % - 3.74

Wholesale Trade

- Swan Hill (RC)% - 3.89
- Mildura (RC)% - 3.32
- Gannawarra (S)% - 2.57
- Campaspe (S)% - 2.80
- Buloke (S)% - 4.17
- Total % - 3.24

Professional, Scientific and Technical Services

- Swan Hill (RC)% - 2.69
- Mildura (RC)% - 3.39
- Gannawarra (S)% - 2.41
- Campaspe (S)% - 3.18
- Buloke (S)% - 1.69
- Total % - 3.04

Administrative and Support Services

- Swan Hill (RC)% - 2.13
- Mildura (RC)% - 3.42
- Gannawarra (S)% - 1.80
- Campaspe (S)% - 1.72
- Buloke (S)% - 1.43

- Total % - 2.46

Financial and Insurance Services

- Swan Hill (RC)% - 1.84
- Mildura (RC)% - 1.79
- Gannawarra (S)% - 1.73
- Campaspe (S)% - 1.69
- Buloke (S)% - 0.83
- Total % - 1.71

Electricity, Gas, Water and Waste Services

- Swan Hill (RC)% - 0.97
- Mildura (RC)% - 1.43
- Gannawarra (S)% - 2.59
- Campaspe (S)% - 1.32
- Buloke (S)% - 0.56
- Total % - 1.37

Arts and Recreation Services

- Swan Hill (RC)% - 1.00
- Mildura (RC)% - 1.03
- Gannawarra (S)% - 0.72
- Campaspe (S)% - 1.24
- Buloke (S)% - 0.41
- Total % - 1.03

Rental, Hiring and Real Estate Services

- Swan Hill (RC)% - 0.53
- Mildura (RC)% - 0.95
- Gannawarra (S)% - 0.44
- Campaspe (S)% - 0.94
- Buloke (S)% - 0.41
- Total % - 0.81

Information Media and Telecommunications

- Swan Hill (RC)% - 0.63
- Mildura (RC)% - 1.05
- Gannawarra (S)% - 0.51
- Campaspe (S)% - 0.66
- Buloke (S)% - 0.79
- Total % - 0.80

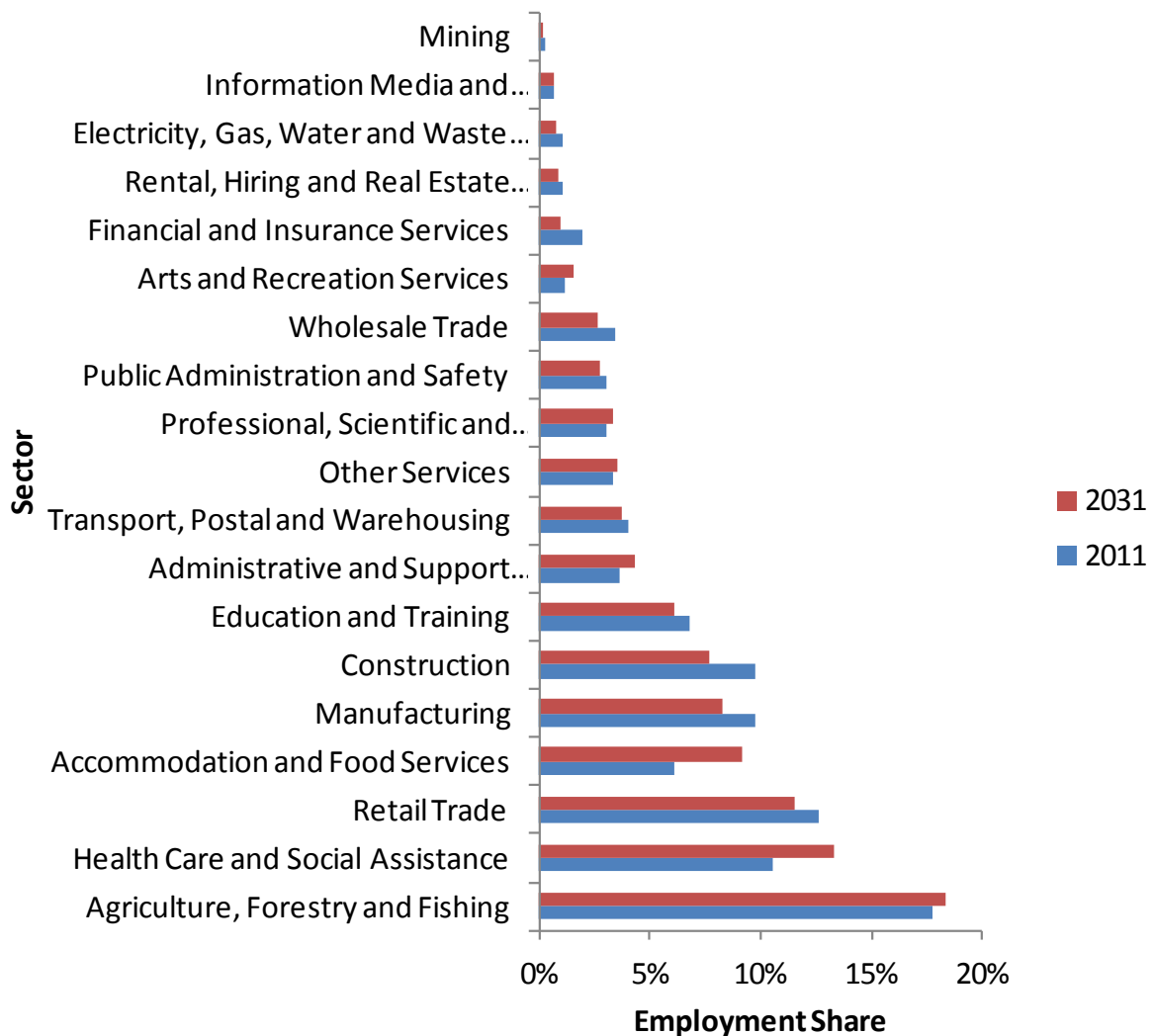
Mining

- Swan Hill (RC)% - 0.37
- Mildura (RC)% - 1.19
- Gannawarra (S)% - 1.00
- Campaspe (S)% - 0.47
- Buloke (S)% - 0.38
- Total % - 0.78

Source: ABS Census of population and housing, 2011

As structural adjustment and increased efficiencies in agriculture continue, the employment rate within agriculture will continue to decrease, resulting in an increased need to diversify opportunities for future employment in the region. Agriculture will continue to be the driving force for the region's economy and employment but the range and type of jobs may vary. Skills shortages in agriculture are already emerging as the sector requires increasingly specific skill sets.

Figure 5: Industry employment share forecast 2011 to 2031



Source: National Institute of Economic and Industry Research, 2012

Skills shortages are a significant threat to Loddon Mallee North communities as they can impact on service delivery and access, as well as affect the amenity of towns and the ability to attract and retain residents. The major occupations with skills shortages in the region are shown in Table 2.

Table 2: Skills shortages in the region

- Accountants
- Automotive electricians
- Building and engineering professionals
- Butchers
- Cabinet makers
- Civil engineers
- Community workers
- General electricians
- General medical practitioners
- Health professionals
- Metal fitters and turners
- Metal machinists
- Motor mechanics
- Nursery people
- Plumbers
- Printing machinists
- Registered nurses
- School teachers
- Structural construction tradespeople
- Structural steel and welding tradespeople
- Welfare workers

Source: Department of Planning and Community Development, 2011

The 2012 unemployment rate for the Loddon Mallee North region was 6.2 per cent. The proportion of workers in the region aged between 45 and 54 years is considerably higher than that for the rest of Victoria (Regional Development Victoria, 2012), which will create an ongoing challenge into the future.

Exports

The region's exports have grown at an average annual rate of two per cent from 2001 to 2011 which is lower than the regional Victoria and statewide average of three per cent and four per cent, respectively. The main exporting sectors of the region are manufacturing and agriculture (Table 3). These sectors account for 80 per cent of the total regional exports in 2011.

Table 3: Exports, 2011 and annual average growth rate from 2001 to 2011

Manufacturing

- 2011 exports (\$million, 2008): \$1517.79
- Annual average growth rate, 2001 to 2011: 4%

Agriculture, Forestry and Fishing

- 2011 exports (\$million, 2008): \$1136.04
- Annual average growth rate, 2001 to 2011: -1%

Retail Trade

- 2011 exports (\$million, 2008): \$114.38
- Annual average growth rate, 2001 to 2011: 18%

Administrative and Support Services

- 2011 exports (\$million, 2008): \$97.08
- Annual average growth rate, 2001 to 2011: 20%

Mining

- 2011 exports (\$million, 2008): \$70.73
- Annual average growth rate, 2001 to 2011: 5%

Accommodation and Food Services

- 2011 exports (\$million, 2008): \$58.65
- Annual average growth rate, 2001 to 2011: 11%

Financial and Insurance Services

- 2011 exports (\$million, 2008): \$56.28
- Annual average growth rate, 2001 to 2011: 6%

Wholesale Trade

- 2011 exports (\$million, 2008): \$49.57
- Annual average growth rate, 2001 to 2011: -3%

Other Services

- 2011 exports (\$million, 2008): \$48.28
- Annual average growth rate, 2001 to 2011: 2%

Education and Training

- 2011 exports (\$million, 2008): \$37.99
- Annual average growth rate, 2001 to 2011: 1%

Electricity, Gas, Water and Waste Services

- 2011 exports (\$million, 2008): \$36.99
- Annual average growth rate, 2001 to 2011: -5%

Rental, Hiring and Real Estate Services

- 2011 exports (\$million, 2008): \$28.34
- Annual average growth rate, 2001 to 2011: 29%

Transport, Postal and Warehousing

- 2011 exports (\$million, 2008): \$21.44
- Annual average growth rate, 2001 to 2011: -9%

Healthcare and Social Assistance

- 2011 exports (\$million, 2008): \$14.43
- Annual average growth rate, 2001 to 2011: -1%

Information Media and Telecommunications

- 2011 exports (\$million, 2008): \$9.48
- Annual average growth rate, 2001 to 2011: -1%

Arts and Recreation Services

- 2011 exports (\$million, 2008): \$6.06
- Annual average growth rate, 2001 to 2011: 13%

Professional, Scientific and Technical Services

- 2011 exports (\$million, 2008): \$4.20
- Annual average growth rate, 2001 to 2011: 2%

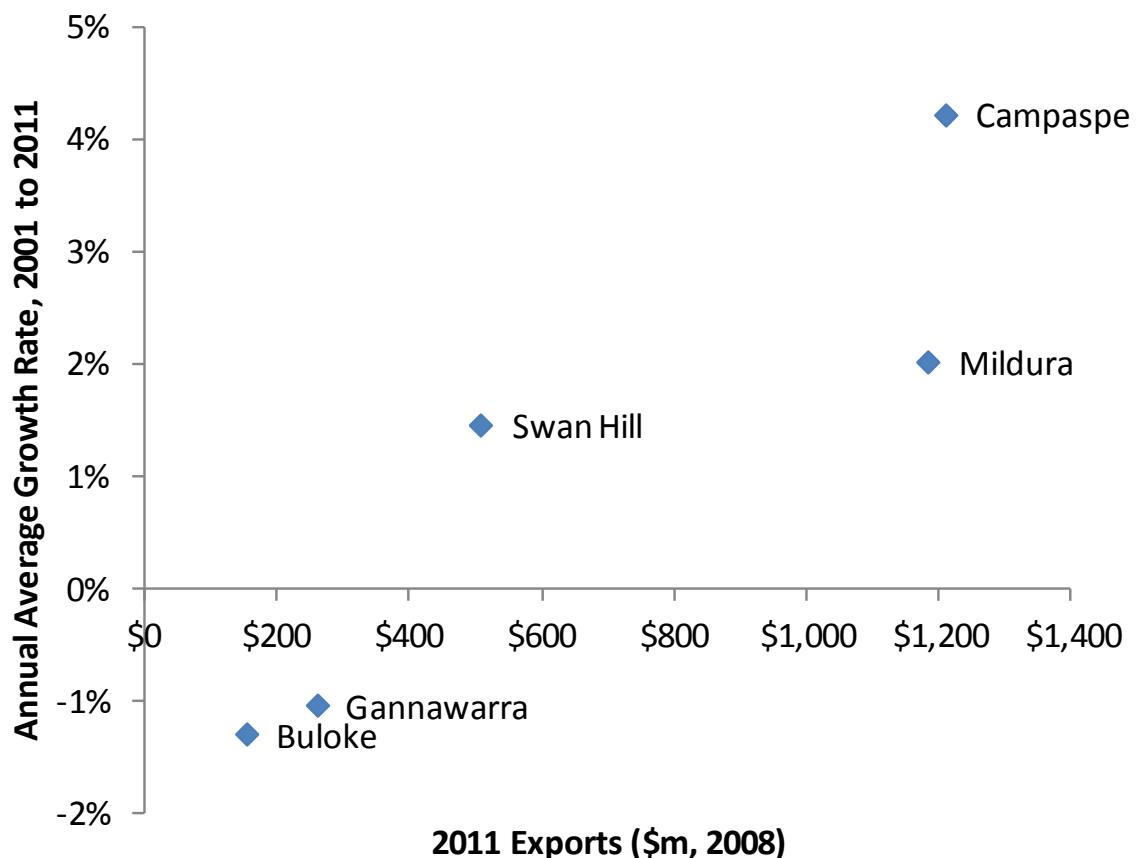
Public Administration and Safety

- 2011 exports (\$million, 2008): \$2.60
- Annual average growth rate, 2001 to 2011: 0%

Source: National Institute of Economic and Industry Research, 2012

In 2011, most of the region's exports came from Campaspe (37 per cent) and Mildura (36 per cent) (Figure 6).

Figure 6: Local Government Area exports, 2011 and annual average growth rate, 2001 to 2011



Source: National Institute of Economic and Industry Research, 2012

Agriculture was the major export for Buloke, Gannawarra and Swan Hill while manufacturing was the major export sector for Campaspe and Mildura.

Implications for the plan

- The plan will facilitate opportunities to diversify the economy to enable provision of local jobs, and alignment of employment growth and population growth.
- The drivers of employment growth are expected to be an abundance of mineral sands processing, new opportunities in the renewable energy sector, as well as construction, transport and tourism.

These industries will need to be supported, and land use planning must consider the needs of the future workforce in terms of access to appropriate education and training facilities, housing, and associated services and amenities to attract and retain workers and their families.

4.2 Water policy

Since the early 1990s, water policy has undergone significant reform including separation of water entitlements from the land, introduction of permanent and temporary water trading and the Australian Government buyback of water entitlements. Further reform is proposed under the Murray-Darling Basin Plan. Water trade resulted in significant movement of water downstream of the Goulburn-Murray Irrigation District to new horticultural developments in Sunraysia, such as at Robinvale, and the federal buyback reduced the total volume of water available for irrigation.

Irrigation areas in Gannawarra and Campaspe were particularly impacted by this water movement and now have a significantly reduced intensity of irrigation in many years. Some years are still seeing extensive irrigation, depending on water availability and other conditions. For example the current irrigation season has seen Goulburn-Murray Water deliver the highest volume of water in over a decade.

The Murray-Darling Basin Plan sets a target sustainable diversion limit of 2750 gigalitres less than current diversions in the rivers across the basin to be achieved by 2019 to provide additional water for the environment³. For the Victorian irrigation districts within the Murray Darling Basin this will result in a reduction in water usage for irrigation by around 200 gigalitres. The target is to be achieved through a combination of works, measures and buyback. The net result of water policy changes since the 1990s, including the Basin Plan, will be that irrigation water usage in the Victorian irrigation districts within the Murray Darling Basin will be reduced by around one third.

Major irrigation infrastructure renewal and modernisation is currently underway across the Goulburn-Murray Irrigation District (through the Goulburn-Murray Water Connections Program) and a business case is being developed for the Sunraysia Irrigation Modernisation Project. These works will reduce losses and generate water savings for consumptive and environmental use, as well as improving irrigation efficiency on farms. The net result of these projects will be a reduction in water available for irrigation and the area of land permanently irrigated, but a more reliable water supply for properties connected to the system.

As the transition is occurring, innovative farming practices are emerging across the irrigation districts, including property amalgamation, restructuring of water management on farm, and properties containing a mixture of intensively irrigated and opportunistically irrigated (occasionally dry land farming) areas. This investment will bring significant opportunities for farmers.

Domestic and stock water use continues to be an 'as of right' use if used for the purposes defined in the *Water Act 1989*, however in 2009 the state government introduced policies to improve the management of such uses. Some of these measures aim to monitor interception activities and ultimately reduce the impact of small catchment dams on overall water availability. Domestic and stock use could undermine the reliability of supply for all water users, particularly as in dryer conditions these dams intercept a greater percentage of rainfall.

There are significant groundwater resources in the Loddon Mallee North region which will help to secure the region's ongoing success.

Implications for the plan

- The significant investments in irrigation infrastructure need to be protected from inappropriate development on or nearby the system. Planning for future urban growth areas needs to have regard for the location of strategic and significant agricultural and industrial land.

³ Basin Plan 2012, p41

- The plan considers opportunities for enabling and supporting land use changes that relate to structural adjustment in agricultural industries and other rural industries as a result of changes in water availability and distribution.
- Water supply throughout the region will have a strong influence on the type of industries that can operate in both rural and urban areas, and on the sustainability of settlements into the future. Water supply to rural areas is changing as part of water reform across the state, which should provide a more secure water future for the region for the next 30 years and beyond.
- Consultation during development of the plan noted the importance of having a secure and high quality water supply to support the economy of the region, in particular intensive industries.
- The plan considers the importance of land use planning support for transitional land uses and the process for determining an appropriate future for them.
- Planning needs to protect the investment in irrigation through appropriate land uses within and adjacent to the irrigation areas.

4.3 Emerging industries and opportunities

Regional Development Victoria identifies and defines propulsive industries as those which have potential import replacement opportunities, projected employment growth opportunities and contributions to the regional economy. Those industries in the Loddon Mallee North region are: Manufacturing; Agriculture, Fishing and Forestry; Retail, Accommodation and Food Services; Construction; Wholesale Trade; Healthcare and Social Assistance; and Education and Training.

There are opportunities to further develop the tourism industry within the Loddon Mallee North region, particularly around its rich natural and cultural environments. The region is broadening its tourism product offerings in emerging market segments such as food, cultural heritage, nature-based and eco-tourism experiences. This could be of major benefit to the region given its natural and cultural heritage assets. However, tourism developments and activities need to be managed so that natural and cultural heritage values are respected. Land use planning can assist with identification and protection of values so that tourism activities are sustainable and provide longer-term economic benefits to the region.

The agricultural industry has the potential to adapt and grow based on the many competitive advantages of the region, including magnitude of scale, modernised irrigation, good soils and climate.

Honey production is a growing industry in the region, with 6000 permanent bee hives in the Mildura district, and between 60,000 and 70,000 hives brought in seasonally. The region produces 1000 tonnes of honey which accounts for 3.2 per cent of Australia's honey production (Department of Primary Industries, 2012).

Mineral sands mining and sand and stone extraction will continue to expand in the region, with exploration under way and flow-on impacts for economic growth from associated infrastructure and logistics requirements. Transport is critical to the development of new mining ventures across the Murray basin region. Studies are currently under way to identify the future freight demand and infrastructure needs in the Murray basin, including for mineral sands. The results of these studies will assist in planning for land use responses to changing needs. Land use responses for mining activities include identification of freight precincts, protection of important freight networks and ensuring that other significant assets are identified so as to avoid conflicts that could reduce future prosperity.

Other niche industries in the region with the potential for growth are aquaculture, salt bush-fed lamb, date palms, pomegranates, pheasants, salt harvesting and powdered health products from wheat and barley grass.

Buloke Shire has been identified as particularly well suited for further expansion of intensive animal industries due to a number of characteristics. These include sufficient existing infrastructure (including water supply), low population density, proximity to established feed mills and meat processing facilities, and proximity to key transport routes.

Land supply

Industrial land supply within the region is largely adequate or can be addressed through infill. Some locations within the region will need an increase in industrial land supply into the future.

Implications for the plan

- The plan considers the implications of the need to identify adequate industrial land to accommodate projected economic growth to support innovation and emerging industries.
- In order to support new and expanding industries it is important to ensure there is a range of appropriately zoned and located land to suit a variety of requirements.

4.4 Opportunities for change in rural land use

4.4.1 Changes in water supply

As the irrigation region adjusts to its new mosaic of intensive and opportunistically irrigated farming practices, other opportunities are emerging. However, the rate of change may be too rapid for markets and people to respond without the necessary tools, programs and mechanisms to assist with the change. Land use change is inevitable in the region, however without appropriate intervention the change will be ad hoc and slow, with potentially unintended consequences such as reduced productivity, environmental impacts and population loss.

The key challenge within the region is to manage the change rather than just relying on the market to respond to it. Land use planning can anticipate such changes and assist in the transition where possible to support other programs and mechanisms that may be put in place to assist farmers with the quick change necessary.

4.4.2 Land management risks

There are a range of land management activities common in rural Victoria, with much of the rural land use dedicated to agricultural production. To ensure the agricultural sector is appropriately managing the landscape, including catchments and potable water supplies, farmers are increasingly required to adhere to a range of regulatory requirements, especially as production systems intensify. At the same time, agricultural industries are developing their own codes of practice and best management guidelines in order to continually improve the manner in which agriculture is practiced.

Land management continues to adapt and change to increase profitability and productivity, to encourage the uptake of emerging and new technologies and information, and to encourage intensification and innovation of farming. At the same time the region is facing significant challenges and opportunities from growth and diversification of farming systems and geographic changes to industry to mitigate risk. The diversification into additional value-adding systems is also prominent across many regions.

There are numerous existing and emerging opportunities for clusters of intensive agricultural production in the Loddon Mallee North region such as piggeries. Clusters of intensive industries provide opportunities to maximise infrastructure efficiencies and minimise impacts on surrounding land through shared buffers. The potential impacts and risks can be intensified as a result of clustering. Therefore consideration must be given to the appropriate siting of clusters away from sensitive land uses or significant assets.

Implications for the plan

- Continued management of land is important to ensure the interface between the urban and rural settlements is well defined so that the settlement future of the region is clear. The siting, form and management of future urban and rural living settlement growth should consider the impacts on existing, and potential future, industries and environmental assets in both planning and implementation.

- Given the constraints and opportunities for the use of rural land in the region, future planning should seek to enable primary producers to respond to rural change and adjustment and facilitate productivity growth.
- Identifying areas for intensive animal industries, or other rural areas of high strategic significance, should consider areas less likely to be encroached by residential areas, especially for high noise and odour-producing activities, such as piggeries.
- In some areas, councils are considering precinct structure planning to effectively enable bolstering of clusters of important intensive industries in their area. These plans would incorporate the land needed to buffer these industries from surrounding sensitive land uses. This may be helped by the findings of the Loddon Mallee North Rural Assets Study which was prepared to inform the development of this plan.

4.5 Resources

4.5.1 Energy

Growth of the renewable energy sector will create new industries across the state that will stimulate local economies and generate thousands of skilled jobs. The main sources of renewable energy that could be harnessed to create electricity in the Loddon Mallee North region are solar and geothermal energy, as shown on Figure 7. This growth in renewable energy provides the region with a competitive advantage in attracting business due to the opportunities for a reduced carbon footprint.

Geothermal has the potential to provide a significant portion of base load energy, although exploration of potential locations is very expensive and access to information about Victoria's geothermal resources is limited. Some opportunities for geothermal power have been identified for the region.

Organic matter, or biomass, can be converted into bioenergy (heat, electricity and biofuels) using a variety of technologies. Bioenergy generators tend to be small-scale and are best suited for local applications such as municipal waste facilities or for on-farm activities. These could be considered as a potential option within the region for protecting power supplies or providing backup power in periods of high demand. Mallee eucalypts have been found to be a good source of energy for biofuels which could generate industry opportunities within the Loddon Mallee North region.

Solar

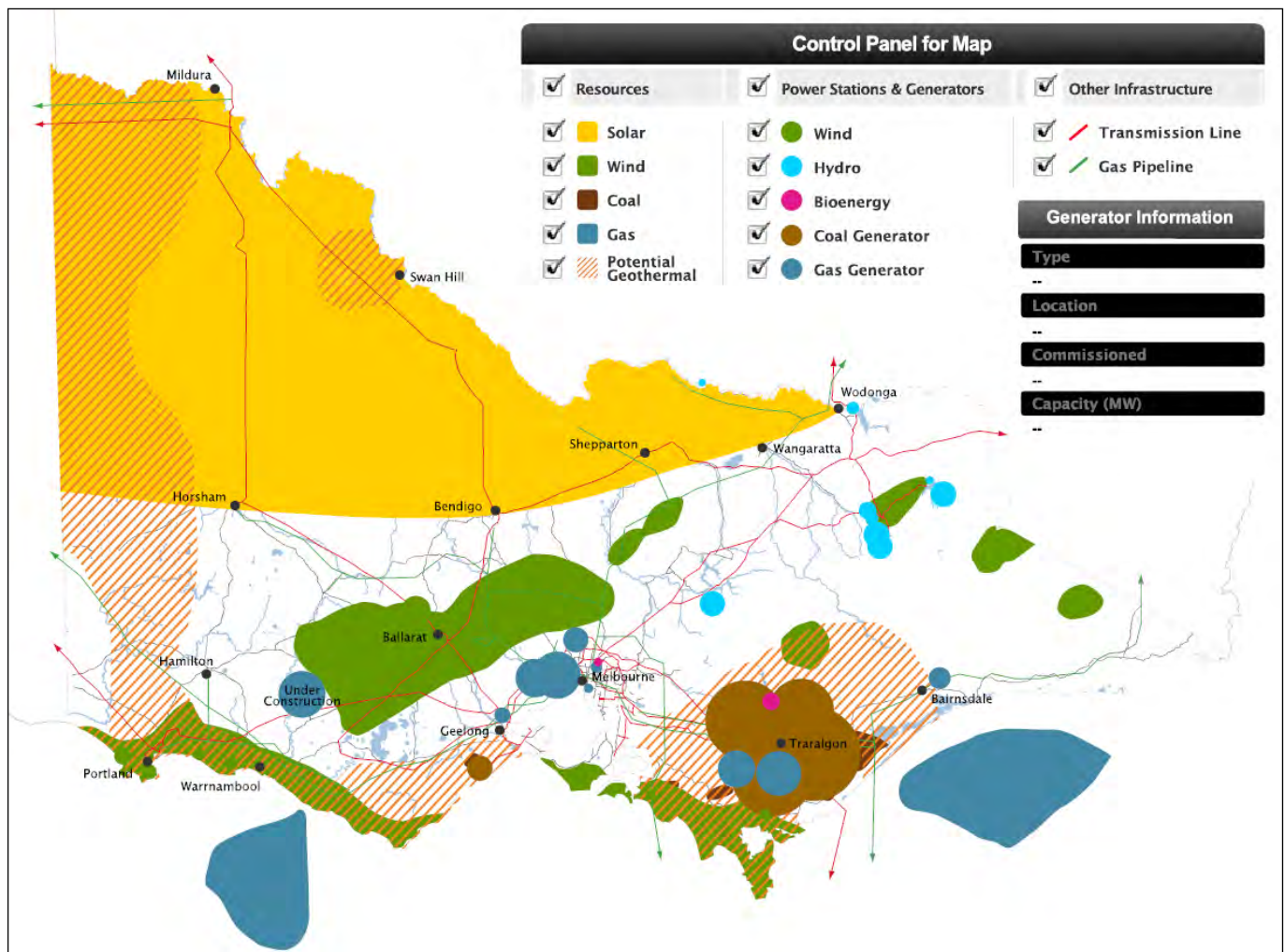
The region's climate and hours of sunshine give it a positive advantage for securing solar and other renewable energy projects. There are a range of opportunities for solar generation of electricity, such as on roofs of large commercial buildings, hospitals, schools, and commercial scale 'solar farms' selling power to the grid. Mildura is positioning itself to be the centre of Australia's solar industry.

There are two key solar projects underway in the region, both near Mildura:

- the Silex/Solar Systems 100 megawatt technology concentrated solar photovoltaic technology demonstration
- the TRUenergy 180 megawatt commercial solar project in Mildura. The Mallee Solar Park proposes to generate 330 gigawatt hours of emissions free electricity per annum catering for over 60,000 households.

Funding and planning approval has been secured for another solar power project further south near Kerang. This 30 megawatt solar project is expected to provide enough energy to power over 14,000 homes as well as employment opportunities and economic benefits to the region.

Figure 7: Renewable energy resource potential in Victoria



Source: Department of Primary Industries, 2011

4.5.2 Mining

Extractive industries

Extractive industries have an important role to play in the region, which is home to significant sand and stone resources, and other earth resources including mineral sands, salt and gypsum. Extractive industry interest areas occur within some areas of Victoria, however are yet to be identified in the Loddon Mallee North region. Such areas are based on suitable geological occurrence of resources and also take into account existing local government planning schemes. They are intended to provide a guide to local government in developing future planning policy.

In May 2012, the Economic Development and Infrastructure Committee of the Parliament of Victoria tabled the results of its inquiry into the benefits and drivers of, and possible barriers to, greenfields⁴ mineral exploration and project developments in Victoria. The Victorian Government's response to the inquiry was released in May 2013, supporting all recommendations. Key aspects of the response include:

- establish Minerals Development Victoria as a single point of entry for investors dealing with Government on their projects
- actions to reduce regulatory burden imposed in legislation

⁴ Greenfields sites are those areas without known mineral deposits.

- actions to build community confidence through greater engagement and clearer communication of information
- additional funding for geosciences research and greater investment attraction
- steps to improve mechanisms to maintain appropriate access to extractive resources while supporting ongoing development and optimum land use.

While it is important to acknowledge these and other aspects of the response, it is beyond the scope of the regional growth plans to deal with the majority of the commitments and they will need to be addressed through other suitable government initiatives. The response did include a commitment to incorporate existing extractive industry interest areas into regional growth plans. The plan recognises these areas accordingly.

Current minerals and extractive industry activities and other potential resources that occur within the region are shown in Figure 8.

Mineral sands

In Victoria, the Murray basin contains more than 60 million tonnes of coarse-grained mineral sand deposits and more than 200 million tonnes of fine-grained deposits. These have the potential to support several long-life mining operations and projects. Many of these projects occur within the Loddon Mallee North region, including the Iluka Resources Ltd Murray Basin Stage 2 projects (near Ouyen and Manangatang). Some mines' operational timelines are shorter; this has implications for settlement planning as it impacts on transport infrastructure and places uneven pressure on settlements (boom cycle). The Iluka enterprise employs approximately 180 people at the Ouyen operations, 40 per cent of whom come from within 100 kilometres of the site. They currently provide staff accommodation for up to 185 people at a workers camp in Ouyen.

Thirty trucks per day, each carrying 50 tonnes of mineral sands, travel to Hopetoun for loading onto the rail network to Hamilton and then to Portland for processing and distribution. This operation is anticipated to be finalised by 2015, although further exploration in the region continues. There are also large, fine-grained, sheet-like heavy mineral sand deposits around the south-eastern margin of the Murray basin. While many similar deposits have been found throughout the Murray basin, their fine-grain size limits their commercial viability. However Astron Ltd's investment in significant mineral sands operations near Donald shows that advances in processing technology are making fine-grained deposits more attractive.

Salt

Lake Tyrell is Victoria's largest saltwater lake and is home to a salt extraction plant, which processes salt deposits that remain after the saltwater evaporates in warmer months. It is one of a number of salt processing plants across the region, extracting salt for both consumptive and industrial uses. Other sites extracting salt from wetlands occur through the Kerang Lakes area. Salt extraction and processing facilities are also located at Hattah to extract salt from underground saline aquifers.

Salt also provides challenges for rural land uses across the region. These are discussed in the natural hazards and risks section (5.3) of this background report.

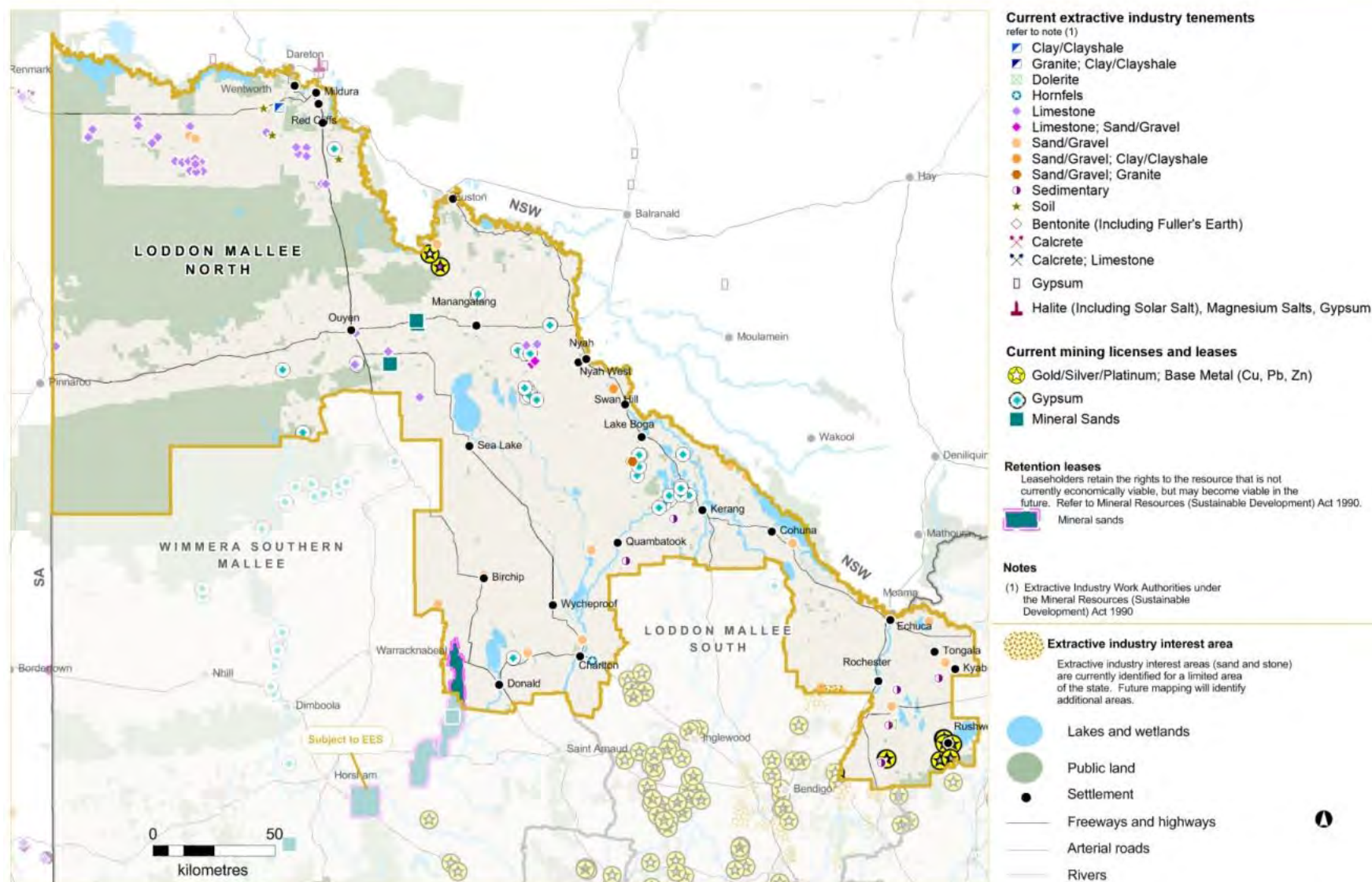
Implications for the plan

- Mineral sands mining, and any extractive or heavy industry in the region, has implications for road and rail infrastructure across the region as heavy loads can cause significant road maintenance costs for councils and state government.
- Key transport links to the Port of Portland need to be maintained and enhanced for efficient access to export markets.
- The plan considers how land use planning could facilitate opportunities to harness the economic benefits of new technology and innovation at the local level.

- Erratic or cyclical demand for housing in some towns can cause difficulties in assessing housing, and service needs.
- Sites for potential future extractive industry may require recognition in the planning scheme through zoning or overlays to avoid land use conflict with incompatible uses and protect the economic benefits to the community.
- Industry and economic development opportunities within close proximity to Loddon Mallee North towns should be considered in future land use planning as there are potential flow-on implications for infrastructure and service delivery needs. There are also potential benefits such as employment and attracting new workers to regional towns.

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Figure 8: Mining and extractive industries, tenements and licences



Source: Department of Environment and Primary Industries

5. Environment and heritage

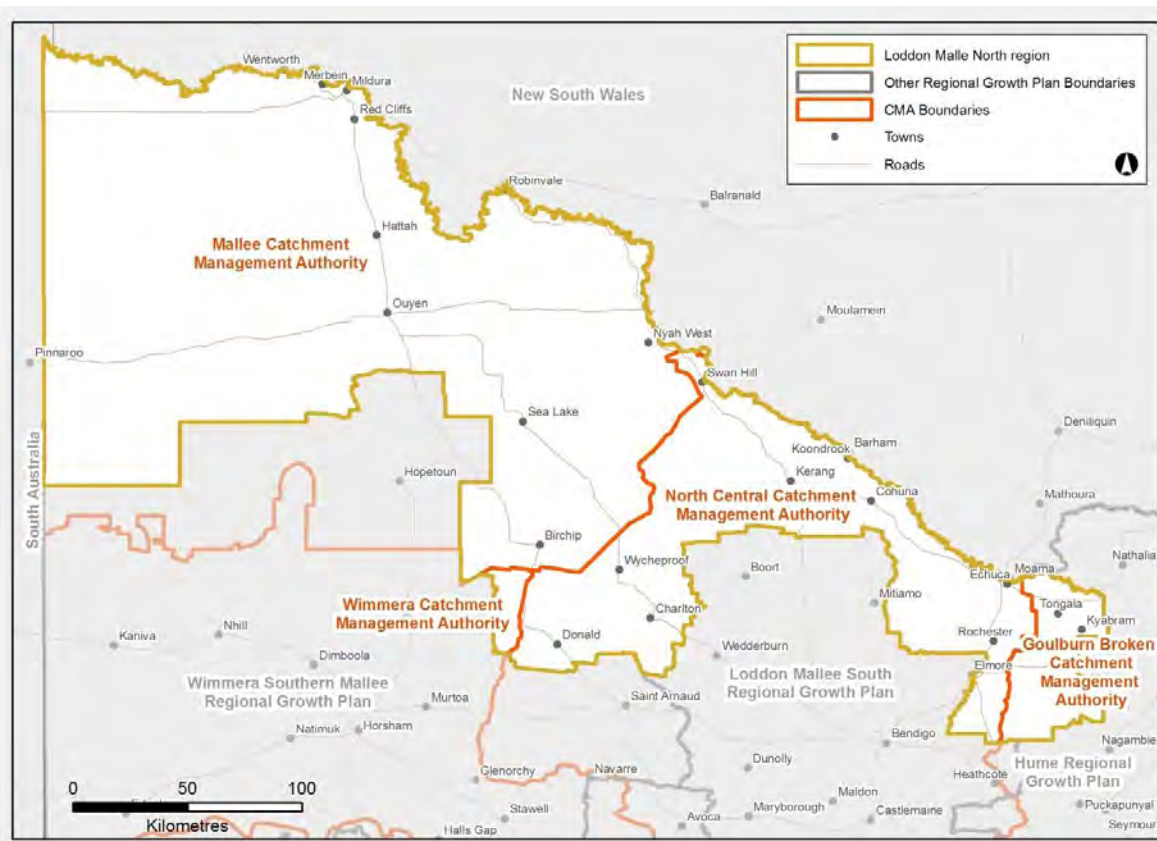
Loddon Mallee North has a diverse landscape, reflected in its history. The region spans dry Mallee scrub and desert national parks, fertile floodplains along the Avoca and Murray rivers, impressive forests of River Red Gum, Black Box and Ironbark, and a network of significant waterways and wetlands. These landscapes have both natural and cultural values.

Environment and heritage assets are often co-located in the landscape, with many Aboriginal and historic sites located in close association with waterways, wetlands, forested areas and public land. Many environmental assets overlap within the landscape and interact across the landscape. For example, rivers run through forested areas and agricultural areas, and are impacted upon by the land use activities on the land they run through. These rivers carry water downstream to wetlands, other rivers and in most cases eventually to marine environments, which can in turn affect those environmental assets. This background report discusses cultural heritage and different types of environmental assets separately to highlight their values to the region and the considerations for planning associated with those assets. The plan integrates these considerations in its future directions and strategies.

The region covers parts of four catchment management authority areas, predominantly the Mallee and North Central catchment management authorities, with small areas of the Goulburn Broken and Wimmera catchment management authorities (refer to Figure 9). Land use planning needs to be aware of, and take into consideration the environment and heritage assets in regional and local planning.

Regional catchment strategies and their sub-strategies, such as regional waterway strategies, identify priorities for investment in protecting and enhancing high value environmental assets. Each catchment management authority uses different methods to identify their high value environmental assets. The regional growth plans across the state use a consistent approach to mapping environmental assets. These assets align with those identified by catchment management authorities, though they may be mapped to a different scale.

Figure 9: Catchment management authority and regional growth plan boundaries



Source: Department of Transport, Planning and Local Infrastructure

5.1 Cultural heritage

The Loddon Mallee North region has a rich and diverse representation of heritage values and places of both Aboriginal and historic significance (post European settlement). Close to 4000 Aboriginal places of cultural significance have been identified in the region. Many significant cultural heritage assets have been identified by the Office of Aboriginal Affairs Victoria and Heritage Victoria and are listed and mapped in Figure 10. It is acknowledged this list is not exhaustive and many other heritage places and landscapes occur throughout the region.

There are also many historic heritage places associated with the massive irrigation scheme expansion of the 20th century and Murray River trading ports of the 19th century, including the many locks and weirs, Echuca Wharf and the paddle steamers. Mildura's irrigation settlement was established in 1886 by George Chaffey, and the post war influx of migrants and soldier settlers lead to a rich and diverse population bringing many skills and techniques to cultivate the region and develop its agriculture-based economy. Irrigation infrastructure around Kerang also developed from the 1880's and was expanded following the construction of Torumbarry Weir in 1923.

Development of the plan has highlighted opportunities to increase nature-based tourism, including linking this to cultural heritage tourism. Opportunities include highlighting the regional heritage assets and how these could be better linked with other significant well-known cultural heritage assets in southern New South Wales, such as Mungo National Park.

Cultural heritage is protected by the *Aboriginal Heritage Act 2006* and the *Heritage Act 1995*. The *Planning and Environment Act 1987* requires that state and local government planning take cultural heritage and its management into account. Cultural heritage places are often fragile and non-renewable but they are dynamic.

Implications for the plan

- In planning for growth and future land use, policy decision-making needs to recognise that cultural heritage is an asset in economic and social terms.
- Many tourists seek heritage and nature-based tourism experiences. Cultural heritage attractions and services contribute to regional economies and employment.
- A challenge is that the heritage values in the region are often expressed at a landscape scale, rather than a specific place, given the intrinsic link between the landscapes and the region's history.
- Land use planning needs to consider the environmental or cultural significance of a place or landscape.
- Opportunities to develop cultural and ecotourism opportunities throughout the region should be supported through appropriate continued strategic land use planning.

5.1.1 Cultural and significant landscapes

Landscapes may be deemed significant for a combination of historic, aesthetic, scientific, religious and social reasons, and where these landscapes are deemed integral to the amenity of the area.

Many areas of Victoria have had broad-ranging landscape assessment studies undertaken such as the Coastal Spaces (Department of Sustainability and Environment, 2006) and South West Victoria landscape assessment studies (Department of Transport, Planning and Local Infrastructure, 2012). These studies identify significant landscapes, determine their relative significance (for example, national, state, regional, local significance) and consider using policies, other custodianship initiatives and guidance in local planning schemes to protect and manage these landscapes into the future.

Many areas of the Loddon Mallee North region are well-known for their landscape character, including the Kerang Lakes, the Murray River and its extensive River Red Gum forests and wetland complexes, the expansive cropping country, and the rolling Mallee landscape.

Many of the areas of high landscape value are also under pressure for increased rural residential development, particularly along the Murray River and around many lakes. These landscapes are also crucial for maintaining the region's tourism potential.

The Significant Landscape Overlay aims to denote significant landscapes and to conserve and enhance their character. It could also be used where other overlays, such as the Heritage Overlay or Environmental Significance Overlay, do not readily fit with the scale or nature of the particular values. No local council in the region currently uses the Significant Landscape Overlay to recognise and/or protect landscape values of the region.

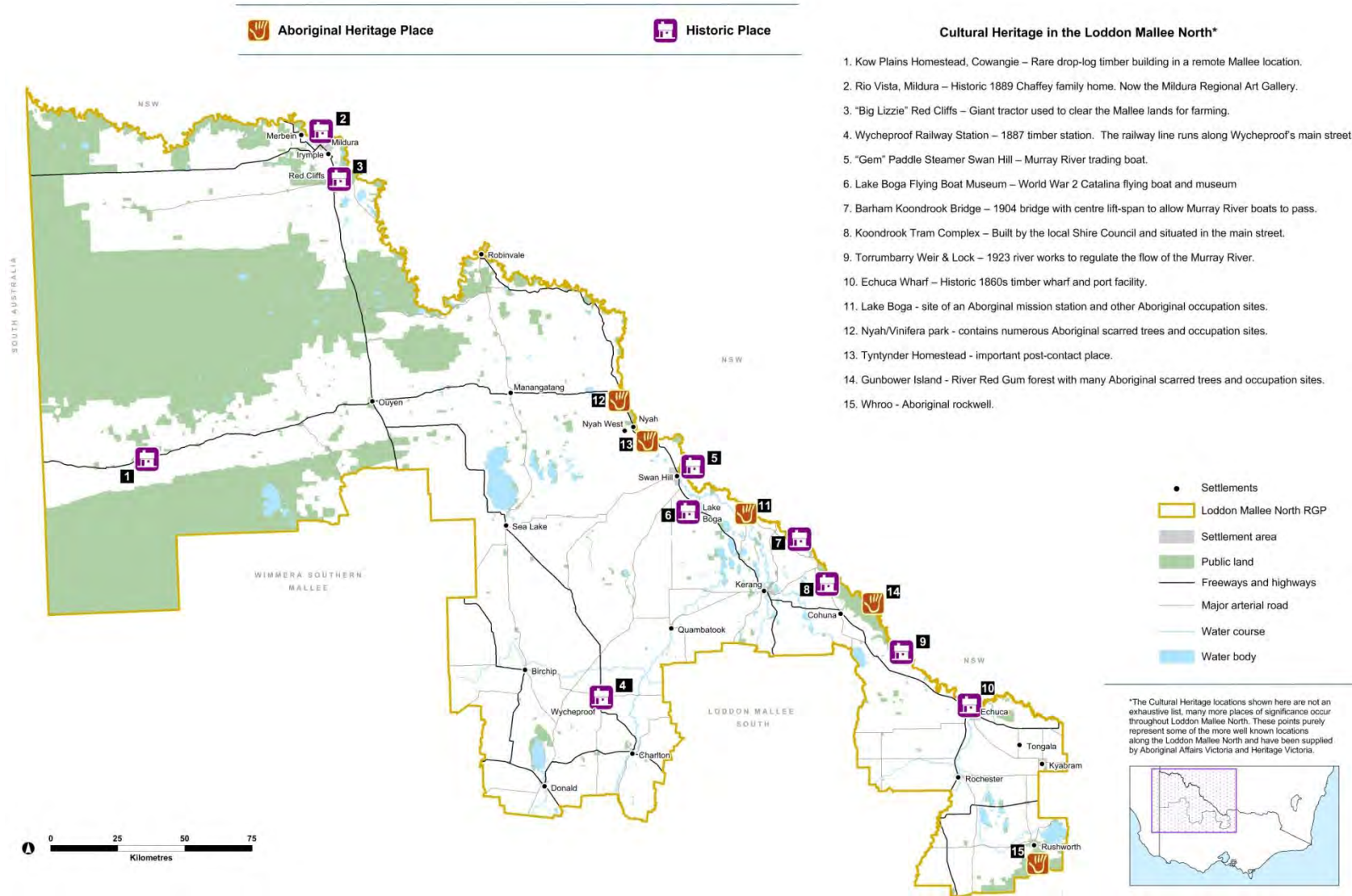
Heritage Victoria has guidelines for assessing significant cultural landscapes that could be utilised to augment the approaches that have been utilised in other areas of Victoria to build cultural heritage values into any significant landscape assessments that occur in the Loddon Mallee North region. This would be beneficial given the close links between the cultural heritage and environmental assets within the region.

Implications for the plan

- Development pressures within some highly valued landscapes need to be carefully managed so they do not detract from the landscape values that have attracted people to these areas, along with other assets in these same areas, such as water supply catchments, public land and terrestrial habitat.
- Consultation during the development of the plan highlighted the need to recognise the multiple values provided to the region from its natural and rural landscapes and the need to encourage economic activities that sustainably use the region's natural resources and assets on rural land.
- There is the opportunity to identify and protect significant landscapes across the Loddon Mallee North region in a consistent way. This could help protect the environmental credentials of the region as well as enhance the tourism future of the region. These significant landscapes could also help with strategic planning of appropriate locations for rural residential development.
- Overlays and policies could be updated in a regionally consistent way, especially in relation to regionally significant assets, to enable coordinated and aligned protection of these assets.

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Figure 10: Cultural heritage assets



Source: Office of Aboriginal Affairs and Heritage Victoria

5.2 Environmental assets

5.2.1 Terrestrial habitat

Native vegetation and habitats (terrestrial habitat) are important as they provide a range of environmental values that underpin the health of land and water, flora and fauna, and natural communities, such as filtering nutrients, habitat regeneration, and climate regulation. Terrestrial habitats help provide clean water, carbon sequestration, timber, firewood and healthy soils as well as providing habitat for flora and fauna. They also provide important spiritual and aesthetic values at various scales and are a key to many of the tourism values in the region.

Loss of habitat extent and quality through clearing of native vegetation, or from other threatening processes for urban and rural purposes has been, and continues to be, a significant threat to native vegetation and habitats across Victoria.

The catchment management authorities in the region have identified the highest value native vegetation and habitat assets within each of their boundaries. Each catchment management authority has used a different method to identify their highest value native vegetation and habitat.

For consistency across the regional growth plans, the Department of Transport, Planning and Local Infrastructure (in agreement with the Department of Environment and Primary Industries) has used the highest three levels of the former Department of Sustainability and Environment's NaturePrint v2.0⁵ mapping to identify significant clusters of vegetation across the state (Figure 11). These align very closely to the terrestrial habitat assets identified by the catchment management authorities; the North Central Catchment Management Authority's priority areas are shown in Figure 11 as an example of this. The areas identified through NaturePrint include considerable areas of grassland, River Red Gum, Black Box and Mallee communities.

There are numerous individual plant and animal threatened species found in the region, although they are too many and their locations too specific to be considered and mapped at the scale of a regional growth plan. The general distribution of threatened plant and animal communities is sufficiently captured by NaturePrint for regional-scale planning. However, finer scale planning, including precinct structure plans or individual planning assessments should always consider threatened species and communities appropriately.

Implications for the plan

- Natural resource management activities within the region include actions to protect high value habitat assets in the region, along with waterway, wetland and soil assets. These activities will involve actions on both public and private land and are likely to use agreements and tailored land management plans with relevant land owners. Natural resource management activities in the region will also include actions to increase the vegetation within the region by creating large scale vegetation corridors in strategic areas. The preferred locations for these corridors may overlap with areas that experience a future change in land use or a change in industry.
- There are emerging economic opportunities on private land centred on environmental values, such as in carbon markets, payments for ecosystem services⁶, and offset markets. There is the opportunity to coordinate planning of the preferred locations of these and other native vegetation planting activities to maximise the benefits gained from them. It is not likely that local government or the Department of Transport, Planning and Local Infrastructure will lead many of these activities, but there are

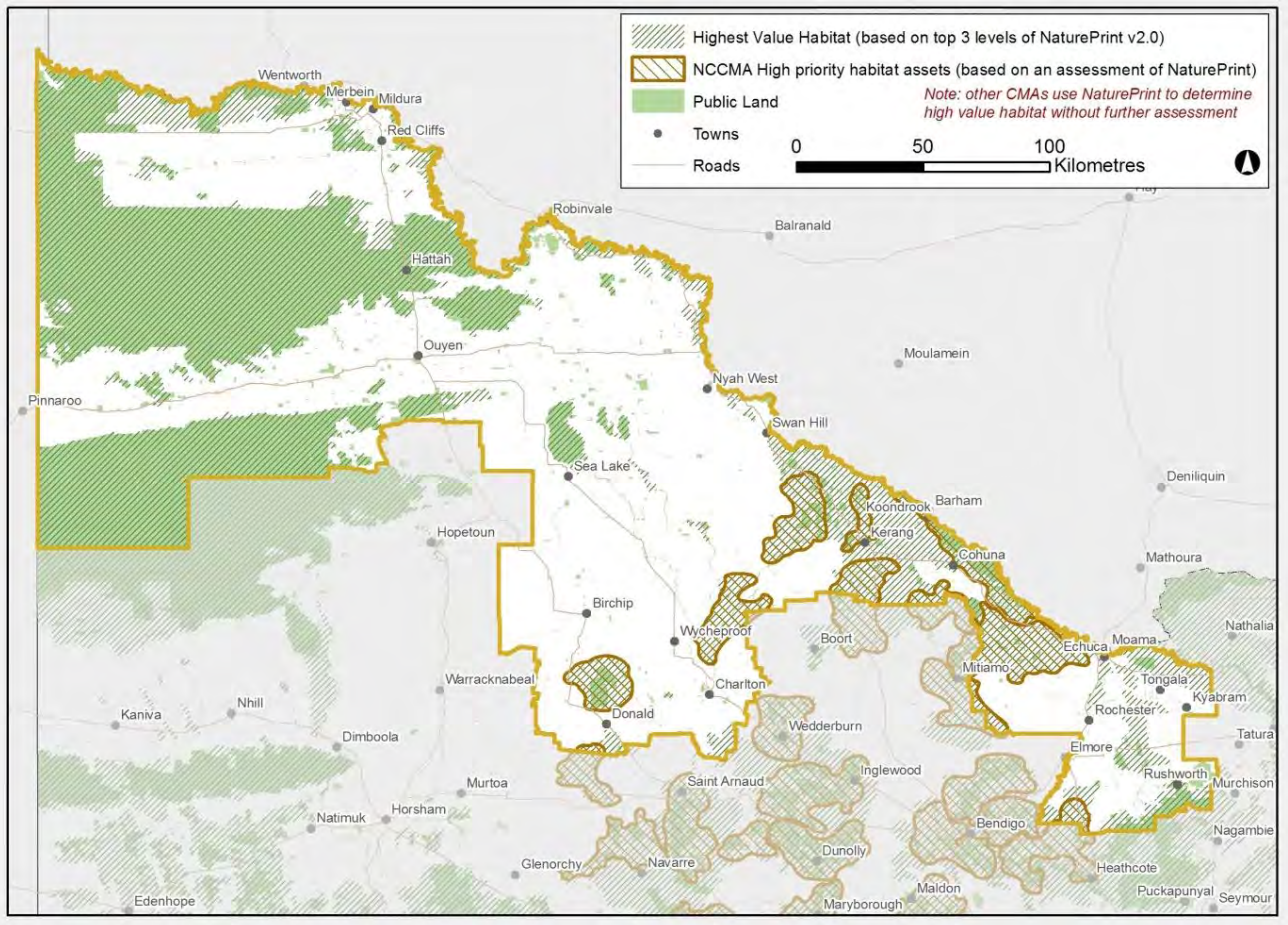
⁵ NaturePrint v2.0 conveys information on relative habitat value for all areas in Victoria (excluding marine), not just those with native vegetation. In its most commonly used form, NaturePrint is illustrated as a map showing relative habitat value (Strategic Natural Values map) showing areas that most contribute to biodiversity conservation. Further information on NaturePrint can be found at <http://www.dse.vic.gov.au/conservation-and-environment/biodiversity/natureprint>

⁶ Providing ecosystem services through market based approaches (including competitive tenders such as EcoTender and BushTender), can provide farmers with income for undertaking environmental works that conserve and enhance the environment.

benefits of having them as part of consultation in planning for their preferred locations to target natural resource management initiatives.

- Careful consideration will need to be given to the preferred locations of vegetation corridors in light of the strategic directions of regional growth plans. This includes considering the balance of values and natural hazards that may change as a result of these corridors being established (for example, increasing bushfire or flood risk). Strategically locating such activities could also provide flow-on economic benefits to the region, such as by improving the visual amenity of tourism routes.
- Planning tools such as environment significance overlays and vegetation protection overlays are used across the region to identify areas where the development of land may be affected by environmental constraints, to protect environmental values such as significant native vegetation and to ensure development is compatible with identified environmental values.
- Overlays and policies may need updating as new information emerges across the region, especially in relation to regionally significant assets. There would be benefits to applying these updates in a regionally consistent way.

Figure 11: Native vegetation and habitat assets



Source: Department of Transport, Planning and Local Infrastructure

5.2.2 Waterways (rivers, lakes and wetlands)

The Loddon Mallee North region contains most of the significant northern floodplains in Victoria, covering parts of the Goulburn, Campaspe, Loddon, Avoca, Wimmera-Avon, Mallee and Millicent Coast river basins (Figure 12). The entire region is part of the Murray-Darling Basin and the Murray River is the region's northern boundary. Some of the region experiences large-scale flooding from these rivers, which can be highly disruptive to the community and the economy in both rural and urban areas.

There are numerous wetlands and wetland complexes throughout the region, most of which are part of the extensive floodplain and only fill periodically in flood events. Some are part of the irrigation system. There are

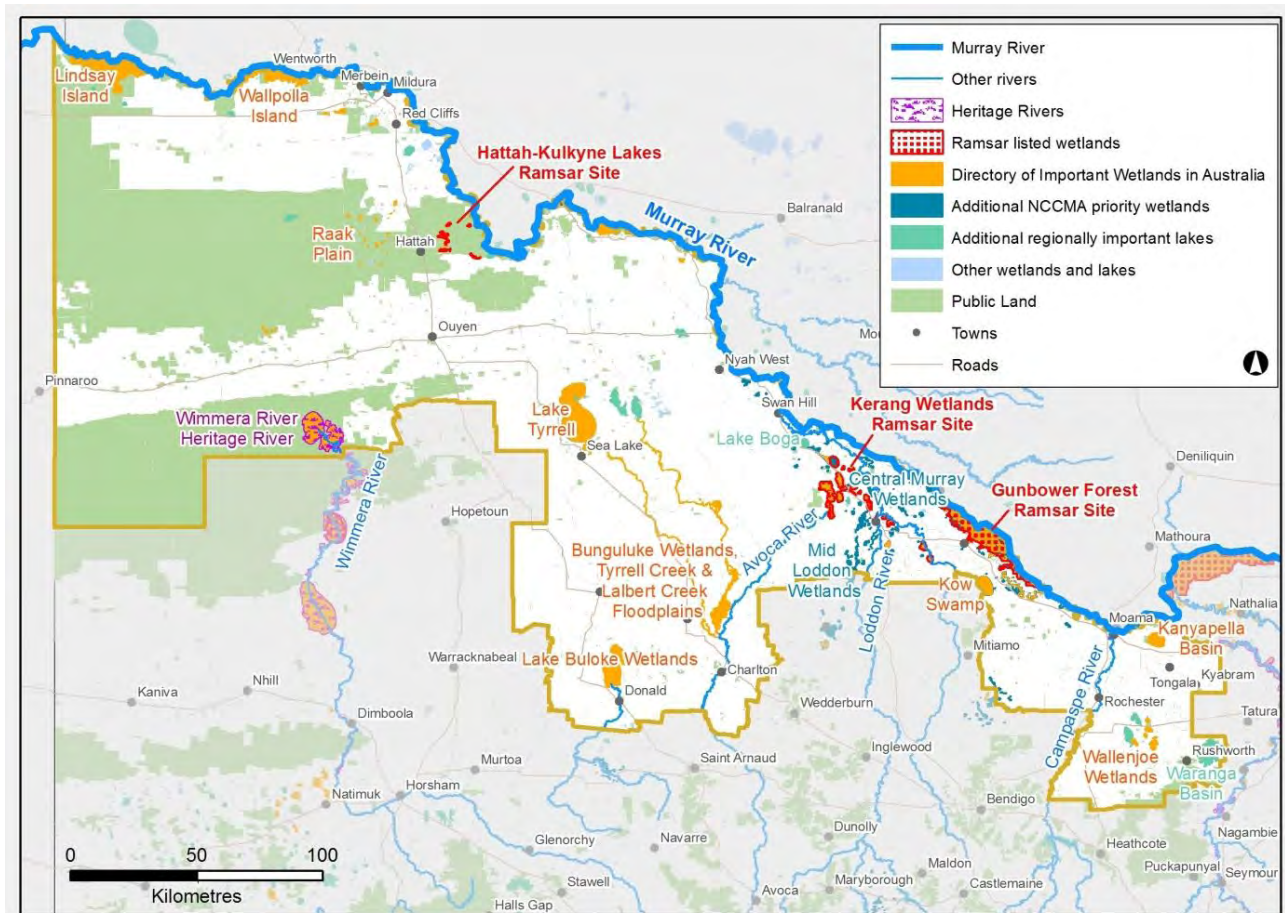
three internationally recognised wetland complexes in the region: Hattah-Kulkyne Lakes; Kerang Wetlands; and Gunbower Forest Ramsar sites.

There are numerous nationally important and protected wetlands, recognised on the Commonwealth's Directory of Important Wetlands in Australia (Refer to Figure 12). The North Central Catchment Management Authority has also identified regionally significant wetland complexes as part of developing its regional catchment strategy. The other catchment management authorities only identify nationally and internationally protected wetlands as their priorities. These are illustrated in Figure 12, where they are in addition to those already described. The small section of the Wimmera River in the region is listed as a Heritage River under Victoria's *Heritage Rivers Act 1992*⁷ and appears on Figure 12 as a nationally significant wetland as a result of this listing.

Waterways in Loddon Mallee North are critical to support the region's towns, industry and agriculture, as well as the environmental values within and adjacent to the rivers, wetlands and floodplains. Some of the wetlands in the region contain important cultural assets, while some lakes and rivers are important tourism assets such as the Kerang Lakes, Lake Tyrrell and the Murray River. The Murray River is a critical water supply source for the region for both people and industry, especially agriculture, as well as being a key part of the region's identity and its continued tourism value.

Irrigation infrastructure throughout the region is intricately linked to many rivers and lakes, with these waterways either acting as a water source, part of the through-flow of the system or as receiving outfall from the irrigation system.

Figure 12: Significant waterways of the region



Source: Department of Transport, Planning and Local Infrastructure

⁷ The Heritage Rivers Act 1992 makes provision for Victorian Heritage Rivers by providing for the protection of public land in certain parts of rivers and river catchment areas in Victoria which have significant nature conservation, recreation, scenic or cultural heritage attributes.

Implications for the plan

- Protecting and improving waterways in Victoria is a long-term goal of the Victorian Government. Management and improvement of waterway assets generally falls to catchment management authorities and/or public land managers, often in partnership with private landholders. Many natural resource management activities are aimed at improving the health of waterways. Much of this activity is focused on improving land management practices.
- Land use change can also significantly affect the values of waterways, either positively or negatively.
- There is potential for future residential development pressure around some lakes and along the Murray River in particular. Appropriate land use planning can help minimise threats to rivers and wetlands such as inappropriate catchment development, urban stormwater runoff, and reducing wetland connectivity. Such development would also need to consider exposure to natural hazards associated with these waterways, for example flood risk.
- Consultation during development of the plan highlighted the need to protect the environmental credentials of the region to safeguard the region's food and fibre production and export potential. Stakeholders identified a need to proactively and strategically plan for potential residential growth adjacent to the region's internationally and nationally significant lakes and wetlands.
- There are no declared water supply catchments in the region, although land use planning still needs to consider mechanisms to protect the quality and quantity of potable and irrigation water supplies.
- Some planning mechanisms, such as overlays, can be used to detail specific considerations around regionally and locally important waterway assets. This is of particular relevance for wetlands, given the prominence of wetlands on private land and the high occurrence of land forming activities which can remove shallow natural wetlands.

5.2.3 Soils

Soils in the Loddon Mallee North region vary depending on the geological and land formation history they have experienced. Each catchment management authority has described soil differently in its regional catchment strategy documents, with each clearly highlighting the productive values and key characteristics of local soils.

The region is well known for some of its soils, such as the striking red Mallee sands and dunes, the rich dark flat floodplain shrinking and swelling clays, and the distinctive wind blown lunettes fringing the wetlands throughout the region. The wide variety of soils within the region helps to determine the distribution of terrestrial habitats as well as supporting a diverse range of agricultural commodities, which will help to keep the region's agricultural future strong.

Healthy and productive soils are essential for the continued economic success of the region, particularly for agricultural enterprises, as well as to support other environmental assets. However, soil can also pose a risk to other environmental assets, which is discussed under soil health threats below.

A mismatch between land use (and management) and the inherent capability of the soils is often at the heart of soil issues. Land capability is a commonly used measure of the value of soil for agricultural production; however it is not the only indicator or driver of the productive capacity of land. Sometimes proximity or security of feed, roads, processors, power and water can be more important considerations. Not all agriculture requires good soil or water to be productive for agricultural purposes; therefore land capability should not be the only indicator of the potential of farmland. Soil capability, is among a number of considerations, in determining appropriate agricultural land uses in rural areas.

Soil, along with water, vegetation and fauna, is defined as an integral part of land under the *Catchment and Land Protection Act 1994*. Private landholders have primary day to day management responsibility for soil health on their properties and must take all reasonable steps to conserve soil and avoid doing anything that would cause or contribute to land degradation on someone else's land. Governments can play a role where

markets fail, or where an agreed target is to be achieved, to encourage the long term preservation of soils and the values and services they provide.

Implications for the plan

- Research is currently being done to identify regionally significant rural land based on a number of factors, including soil and land capability.
- Land use planning can identify high quality productive agricultural land and specify its protection for future agricultural production or protect it from inappropriate development.
- Land use planning can assist in the protection of the state's soil resource by promoting that land use change does not disturb soils to a level that could result in deterioration of the soil assets within each region, or further contribute to pollution of waterways in any significant volume. One example might be to apply the Erosion Management Overlay.
- Each of the catchment management authorities will be developing a regional soil health plan, as a result of the Department of Environment and Primary Industries' Soil Health Strategy. Land use considerations would be beneficial to those plans. Continued development of information to support decision-making such as regional soil plans and capability mapping will be important to enable growth in productive agriculture and settlements into the future.
- Soil health considerations, such as erosion and salinity are considered in the natural hazards and risks section.

5.2.4 Public land

There is an extensive network of public land reserves in the Loddon Mallee North region that protect numerous environmental, cultural heritage, economic and social assets and values. Approximately 40 per cent of the state's national park area is in the region. These values include conserving flora and fauna, protecting wetlands and rivers, providing water supply, providing timber for sustainable forestry, protecting landscape, archaeological and historic places, and providing recreational and educational opportunities. Public land in the region is shown in Figure 13.

Public land protects many of the significant environmental assets of the region, such as the significant River Red Gum forests along the Murray River, many of which are within the Gunbower National Park, Hattah-Kulkyne National Park and Chowilla Floodplain-Lindsay Walpolla Islands. Other key public land reserves include Murray-Sunset National Park, Wyperfeld National Park and Big Desert Wilderness Park. These public land assets, and their surrounding landscapes, bring in many visitors and significant income to the region. These areas are key to the tourism future of the region, as well as protecting the environmental assets of the region into the future.

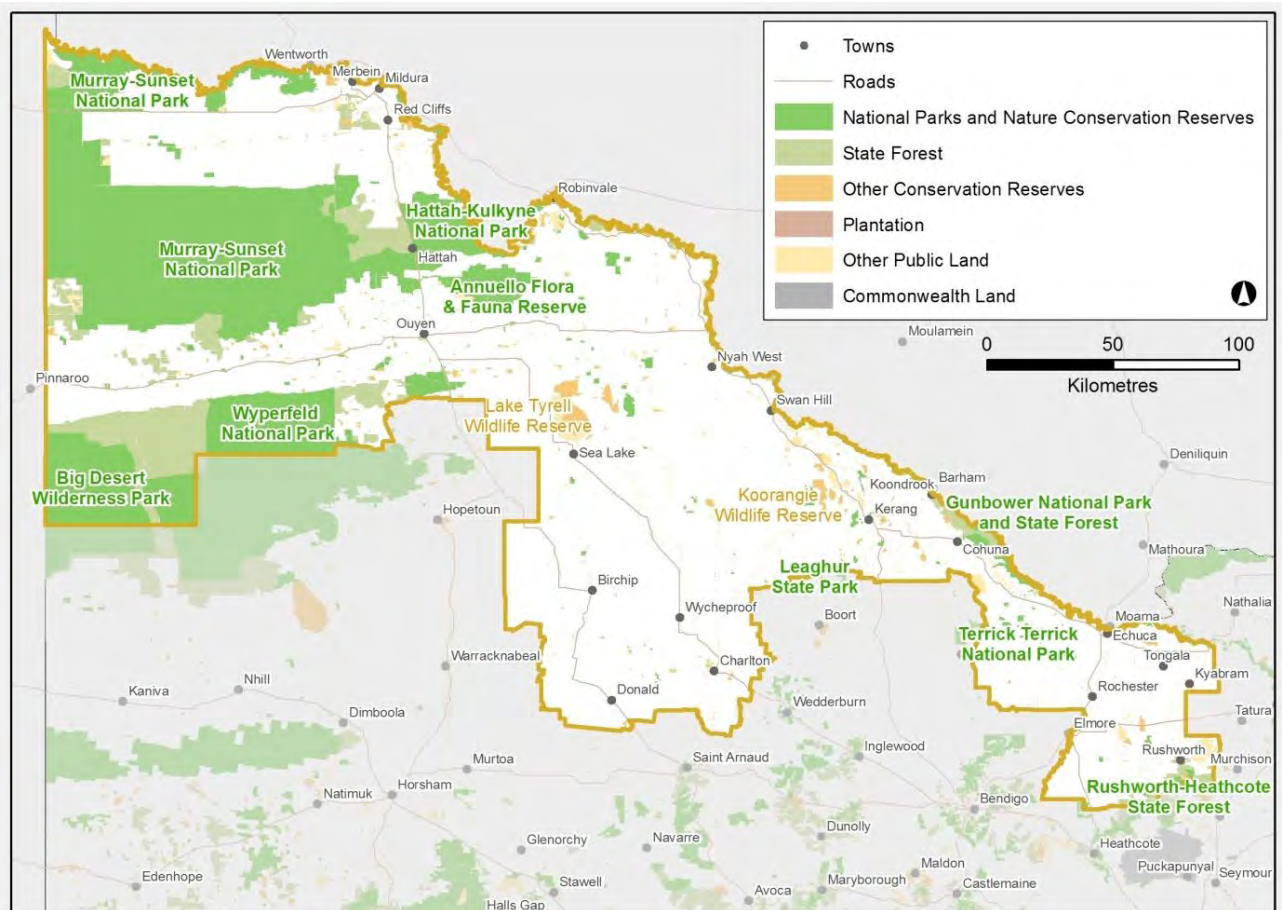
There are also substantial areas of high natural value outside public land, particularly grasslands and floodplains in the east of the region.

Implications for the plan

- Public land is an important asset in the region to protect ecosystems, and to provide amenity benefits through recreation and tourism. Public land may also generate income through sustainable forestry and natural resource extraction.
- There are emerging opportunities for private sector investment into tourism infrastructure within national parks across Victoria. Opportunities may arise for tourism development associated with or linked to public land which should be fostered by the plan to promote growth. This is particularly relevant around large national parks and the Murray River. Directing tourism development into existing settlements and activity centres that are close to these tourism assets wherever possible will help maintain the character and values of those assets.

- Consideration of facilities in towns with the support of established local communities with access to the tourism assets should be undertaken as a first step.
- There are pressures for increased rural residential development particularly in the east of the region adjacent to the permanent lakes. Although public land, these lakes are managed by a variety of agencies including the Department of Environment and Primary Industries, Parks Victoria and water corporations. Development and growth in close proximity to public land needs to consider natural hazards such as bushfire and flood, as well as impacts of development on the environmental assets nearby.

Figure 13: Public land in the region



Source: Department of Transport, Planning and Local Infrastructure

5.3 Natural hazards and risks

5.3.1 Flooding

The Loddon Mallee North region has an extensive history of flooding. Recent floods in 2010-11 were the most extensive recorded in the region. Water from these floods remained across some areas of the floodplain for many months. The floods provided crucial inflows to wetlands across the region, although they also impacted many towns and infrastructure. The severe impacts of a single flooding event are clearly illustrated by the length of time (over one year) that the Murray Valley Highway was closed near Kerang after the floods. Critical power supply to northern Victoria and southern New South Wales was also threatened by these floods.

Regional towns most affected by the 2010-11 floods, either through inundation or isolation, included Charlton, Swan Hill, Echuca and Kerang. Flash flooding also caused significant damage in Mildura.

The flooding prompted various investigations including the Victorian Flood Review and the Inquiry into Flood Mitigation Infrastructure in Victoria, and has led to the review of flood mapping in many areas. The Victorian

Government released its implementation plan in response to the Victorian Floods Review in November 2012, which included various commitments, including improving flood planning and flood intelligence capabilities across the state, which will benefit future land use planning.

Catchment management authorities develop, oversee and implement regional floodplain management strategies. These strategies integrate local floodplain management issues and prioritise the development of urban and rural floodplain management plans within the region. Catchment management authorities also have the responsibility to develop surface water drainage plans that provide for shallow drains that remove rainfall induced runoff from agricultural land.

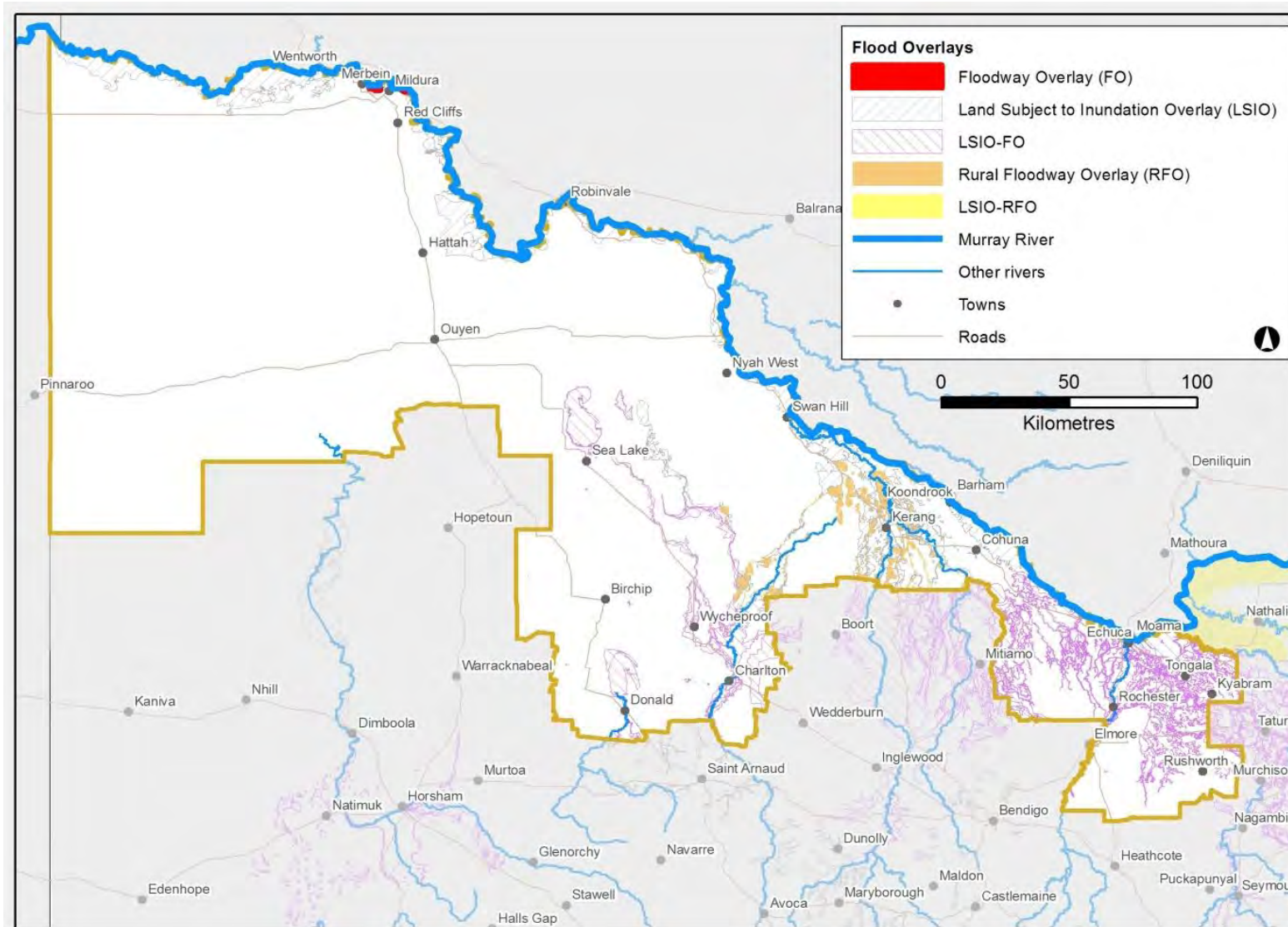
Municipal councils in regional Victoria have historically had operational responsibility for most floodplain management activities occurring within their boundaries. This has included controlling floodplain development through the municipal planning scheme and implementing local floodplain management plans.

The existing flood overlays for the region are shown in Figure 14. Flood studies have been released for various areas of the region by the catchment management authorities although some will require updating in light of the most recent floods.

Given the likely increase in the intensity of flooding across the region over time as a result of climate change, the potential for increased flooding will be a key consideration in making responsible planning decisions for the region. Flood mapping is being undertaken by the Department of Environment and Primary Industries, the Department of Transport, Planning and Local Infrastructure and catchment management authorities that will address changing risk profiles.

Loddon Mallee North Regional Growth Plan
Background Report

Figure 14: Flood overlays in the region



Source: Department of Transport, Planning and Local Infrastructure

Implications for the plan

- Catchment management authorities in the Loddon Mallee North region advise that floodplains in the region could be improved by addressing inappropriate development and land use, among other factors.
- The North Central Catchment Management Authority is currently undertaking flood studies for areas that experienced severe flooding in 2010-11, including Charlton, Rochester and Donald. This information will be needed to update flood overlays in planning schemes where relevant. Further understanding of flooding in the region will also need to be incorporated into planning decisions as future research and modelling is released over time.
- Land use planning is considered by the Victorian Flood Review to be the most effective means of reducing future risks and damage from flooding. Regional land use planning, through the plan, must explicitly consider the implications of flooding on growth, particularly settlement growth, and protection of human life. The plan considers and maps where flood issues must be considered in more detailed settlement growth planning for Mildura, Echuca and Swan Hill. Flooding is also an issue across the broader landscape.
- Land use planning decisions should be based on the best quality information on flooding hazard to minimise risk to life, property, community infrastructure and environmental assets.
- Flood provisions in planning schemes could be used consistently across the region to avoid inappropriate development (or redevelopment) or require appropriate development responses, as well as apply design responses through the building code.
- New development will be directed away from areas of floodplain hazard and development should not be supported if it increases the flood risk for other sensitive areas or development.
- Climate change predictions indicate that more extreme flood events may occur in the future. Existing flood risk assessments do not take account of these likely increases in the intensity of storm and flood events. The increase in flood risk should be monitored and incorporated into future strategic planning.

5.3.2 Bushfire

The Loddon Mallee North region has extensive areas designated as bushfire prone, including large treed areas, and expansive grasslands. Many of the landscapes most attractive to residents and tourists are at the highest risk from bushfire. The existing Bushfire Management Overlay for the region is shown in Figure 15. This overlay is not extensive and does not reflect the known bushfire prone areas across the region. The Bushfire Management Overlay will be updated in the near future to reflect the most recent understanding of bushfire hazard.

Pressure for residential and tourism development in or adjacent to these bushfire prone areas is likely to continue, particularly in the east of the region, which presents challenges for land use planning. Loddon Mallee North has lower fuel loads than most other regions in Victoria as a result of the vegetation of the region, although this does not provide immunity from bushfire risk.

Predictions indicate that as the climate changes there will be an increase in the number of extreme fire index days each year. Bushfire frequency and intensity is likely to increase as a result of climate change. The impacts of climate change on bushfire risk should also be considered in the future planning.

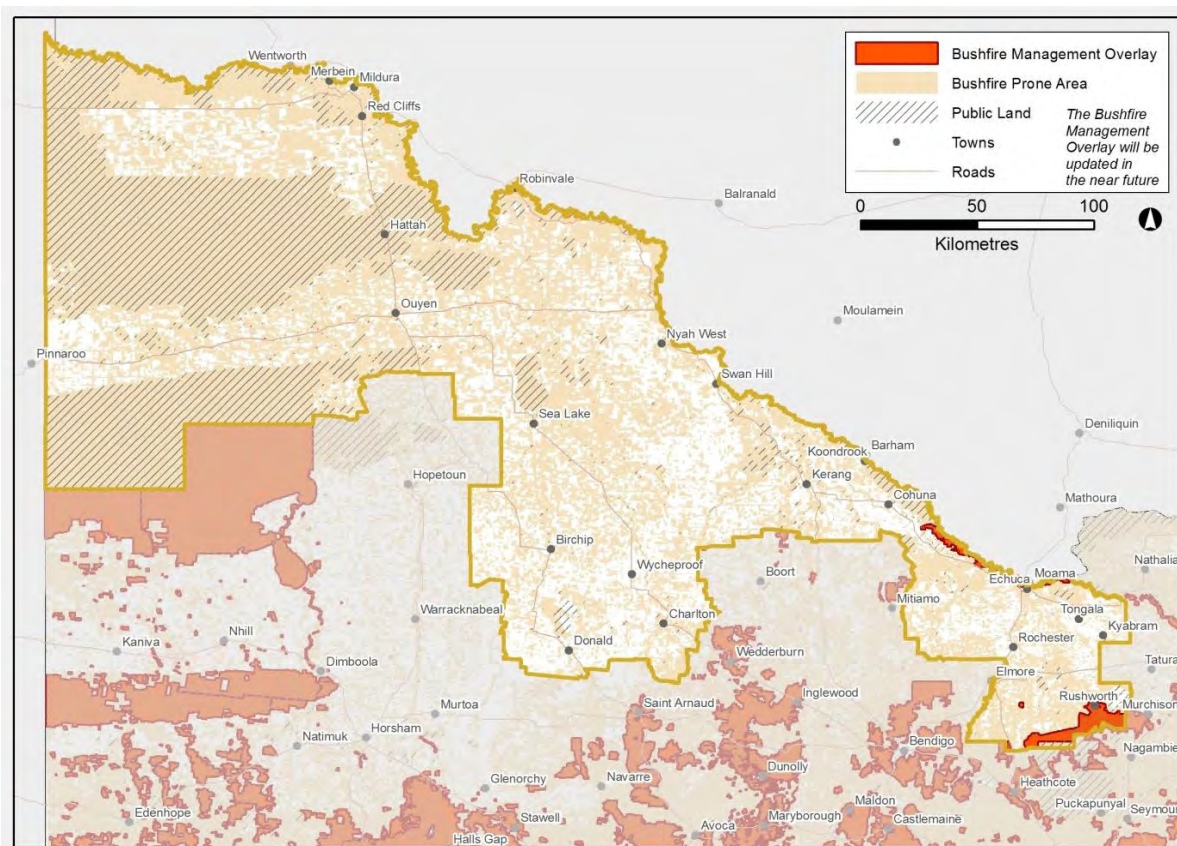
Following the Victorian Bushfire Royal Commission, Amendment VC83 was gazetted in November 2011 to incorporate new bushfire planning provisions into the state planning framework, which integrates with changes made earlier to building regulations. Regional bushfire planning assessments provide extra information about areas (referred to as 'identified areas') where a range of land use planning matters intersect with a bushfire hazard to influence the level of risk to life and property from bushfire. This information should be addressed as part of strategic land use and settlement planning at the regional, municipal and local levels.

The regional bushfire planning assessment maps and supporting information for the Loddon Mallee North region can be found on the Department of Transport, Planning and Local Infrastructure's website.

Implications for the plan

- Bushfire hazard is a critical consideration for future development, particularly given recent changes in planning regulations as a result of the 2009 Victorian Bushfires Royal Commission recommendations. The implications of these changes are still emerging and have been included where possible as a consideration in growth planning.
- Regional and local planning should consider bushfire hazard in detail, with the assistance of planning tools, such as the Bushfire Management Overlay, regional bushfire planning assessments and Bushfire Prone Areas, as well as input from key stakeholders such as the Country Fire Authority.
- Of major significance for land use planning is the requirement to prioritise the protection of human life over other policy considerations, reinforced by an explicit requirement to apply the precautionary principle in decision-making when assessing the risk to life, property and community infrastructure.
- In line with 2009 Victorian Bushfires Royal Commission recommendations, development should be substantially restricted in the areas of highest bushfire risk, while giving due consideration to biodiversity conservation. Regional and local settlement planning need to clearly demonstrate how bushfire risk has been considered and how a response to risk has informed that planning.
- The plan shows where bushfire risk is a key consideration for growth of specific settlements in the region. The settlement frameworks for Mildura, Swan Hill and Echuca have explicitly considered bushfire risk in determining future areas for development. Bushfire risks to tourism and landscape values also need to be considered when considering non-urban changes in land use in the region.
- Bushfire risk will need to be assessed to a finer level when more detailed planning is underway at a municipal level.

Figure 15: Bushfire Management Overlays in the region



Source: Department of Transport, Planning and Local Infrastructure

5.3.3 Climate change

Predicted changes in rainfall, temperature and evaporation as a result of climate change suggest the Loddon Mallee North region will be hotter and drier than today. Bushfire risk is expected to increase and although rainfall is expected to decline, the intensity of heavy rainfall is likely to rise, potentially resulting in severe floods. Drought may become more common.

The Victorian Climate Change Adaptation Plan (Victorian Government 2013) indicates that the reduced average rainfall and streamflow in the region may reduce reliability of water supplies for both irrigated and non-irrigated enterprises and for communities. Changes in average temperatures may alter the mix of industries that can succeed in the region and provide new opportunities for some industries to develop. New agricultural priorities and changes in the regional economy may have flow on effects to population and communities as they adjust.

Other long-term consequences of climate change for the region include:

- damage to infrastructure, industries and agriculture from severe weather events and natural hazards
- pressures on natural ecosystems
- reduced suitability of some locations for agriculture or residential development
- implications for communities, such as human health, energy use, housing needs, and service provision⁸
- an increasing likelihood of more extreme events such as heat waves, bushfires and flooding.⁹

Climate change may also produce positive benefits for the regions as well, enabling economic diversification into different commodities and industries.

Climate change is expected to have a range of impacts on the region's communities, industries and the environment. Some research projects are already underway in the region to help understand and plan for the potential impacts on industries in the region, such as numerous projects undertaken by the Mallee Catchment Management Authority (in partnership with industry bodies) to understand how predicted climate change may effect farming practices in dry land farming areas (details of these projects can be found on the Mallee Catchment Management Authority website). Some of their research indicates that crops grown on soils with subsoil limitations such as salinity were more vulnerable to climate change, with greater decline in yields than less saline sites.¹⁰

Agricultural research bodies, such as the Birchip Cropping Group, are also undertaking research into the impacts of climate change on agricultural industries which should be used to inform any future climate change adaptation planning for the region.

In terms of supporting the region's resilience, key considerations for the region include:

- As commodities shift, what affect might this have on the supporting industries and freight task within the region?
- What land use implications might these changes have?
- What implications might these potential changes have on the settlements in the region?
- What adaptability does future strategic planning need to facilitate to enable this shift to occur, and ultimately strengthen the region's economy?
- Where is it safest to direct future settlement growth, considering potential future increase in bushfire and flood events?

These questions are not answered by the plan but instead could help inform future coordinated strategic planning and research in the region around climate change adaptation.

⁸ <http://www.climatechange.vic.gov.au/regional-projections/north-central>

⁹ <http://www.climatechange.vic.gov.au/what-is-climate-change>

¹⁰ http://www.malleecma.vic.gov.au/resources/technical-bulletin/climatechangetb_final_lowres.pdf

Implications for the plan

- Regional and local planning should respond to opportunities for innovation and industry development arising from climate change and initiatives that support national and global action to reduce greenhouse gas emissions, such as a price on carbon, and where appropriate remove any barriers to such action.
- An important consideration for the plan isn't necessarily the magnitude of the change in climate but rather how land use planning can help improve the region's resilience and ability to adapt to change as impacts emerge. For example, land use in rural areas will still predominantly be farming related, but the commodities that can successfully be cultivated in the region may change as the climate changes. Economic diversification may also occur to include other commodities and industries, including those related to potential initiatives such as a price on carbon, including carbon farming, renewable energy production or other new industries.
- Strategic planning should consider any likely increase in exposure to natural hazards and reduction in water availability as a result of climate change.
- Consideration should be given to the appropriate design of urban areas to address potential risks of climate change on regional cities and centres, such as increased urban heat island effects.

5.3.4 Threats to soil health

A soil that is healthy delivers a wide range of environmental values (including ecosystem services) and is less likely to be acidic, saline, compacted, losing nutrients, or eroding. Soil erosion and land degradation have significant economic, social and environmental costs, both onsite (such as loss of carbon storage) and on downstream assets, for example, erosion entering rivers, reducing water quality. Productive soils are also essential for the agricultural profitability of the region. Planning for future land use must ensure that land use change does not disturb soils to a level that could result in deterioration of the soil asset in the region or contribute to pollution of waterways.

Salinity is the widest ranging threat to soil health in the Loddon Mallee North region, with erosion also an issue, particularly in the Mallee. Waterlogging also occurs through the region, further compounding the salinity and erosion issues. Changes to farming practices and catchment management within the last 30 years have helped to significantly reduce and manage these threats. Acid sulfate soils and contaminated land also impact on soil health and the management of soils in relation to land use change.

Salinity

Salinity is caused by the accumulation of salt in soil (or in waterways). Saline soils do occur naturally within the region (termed primary salinity); however, activities related to European settlement have resulted in an increase in saline areas (termed secondary salinity). The replacement of perennial native vegetation with annual crops and pastures, and the use of irrigation have altered the water balance as more water moves through the soil, resulting in saline groundwater rising to within capillary reach¹¹ of the land surface. In some areas groundwater levels are high enough to directly discharge saline water to the soil surface. When such waterlogged soils dry out, they can be more susceptible to other threats to soil health, in particular erosion.

Salinity can be termed 'dry land', 'irrigation' or 'urban' salinity, depending on where it occurs in the landscape and its causes. Dry land, irrigation and urban salinity all occur within the region and are a significant soil health issue within some areas. Salinity is considered a natural hazard because it has the potential to impact the quality of water supply, the integrity of infrastructure and cultural heritage assets, agricultural productivity and the values provided by environmental assets.

¹¹ Shallow saline water tables at less than about two meters (capillary reach) from the surface can cause salt to accumulate in the root zone of plants. The drier soil surface condition above the groundwater allows capillary action to transport saline ground water to the soil surface – evaporation and plant use of water removes soil water leaving the salts behind in the upper layers of soil profile, resulting in saline soils (adapted from Lanyon 2011).

Salinity issues in relation to rural areas are generally managed through salinity and/or land and water management plans and programs of catchment management authorities, particularly through whole farm planning, and drainage programs and salt interception schemes. Their activities include actions aimed at assisting landholders and land managers with both managing and living with threats to agricultural production, water quality, soil quality and native species.

The irrigation areas within the region have a well known history of salinity issues, which have been managed in rural environments through on-farm programs and salt interception schemes for over 30 years. Salinity is an ongoing consideration for these areas, and may have implications for urban towns within these geographic areas into the future. Some catchment management authorities also assist councils with the management of urban salinity.

Urban salinity can cause damage to many environmental and built assets including corroding buildings, bridges, pipelines and, cemeteries, affecting the health of plants and soils in parks and gardens, and affecting water quality in lakes and waterways. Salinity can affect private homes and gardens. It can result in dying gardens, bare soils and/or soils that can only grow salt-tolerant species. There are known urban salinity considerations in Mildura, Nichols Point, Irymple and Red Cliffs, which are acknowledged through the use of the Salinity Management Overlay in these areas.

The impacts of salinity both in urban and rural areas decreased during the recent extended drought; however the problem was only temporarily halted. The return to wetter years has seen a return of many salinity-related problems. Salinity will be an ongoing consideration in the region over the life of the regional growth plan.

Erosion

Soil erosion, in particular erosion caused by wind, is a significant threat to soil health across the region, particularly in agricultural and other rural areas. Though management of rural erosion, risks are predominantly the responsibility of land managers to address through their own land management techniques, councils can apply planning tools such as the Erosion Management Overlay to help minimise threats to soil health from erosion. The purpose of this overlay is to protect areas prone to erosion, landslip or other land degradation processes, by minimising land disturbance and inappropriate development. No councils within the region currently have an Erosion Management Overlay.

The catchment management authorities have undertaken various investigations in to soil erosion within their regions, to varying detail. The Mallee Catchment Management Authority in particular has undertaken detailed wind erosion susceptibility modelling which could be used to inform land use planning decisions.

It is important to note that soil movement in the region is part of some important natural processes, such as the formation of lunettes around ephemeral (wetting and drying) wetlands. The management of erosion in the region is not intended to interfere with such natural processes.

Implications for the plan

- The Salinity Management Overlay is used in some local government areas to highlight salinity issues. The overlay generally identifies areas subject to saline ground water discharge or high groundwater recharge. Part of the purpose of the overlay is to prevent damage to buildings and infrastructure from saline discharge and high water tables. This overlay has been applied to two councils in the region to some degree:
 - Mildura Rural City Council is the only council that has identified urban salinity risks. These have been identified within the 2030 urban growth boundary for Mildura, Nichols Point and Irymple. Low, moderate, high and very high salinity risks occur within this footprint (predominantly moderate to high, where risk exists). The council has applied the Salinity Management Overlay to these areas, and other areas of known salinity within Mildura and Red Cliffs.

- The Shire of Campaspe has applied the Salinity Management Overlay to a rural area in the south of the region, near Heathcote-Rochester Road, Corop to the region's southern border.
- The Salinity Management Overlay could be more consistently used across the region to assist planning decisions in urban areas and areas of potential rural residential development. Salinity and/or land and water management plans of the various catchment management authorities will continue to be used to coordinate salinity management activities in the region and are a useful source of information for informing land use planning tools and decisions in relation to salinity threats.
- The impacts of salinity on new development and the impacts of new development on salinity management need to be carefully considered.
- Consideration could be given as to whether areas prone to erosion have been adequately identified in local government planning schemes based on existing knowledge.
- The Erosion Management Overlay could be used by the councils to identify areas susceptible to erosion.

Potentially contaminated land

Contaminated sites are land, and sometimes groundwater, where chemical and metal concentrations exceed those specified in policies and regulations. The location and number of contaminated sites across Victoria is not accurately known. A desktop assessment in 1997 estimated there were around 10,000 contaminated sites in Victoria.

Contaminated sites can pose immediate or longer-term risks to human health and the environment, depending on the type and extent of contamination and on how the site is used.

There are many areas and properties that may contain contaminated land in the region due to historic land use and management, such as previous use of chemicals at an industrial or agricultural site. Many of these areas could be subject to development pressures, either through infill or urban expansion.

Potentially contaminated and known contaminated sites are regulated through a framework that encompasses the *Planning and Environment Act 1987*, the *Environment Protection Act 1970*, and a range of complementary regulatory instruments.

Implications for the plan

- Given that accurate locations for potentially contaminated sites are unknown, there are direct implications for land use planning, particularly as residential development expands and/or infills onto sites that have had a complex history. The existence of contamination can significantly restrict the viable uses of affected land, unless the contamination is remediated, which often involves costly removal and/or treatment.
- A report by the Victorian Auditor General's Office determined that the former Department of Planning and Community Development, the Environment Protection Authority and councils were not effectively managing contaminated sites, and consequently cannot demonstrate that they are reducing potentially significant risks to human health and the environment to acceptable levels. The Victorian Auditor General's Office determined this was 'largely because the complex regulatory framework that has evolved to deal with contaminated sites which has significant gaps, and key elements lack clarity. In many cases, this has led to a lack of accountability and responsibility, and subsequent inaction' (page vii of the Victorian Auditor General's report).
- It is not the intention of the plan to try to address issues within the regulatory framework, however the plan does acknowledge the need to include consideration of potential contamination in planning for future growth, particularly once planning is occurring at a more detailed level.

Potential acid sulfate soils

Potential acid sulfate soils are found naturally within the Loddon Mallee North region, and are most often associated with ephemeral (wetting and drying) wetland and river environments. According to mapping available on the Australian Soil Resource Information System, there is a high probability that potential acid sulfate soils might occur in certain locations within the region, predominantly associated with wetland sites.

Potential acid sulfate soils can pose significant threats to human health, agricultural production and infrastructure, and are an important planning consideration. Generally these soils should not be disturbed. The Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils (Department of Sustainability and Environment, 2010) was produced to guide landowners, developers, planners and decision makers through a risk identification approach and aid in the assessment and management of coastal potential acid sulfate soils. It may have some applicability to potential inland acid sulfate soils.

More information on the location of acid sulfate soils in the region can be found on the Victorian Resources Online website¹².

Implications for the plan

- It is important to identify areas where development is best avoided due to potential acid sulfate soils. Already, there are many examples of costly mistakes in Australia involving considerable damage to land, buildings and waterways as a result of disturbing coastal potential acid sulfate soils. Inland potential acid sulfate soils are often associated with saline wetland/lake environments.
- There is a risk that potential acid sulfate soils are present in areas that may be subject to disturbance, such as urban growth areas in regularly waterlogged areas or potential development around lakes. Detailed investigation will be necessary at a local level before any such development is approved.
- Potential acid sulfate soils should not be disturbed.

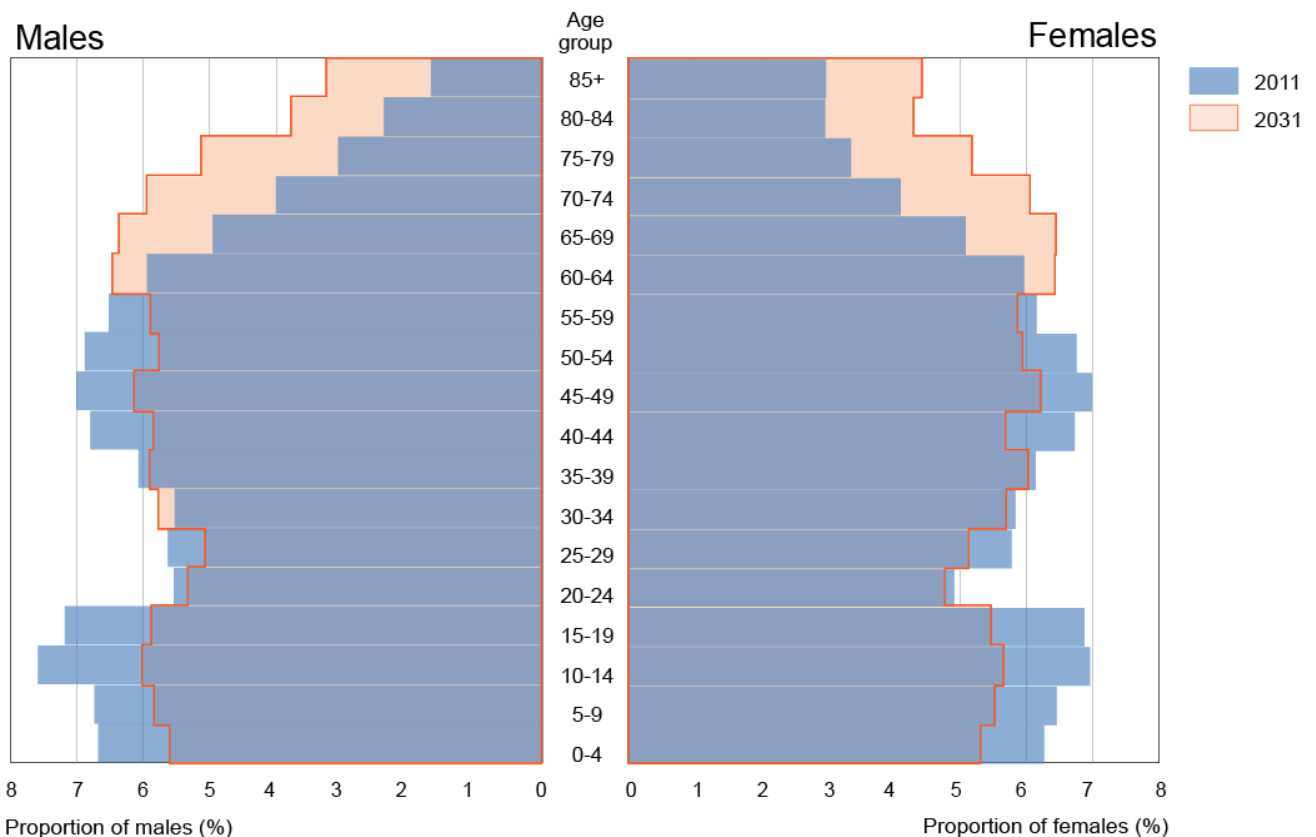
¹² http://vro.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/soil_acid_sulfate_soils

6. Living in the region

6.1 Population structure

The age structure and diversity of communities across the Loddon Mallee North region varies (Figure 16). Campaspe, Mildura and Swan Hill have younger than average age structures and by regional Victorian standards, also have high levels of people from diverse cultural backgrounds and high Aboriginal populations. Buloke and Gannawarra have an older age profile.

Figure 16: Age structure 2011 and projected 2031

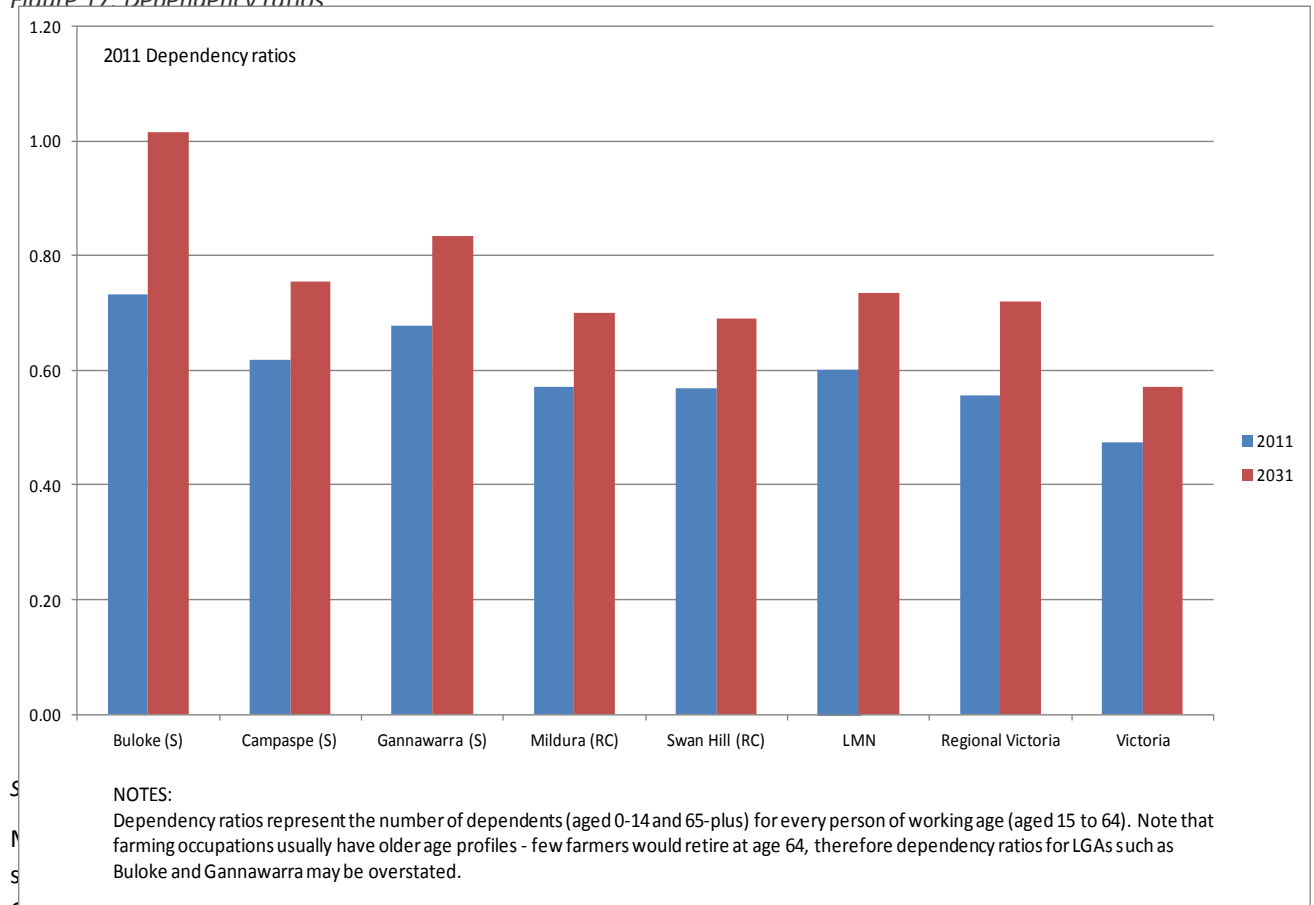


Source: Victoria in Future, 2012

The population structure is projected to age with the highest growth of around 16,000 between 2011 and 2031, in the 65+ age group. Between 2006 and 2026, in age groups less than 55, projections indicate a 10 per cent decrease in population across the whole region. Internal migration is a major determinant of population change in the region. School leavers tend to leave for tertiary education in Melbourne or regional cities while older migrants are attracted to high amenity areas within the region. It appears the Murray River corridor is attracting retirees, especially closer to the larger centres.

The region faces significant challenges in terms of assisting smaller settlements to remain viable and keeping their communities connected to sustainable and accessible services. With diminishing youth numbers and an expanding retiree population across the region, Loddon Mallee North's dependency ratio (ratio of those aged under 15 and over 64 years to the working age population aged 15-64 years) is expected to reach 0.74 by 2031, from a current level of 0.6 dependents per working age resident (Figure 17). In Buloke Shire that figure is going to expand to over 1.01 dependents per working age resident by 2031. However, given the older age profile of farmers generally, this may be a misrepresentation as farmers over 64 are not necessarily retired.

Figure 17: Dependency ratios



Gannawarra has experienced net outward movement of young people and little inward movement amongst older age groups. A decreasing and ageing population raises a number of issues including:

- labour shortages
- increased demand for the provision of and access to aged care services
- changing demands for housing, public transport, health and community services
- equitable connections to health, employment, education and other services in the region.

6.2 Population change

The region's population is diverse, both ethnically and geographically. Aboriginal peoples make up 2.5 per cent of the regional population. Mildura is one of 10 regional cities in Victoria, and the only one in the region. The regional population is expected to increase from 134,400 people in 2012 to 158,681 people in 2041¹³ (Victoria In Future 2012). This equates to an increase of 13 per cent, with an average annual growth rate of 0.6 per cent. This rate is consistent with recent experienced growth.

This growth has been unevenly distributed across urban and rural areas in the region, and also between the urban centres, with Mildura receiving 41 per cent of the total growth in the region (Figure 18). While there has been steady population growth (0.7 per cent per year) in Mildura, this has been confined to the urban area, with the rural balance of the area experiencing a decreasing population (-2.2 per cent per year). This is the largest average annual decline of any statistical division in Victoria over the period 2001 to 2011.

Buloke and Gannawarra shires, which have the smallest populations, experienced a decrease in population (Table 4) due to structural adjustment, contraction of agricultural commodities and lack of economic diversity.

¹³ Population figures are provided by the Department of Planning and Community Development's Victoria in Future 2012 analysis. This data is derived from the 2011 Census and uses modelling to predict future growth rates and population and demographic change. While the regional growth plans look ahead 30 years to 2041, Victoria In Future 2012 only provides forecasting at a town and local government area level to 2031.

Smaller settlements and rural areas in all municipalities have experienced greater rates of population decrease and ageing and this is expected to continue. However, across the region, there are small communities experiencing a reversal in these population trends associated with:

- high-amenity locations such as at Koondrook
- localised economic diversity such as in Donald
- rapid expansion of an economic sector such as irrigated horticulture at Robinvale.

Decreasing population of agricultural areas, particularly in the dry land agricultural areas, has been driven by farm aggregation and other efficiencies. Towns in these areas that once played a service centres role for local family farms may no longer play this role as the population and the viability of services, businesses and industry decreases.

There is a cohort that leaves for employment, education or lifestyle prospects elsewhere. The few migrants to these towns are generally older (past working age) and/or seeking more affordable housing. As a result, the level of disadvantage in these towns tends to increase and residents can find themselves locked into a lower value property market and unable to access services.

Table 4: 2011 to 2031 population projections by Local Government Area (LGA)

Buloke

- 2001 population: 7310
- Current population: 6925
- 2031 projected population: 6519
- % change 2010-11: -1.3
- % change 2011 to 2031: -0.30

Campaspe

- 2001 population: 36,363
- Current population: 38,981
- 2031 projected population: 45,541
- % change 2010-11: 0.2
- % change 2011 to 2031: 0.78

Gannawarra

- 2001 population: 12,067
- Current population: 11,467
- 2031 projected population: 11,288
- % change 2010-11: -1.1
- % change 2011 to 2031: -0.08

Mildura

- 2001 population: 49,283
- Current population: 54,666
- 2031 projected population: 64,288
- % change 2010-11: 0.8
- % change 2011 to 2031: 0.81

Swan Hill

- 2001 population: 21,404
- Current population: 22,275

- 2031 projected population: 24,448
- % change 2010-11: 0.4
- % change 2011 to 2031: 0.47

Loddon Mallee North

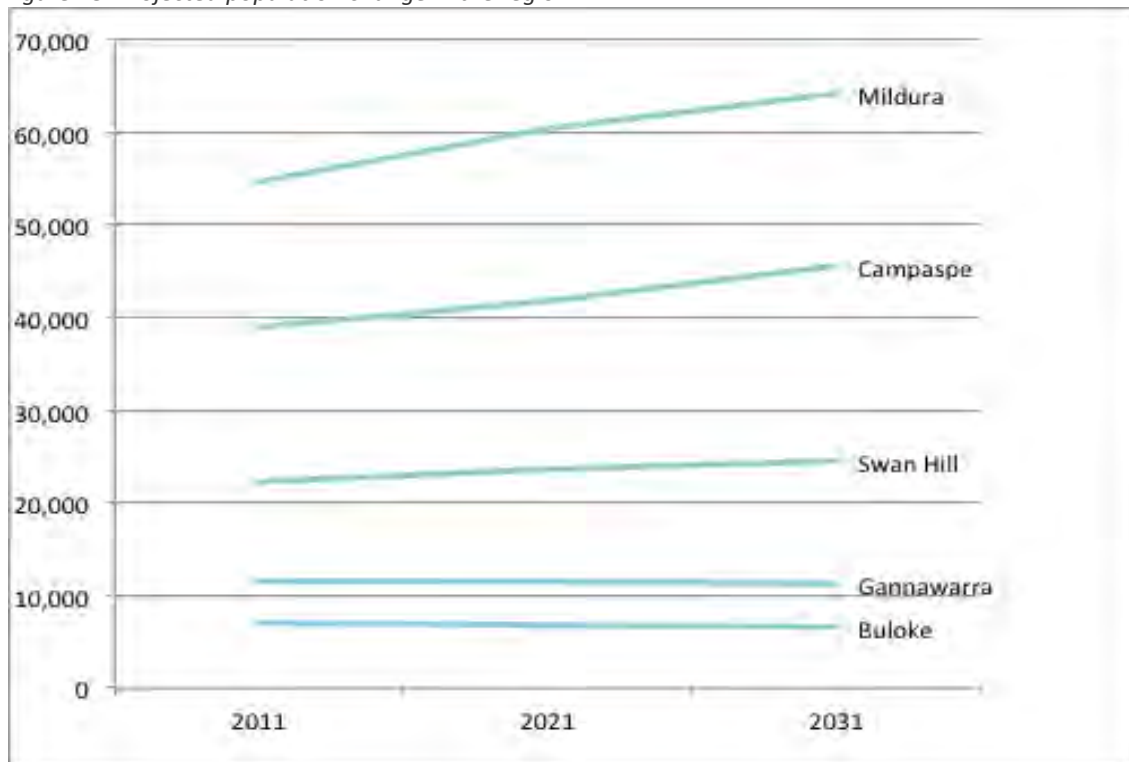
- Current population: 134,314
- 2031 projected population: 152,084
- % change 2011 to 2031: 0.62

Regional Victoria

- Current population: 1,483,160
- 2031 projected population: 1,913,980
- % change 2011 to 2031: 1.28

Source: *Victoria in Future, 2012*

Figure 18: Projected population change in the region



Source: *Victoria in Future, 2012*

6.3 Liveability

Although overall populations have decreased in predominantly rural municipalities in the region, urban populations continue to increase. This has been confirmed by analysis of population change in shires such as Buloke. This reflects an ongoing trend of urbanisation as farm sizes increase, farmers retire off the land, into nearby towns and new farm management models no longer necessitate living on-farm.

The Loddon Mallee Regional Strategic Plan – Northern Region (2010) seeks to address the challenges of population change and decrease by building a diverse and robust economy and resilient and connected communities. Priority actions specific to settlement planning outlined in the strategic plan include:

- Plan and develop centres and towns to attract residents and employment opportunities. Develop and invest in rural settlements to provide sustainable, liveable places for local and nearby rural residents. Develop innovative and economical approaches to delivery of essential services to remote localities.

- Invest in and advocate for place-based community planning; strengthening community leadership models; improving transport connections; encouraging joined up government service delivery; and investing in urban renewal (including community hubs, recreation facilities and streetscape enhancement) to improve the liveability of small towns and their ability to manage change.

Population growth and change in southern New South Wales is important as there are significant communities of interest relating to settlements in the region. In 2006 municipalities on the New South Wales side of the Murray River bordering the region had a combined population of 21,000 people. It is projected that this population will not vary much into the future, although there is projected to be growth in Murray Shire, opposite Campaspe Shire and an almost balancing decrease in the other shires.

While the current population of Echuca is 13,000 people it is estimated that it services a broader community of 50,000 people within a 70 kilometre radius (Beca, 2011), spanning Moama and the New South Wales and Victorian hinterlands.

On a broader scale, work undertaken for the draft Murray River Settlement Strategy identifies Swan Hill-Murray Downs and Greater Mildura-Gol Gol-Wentworth-Dareton as the key regional cities/strategic centres, and Cohuna, Koondrook-Barham, Kerang and Robinvale-Euston as strategically located medium-sized centres.

Planning for housing and employment development, provision of infrastructure and public transport will need greater attention where these involve twin towns to avoid unnecessary duplication and ensure costs of service provision are minimised. This will also apply to the location of future commercial areas and community facilities.

There are a number of towns within the region that are relatively disadvantaged and contribute to the most disadvantaged 10 per cent of the population in Australia. These include Mildura, Robinvale, Echuca, Merbein, Red Cliffs, Swan Hill, Kerang, Rushworth, Kyabram, Nyah West, Gunbower, and Quambatook. Disadvantage is not uniform across these localities but is clustered in pockets within them. This is a result of a number of factors, including loss of jobs from traditional employment industries, such as agriculture and manufacturing, and a high level of unskilled workers (one in five workers in Loddon Mallee).

There are also higher school dropout rates in years 10 to 12 with 23 per cent of young people dropping out of school during these years compared to 15 per cent in Melbourne. Out migration of skilled workers and young people seeking higher incomes, education or better quality housing can be exacerbated by an influx of already disadvantaged people seeking affordable housing.

The region has an average weekly household income of \$1549, compared with the Victorian average of \$2144 (Australian Bureau of Statistics, 2012).

Increasing disadvantage in remote locations can raise a number of issues including:

- provision and access to aged care and other community services
- access to public transport
- access to employment and training opportunities and education
- access to culturally appropriate services and economic development opportunities.

6.4 Housing

It is projected that growth and change patterns in the Loddon Mallee North region in the next 30 years will continue to be similar to the present pattern. The number of, and increased diversity of, households has been and is expected to continue to grow at a faster rate than the population. The impact of this changing population structure will be a considerable reduction of people in traditional workforce age groups, a decrease in average household size across the region, and demand for wider housing choice, particularly housing for smaller households close to services.

Throughout the region, detached dwellings are the most common form of housing, averaging 90 per cent of the housing stock. Of these, the majority are three bedroom dwellings. Buloke Shire is unique in the region, in that the majority of houses (56 per cent) are owned outright. Across other municipalities, dwelling tenure is more evenly spread between those that are owned outright, owned with a mortgage or rented (Table 5).

Table 5: Tenure of occupied dwellings in the region

Buloke

- Owned outright: 56%
- Mortgaged: 23%
- Rented: 17%

Campaspe

- Owned outright: 39%
- Mortgaged: 33%
- Rented: 24%

Gannawarra

- Owned outright: 48%
- Mortgaged: 25%
- Rented: 22%

Mildura

- Owned outright: 32%
- Mortgaged: 33%
- Rented: 30%

Swan Hill

- Owned outright: 36%
- Mortgaged: 29%
- Rented: 30%

Source: Australian Bureau of Statistics, 2011

The region already has smaller households, relative to both regional Victoria and the state as a whole, and this trend is expected to continue as household size continues to decrease over the next 30 years (Table 6).

Table 6: Average household size by LGA 2011-2031

Buloke (S)

- 2011: 2.30
- 2016: 2.28
- 2021: 2.24
- 2026: 2.21
- 2031: 2.18

Campaspe (S)

- 2011: 2.45
- 2016: 2.41
- 2021: 2.36
- 2026: 2.33
- 2031: 2.29

Gannawarra (S)

- 2011: 2.36
- 2016: 2.35
- 2021: 2.30
- 2026: 2.27
- 2031: 2.24

Mildura (RC)

- 2011: 2.51
- 2016: 2.49
- 2021: 2.44
- 2026: 2.40
- 2031: 2.37

Swan Hill (RC)

- 2011: 2.53
- 2016: 2.49
- 2021: 2.44
- 2026: 2.40
- 2031: 2.37

Loddon Mallee North

- 2011: 2.47
- 2016: 2.44
- 2021: 2.40
- 2026: 2.36
- 2031: 2.33

Regional Victoria

- 2011: 2.51
- 2016: 2.47
- 2021: 2.43

- 2026: 2.40
- 2031: 2.37

Victoria

- 2011: 2.59
- 2016: 2.55
- 2021: 2.52
- 2026: 2.50
- 2031: 2.47

Source: Victoria in Future, 2012

As household size continues to decline, and the region's population continues to grow, there will be a corresponding growth in the number of dwellings required. As seen in Table 7, an additional 10,000 houses will need to be provided in the region to 2031, as well as adequate infrastructure and services to them.

Table 7: Occupied private dwellings by Local Government Area (LGA) 2011-2031

Buloke (S)

- 2011: 2920
- 2016: 2926
- 2021: 2908
- 2026: 2872
- 2031: 2835

Campaspe (S)

- 2011: 15,658
- 2016: 16,439
- 2021: 17,399
- 2026: 18,443
- 2031: 19,429

Gannawarra (S)

- 2011: 4754
- 2016: 4819
- 2021: 4858
- 2026: 4870
- 2031: 4876

Mildura (RC)

- 2011: 21,335
- 2016: 22,831
- 2021: 24,180
- 2026: 25,370
- 2031: 26,379

Swan Hill (RC)

- 2011: 8589
- 2016: 8991
- 2021: 9359

- 2026: 9681
- 2031: 9952

Loddon Mallee North

- 2011: 53,256
- 2016: 56,006
- 2021: 58,704
- 2026: 61,237
- 2031: 63,471

Regional Victoria

- 2011: 682,302
- 2016: 736,237
- 2021: 794,740
- 2026: 854,095
- 2031: 911,580

Victoria

- 2011: 2,138,574
- 2016: 2,335,105
- 2021: 2,531,437
- 2026: 2,722,084
- 2031: 2,906,124

Source: Victoria in Future, 2012

The mining and horticultural industries rely on mobile and seasonal workforces. Current planning provisions for agricultural areas restrict the capacity of agricultural businesses to provide appropriate accommodation at a sufficient scale.

Implications for the plan

- The cross-border relationships and interdependencies for services such as health and education will have ongoing implications for population growth and service delivery.
- The increasing proportion of older residents will place a significant strain on the health services and the regional economy unless young people and workers are attracted back or encouraged to remain. The plan will need to facilitate employment growth and higher education opportunities to attract and retain the younger people.
- Loddon Mallee North's urban centres will face increasing demand for aged care facilities and appropriate housing for the elderly. Planning for the location of residential growth will need to consider areas suitable for aged care housing, close to services and amenities, including access to health care facilities.
- Rationalisation of services as a result of decreasing populations in some areas causes ongoing problems as existing residents have greater difficulty accessing those services, and the reduced amenity makes it harder to attract and retain people.

7. Regional infrastructure

7.1 Utilities

7.1.1 Water

Victoria has an integrated and adaptive planning framework, which ensures urban water customers and the broader community has secure supplies of high quality water. These supply drinking and non-drinking needs, for recreational facilities, parks and gardens.

The state government's Living Victoria program was launched in April 2012 and has direct implications for water and urban planning across Victoria. Although the immediate focus of Living Victoria is on the metropolitan Melbourne region, the overarching directions of the program are intended to apply more broadly across the state over time. As this occurs, plans and strategies produced under the program will gradually supersede existing strategies.

Living Victoria responds to the recognition that:

- water needs to be better integrated into urban landscapes
- the community needs to be better engaged in water planning
- improved evaluation frameworks capable of capturing a broader range of costs and benefits are needed to effectively assess the wide array of options for providing urban water services.

By implementing the Living Victoria program, the Office of Living Victoria will develop and coordinate new integrated urban and water planning frameworks and develop tools for the whole state such as changes to the Victoria Planning Provisions.

At present, the key plans and strategies that guide urban water planning in regional Victoria are:

- water supply demand strategies, which will be superseded by integrated water cycle strategies
- regional sustainable water strategies
- drought response plans.

Water supply demand strategies

Water supply demand strategies were initially released in 2007. These strategies evaluated future water supply and demand scenarios and identified the mix of water supply and demand management measures needed to secure safe and reliable town water supplies, with a 50 year outlook. Urban water corporations released updated strategies in early 2012, which included new features to increase their alignment with the Living Victoria program including an Alternative Water Atlas and an annual Water Security Outlook.

Climate variability can have a profound impact on the amount of water available. This is expected to be exacerbated by the potential longer-term impacts of climate change that are expected to lead to a general reduction in water availability for the environment and water users. Water supply demand strategies consider how water supplies can be managed under a range of climate scenarios.

Four urban water authorities service the Loddon Mallee North region. These are: Goulburn Valley Water, Coliban Water, Lower Murray Water and Grampians Wimmera Mallee Water. The adequacy of supply for the relevant supply areas of each water authority is shown in Table 8.

Table 8: Summary of water supply demand strategy predictions

Goulburn Valley Water

- Supply system: Goulburn River system
Adequacy of supply: Adequate supply to 2041
Potential interventions to improve supply: May need to purchase more water after 2041 depending on yield

Coliban Water

- Supply system: Murray system
Adequacy of supply: Potential shortfall in supply within the next 10 years, continuing through 2030 and 2060
Potential interventions to improve supply: Purchase temporary water to make up shortfall for next 30 years, and purchase permanent water for the following 30 years
- Supply system: Goulburn system
Adequacy of supply: Sufficient supply to meet demand for the next 50 years
Potential interventions to improve supply: Not applicable

Lower Murray Water

- Supply system: Not applicable
Adequacy of supply: No shortfalls anticipated, however there are uncertainties due to potential climate change scenarios
Potential interventions to improve supply: Purchase water to make up any shortfall. Complementary actions to reduce demand for potable water, improve use and use alternative sources

Grampians Wimmera Mallee Water

- Supply system: Murray systems (Northern Mallee Pipeline, and Wimmera Mallee Pipeline)
Adequacy of supply: Supply will not meet demand
Potential interventions to improve supply: Purchase water. Complementary actions to improve system efficiency and increase user efficiency
- Supply system: Grampians system (Wimmera Mallee Pipeline)
Adequacy of supply: Demand can be met to 2060, except in very dry conditions and with median climate change at 2060
Potential interventions to improve supply: Improve system efficiency and increase user efficiency. Potentially link to the Murray System
- Supply system: Groundwater supply
Adequacy of supply: Sufficient supply to meet demand for the next 50 years
Potential interventions to improve supply: Not applicable

Integrated water cycle strategies which will replace water supply demand strategies will identify the best mix of measures to:

- maintain a balance between the demand for water and the supply of water in cities and towns
- facilitate efficient investment in all water cycle services, including recycling sewage or trade waste, stormwater capture and re-use, and demand management
- improve the resilience of water supply systems, by taking account of risk and uncertainty in planning and adaptive management and providing water of appropriate quality for particular uses.

Sustainable water strategies

Future water supply at a regional scale is strategically planned for and managed through the Victorian Government's Northern Region Sustainable Water Strategy and Western Region Sustainable Water Strategy to secure water for urban, industrial, agricultural and environmental water users in the long term. These sustainable water strategies identify threats to reliability of water supply and quality of water, and examine ways to improve supply and quality of supply for existing and future users. They also identify ways to improve, protect and increase environmental water reserves.

Most of the actions in the Northern Region Sustainable Water Strategy have been completed or are being refined and pursued in line with the Murray-Darling Basin Plan. The Western Region Sustainable Water Strategy is still relatively new and is now being implemented.

Drought response plans

Drought response plans manage temporary water shortages due to prolonged periods of below average rainfall or other causes such as poor water quality. They outline a range of options to balance supply and demand, which may include imposing water restrictions. The water restriction framework was reviewed in late 2011 to meet community expectations and to apply consistent restriction rules across the state.

Water supply in the Loddon Mallee North region

Water is delivered to urban, rural and irrigation customers through various means, including through open channels and various stock and domestic pipelines. The Wimmera Mallee Pipeline replaced a network of earthen channels and now delivers reliable supplies of high quality water for towns and farms. It services 36 towns and 7000 rural customers. In the Loddon Mallee North region, this includes communities and farmers in Buloke Shire and dry land areas of Swan Hill Rural City and parts of Gannawarra Shire. This is generating various economic opportunities throughout the region due to a higher reliability and quality of water supply within the region.

The Goulburn-Murray Water Connections Project (previously known as the Northern Victoria Irrigation Renewal Project) is responsible for planning, designing, and delivering Australia's largest irrigation modernisation project, the upgrading of irrigation infrastructure in the Goulburn-Murray Irrigation District. This project will be the most significant upgrade to the region's irrigation infrastructure in its 100-year history with automated technology and repairs to out-dated channels enhancing water delivery and efficiency. The project aims to recover long term average annual water savings of 425 gigalitres and increase irrigation water use efficiency from approximately 70 per cent to at least 85 per cent.

The Goulburn-Murray Irrigation District infrastructure will be redeveloped into a world-class, best practice system and help secure the future of the region's \$9 billion irrigated agricultural industries and \$1.53 billion export market. The project will also enhance environmental flows and urban water supplies (Goulburn-Murray Water, 2012).

Implementation of the Murray-Darling Basin Plan will influence water availability throughout the region into the future, particularly for rural uses.

Implications for the plan

- Water supply issues for the Loddon Mallee North region are being managed through the Northern Region Sustainable Water Strategy and Western Region Sustainable Water Strategy and various water authority water supply demand strategies.
- Implementation and future reviews of the plan will need to take account of any updated predictions of water supply as the sustainable water strategies and Living Victoria initiatives are implemented, including updates around climate change implications.
- Integrated water cycle strategies will need to consider the future directions and growth proposed in the plan as they are developed and revised into the future.

7.1.2 Energy

Of the five local government areas within the region, only Mildura and Campaspe have natural gas supplies, and these are limited in distribution.

However, Regional Development Victoria commissioned a study (GHD December 2012) into provision of natural gas to Murray River communities between Echuca and Mildura. This was essentially to supply Swan Hill with connection of other towns along the route. The study concluded that the most feasible point at which to extend the existing transmission line was from Bendigo, as:

- the transmission pressure upgrade from Echuca was too expensive; and
- there was insufficient additional capacity from Mildura.

The preferred route released by Regional Development Victoria on 20 December 2012 is the Bendigo East route as shown in Figure 19.

Regional Development Victoria has advised that this Stage 1 Preliminary Technical and Demand Assessment leads to the next step of producing feasibility study which includes an 'economic impact study of supplying the region with natural gas', and an 'investigation of alternative energy options for the delivery of natural gas to communities in the study area'.

These solutions involve the 'use of compressed natural gas or liquefied natural gas technologies whereby natural gas is transported by road tanker/trailer to the outskirts of a regional town or industrial estate, thus avoiding significant costs involved in the construction of major pipelines'. This refers to the significant cost of the transmission pipeline itself which adds to the cost of gas supply and therefore the impetus to use gas. This Stage 2 is to proceed in 2013.¹⁴ All towns in the region have access to electricity supply.

7.1.3 Waste

Effective waste and resource recovery management is an essential service that protects environmental and public health. The Victorian waste management system includes waste generation, collection and transport, sorting and processing, recycling and reprocessing, export, reuse and disposal. The waste management system operates across all activities in the region, such as household or municipal waste, commercial and industrial waste, and construction and demolition waste.

The state government is responsible for policy development and regulation around waste management, and for promoting environmental sustainability. Local government authorities are responsible for providing waste collection, transport and reprocessing or disposal to landfill services. Regional waste management groups are responsible for planning and coordinating municipal solid waste for local government authorities within their regions, as well as helping communities reduce waste, maximise recovery and reduce environmental harm.

There are many existing and emerging industries in waste management, particularly in terms of recovery, reuse and recycling of waste. Energy generation from waste is an expanding industry in Victoria. There are also opportunities to promote the recovery of waste to recycle it for use in other production processes, either as recycled waste for re-manufacturing or as new products created from recycled materials, such as generating energy from waste. Promoting these opportunities would help reduce the amount of waste going to landfill.

Waste management in the Loddon Mallee North region

Buloke Shire has five main landfill sites:

- Birchip – with an expected lifespan of at least 50 years
- Charlton – expected lifespan of at least 20 years, Donald expected lifespan of 10-15 years
- Culgoa – an expected lifespan of 20 years
- Wycheproof – with an expected lifespan of 5 years.

In addition, there is landfill at Nandaly (5-10 years), a transfer station at Sea Lake and recycling centre at Watchem. Charlton, Donald and Birchip landfills are proposed to be upgraded to accommodate future demand, and other sites closed and rehabilitated to rationalise facilities.

Campaspe has eight waste transfer stations.

Gannawarra has one landfill with approximately 50 years capacity.

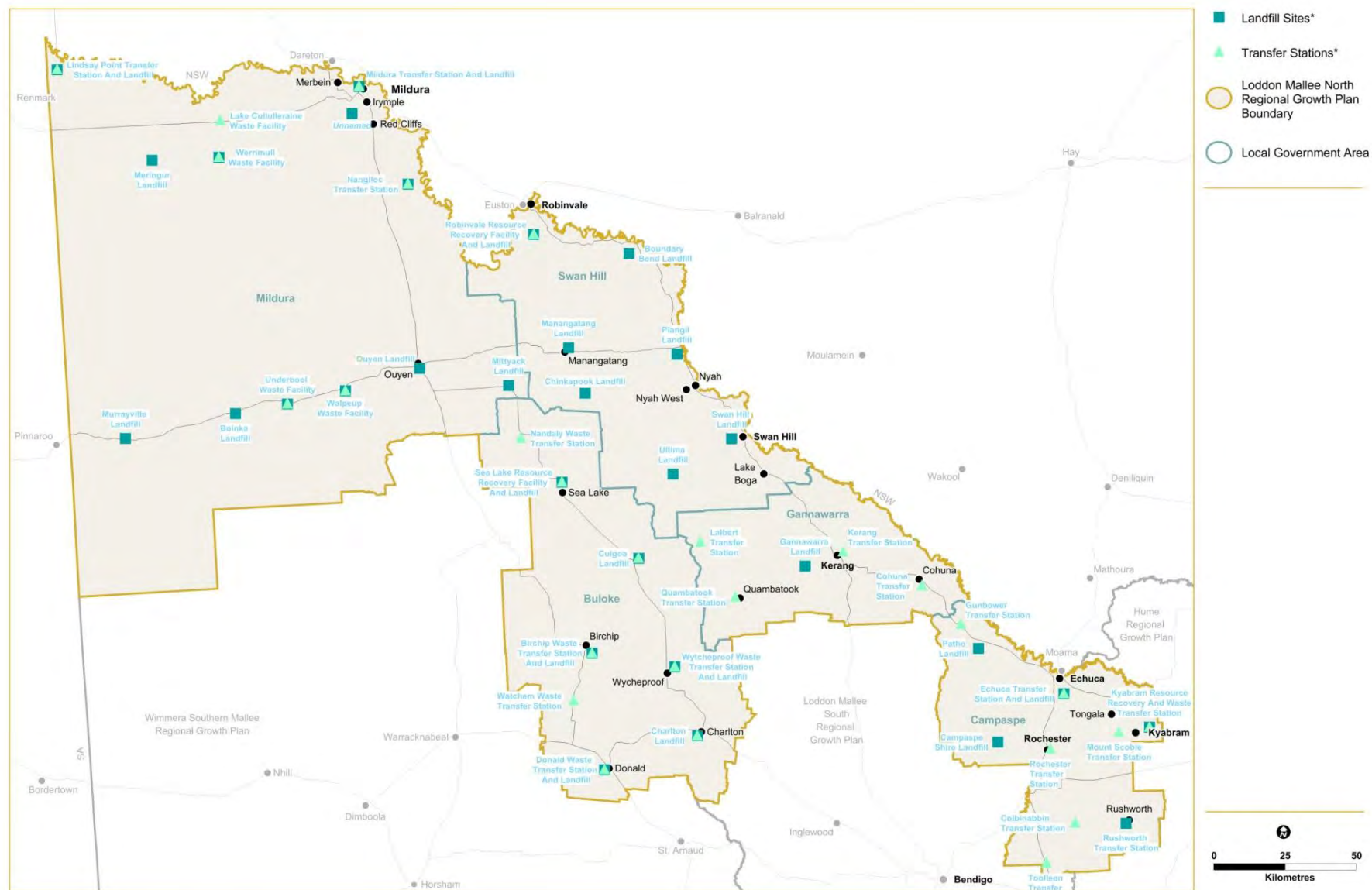
There are nine landfills in Mildura and six landfills in Swan Hill.

Consultation during development of the plan identified the need to provide appropriate waste disposal across the region to support industry growth. Landfill and transfer stations in the region are shown in Figure 20.

¹⁴ Taken from PGA Utilities Infrastructure Report May 2013

Loddon Mallee North Regional Growth Plan Background Report

Figure 20: Landfill and transfer station locations across the region



Source: Department of Transport, Planning and Local Infrastructure

Implications for the plan

- Victorian waste generation is expected to increase by around four per cent per year. The plan needs to consider how it will prepare for and manage the waste associated with the proposed growth. As the recently released Victorian Waste and Resource Recovery Policy (Victorian Government, 2013b, page 16) states:
 - *“As our cities grow, securing land for our waste management facilities is a challenge. As population increases our waste generation increases and as we strive for world’s best practice environmental standards, finding and securing land for waste management facilities is likely to become even more difficult.*
 - *Successfully securing land close to transport corridors, points of waste generation and end markets, and where possible co-locating activities to achieve economies of scale, relies on coordination across the environment portfolio, land use planning and transport, and local government and industry investors.”*
- The plan can encourage future strategic land use planning of councils to include consideration of waste management, such as protecting buffer zones around these sites from incompatible development.
- There are opportunities to encourage and support investment in advanced technology that can convert waste into energy or fuel products in the region. The plan and local planning should encourage and enable such developments, where appropriate.
- The region should consider an integrated and coordinated approach to waste management into the future as the region grows.
- Business and industry within the region should be supported in their efforts to realise the economic benefits of boosting resource productivity through waste recovery and reuse, including the exchange of waste materials for reuse and mutual benefit.

7.2 Transport

Transport networks throughout the Loddon Mallee North region include routes of national significance, linking Adelaide, Sydney, Brisbane and Melbourne, and connecting the region to the critical ports of Portland, Geelong, Melbourne and Hastings.

The Calder, Sunraysia and Murray Valley highways are the key routes by road to the region, particularly for freight. Complementing these highways is the Loddon Valley Highway which links Bendigo and Kerang. The Mallee Highway provides an east west route within the region as does the Sturt Highway connecting Adelaide to Sydney. The Northern Highway is an important connector through to Melbourne for Echuca and southern New South Wales.

The rail network plays a significant role for both freight and passenger transport, as does Mildura Airport, the third busiest passenger airport in Victoria.

7.2.1 Transport policy context

Victorian Freight and Logistics Plan

The Victorian Freight and Logistics Plan was released in August 2013. It examines long-term freight forecasts for Victoria up to the year 2050 and will use these forecasts to create and model a wide range of freight network scenarios to inform decision making for future projects and initiatives. The Victorian Freight and Logistics Plan also encompasses previous policy such as Growing Freight on Rail and the Transport Solutions Framework.

Victoria’s submission to Infrastructure Australia 2012

The state government submitted a number of projects to Infrastructure Australia in 2011. The 2012 submission updated the 2011 submission and includes several projects arising out of the development of a metropolitan

planning strategy, regional growth plans and the Victorian Freight and Logistics Plan. Projects submitted to Infrastructure Australia for consideration, relevant to the Loddon Mallee North region, include:

- High Productivity Freight Vehicles Upgrade Package
- Murray Basin Transcontinental Rail Link, including converting the Geelong-Mildura line to standard gauge
- Sturt Highway – Mildura Truck Bypass
- Transport Solutions
- Murray River Crossings (Echuca and Swan Hill)
- Upgrade Regional Passenger Lines

The National Airports Safeguarding Framework (2012)

The federal government's Aviation White Paper 2009 proposed the development of a national land use planning framework to:

- improve community amenity by minimising noise-sensitive developments near airports including through the use of additional noise metrics and improved noise-disclosure mechanisms
- improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety-related issues.

In 2012 the National Airports Safeguarding Advisory Group started work on developing the National Airports Safeguarding Framework. The framework has a number of guidance notes including:

- the principles of the framework
- measures for managing impacts of aircraft noise
- managing the risk of building generated windshear and turbulence at airports
- managing risk of wildlife strikes in the vicinity of airports
- managing the risk of wind turbines as physical obstacles to air navigation
- managing the risk of intrusions into the protected airspace of airports.

The national land use planning framework will ensure future airport operations and their economic viability are not constrained by incompatible residential development.

Each state government will implement the framework into its planning system.

Cycling into the Future 2013-23

The Victorian cycling strategy, Cycling into the Future 2013-23, has been released and supports cycling as a means of meeting transport needs and supporting vibrant, healthy urban communities in regional Victoria. Cycling can play an important role in all urban centres and the state government will continue to work with local government authorities to plan urban cycling networks, and identify priorities for new cycling paths, as well as opportunities to construct missing links on existing paths.

7.2.2 Economy and transport

This section provides an indicative overview of the region's economic flows and interactions. The last part of this section provides an analysis of journey to work patterns within the region which informs the functional economic areas defined as the main unit of analysis in the next section.

Rail freight

In other states standard gauge rail dominates while in Victoria broad gauge is predominant. Therefore, it may be prudent to consider standardising the gauge in the region to increase rail freight competition as a way of attracting more freight to rail. The state government's Victorian Freight and Logistics Plan may provide an impetus for rail

freight. It should also be noted that the Mildura rail line was upgraded a couple of years ago with provision for future conversion to standard gauge.

Long distances to and from the region makes rail freight haulage a viable option. Rail freight is also best for bulk products, such as sand and stone, mineral sands and grain, as well as containerised agricultural commodities. Intermodal terminals at Merbein and Donald have been upgraded and grain receivals have been consolidated at fewer, more efficient silos. Further development of rail infrastructure could potentially be driven through a possible link to the Transcontinental Rail Link and increased use of rail for mineral sands transport and other freight. Conversion of key lines to standard gauge may be required to achieve this.

Equally the nature of the region's economic base and farming products may change into the future. If this occurs the freight task may change, requiring different forms of infrastructure investment over and above rail standardisation.

Grain transport will be a requirement across the Loddon Mallee North region for the foreseeable future and ensuring access routes to market is critical to ensure farmers remain competitive and profitable. Retention of the region's rail freight network in good condition to support efficient grain train times to ports will ensure grain continues to be transported by rail. A change in the agricultural mix of the region may result in increased stock numbers over time and this may have implications for the freight task.

Road traffic flows

Major thoroughfares in the region, together with their respective routes, are shown below:

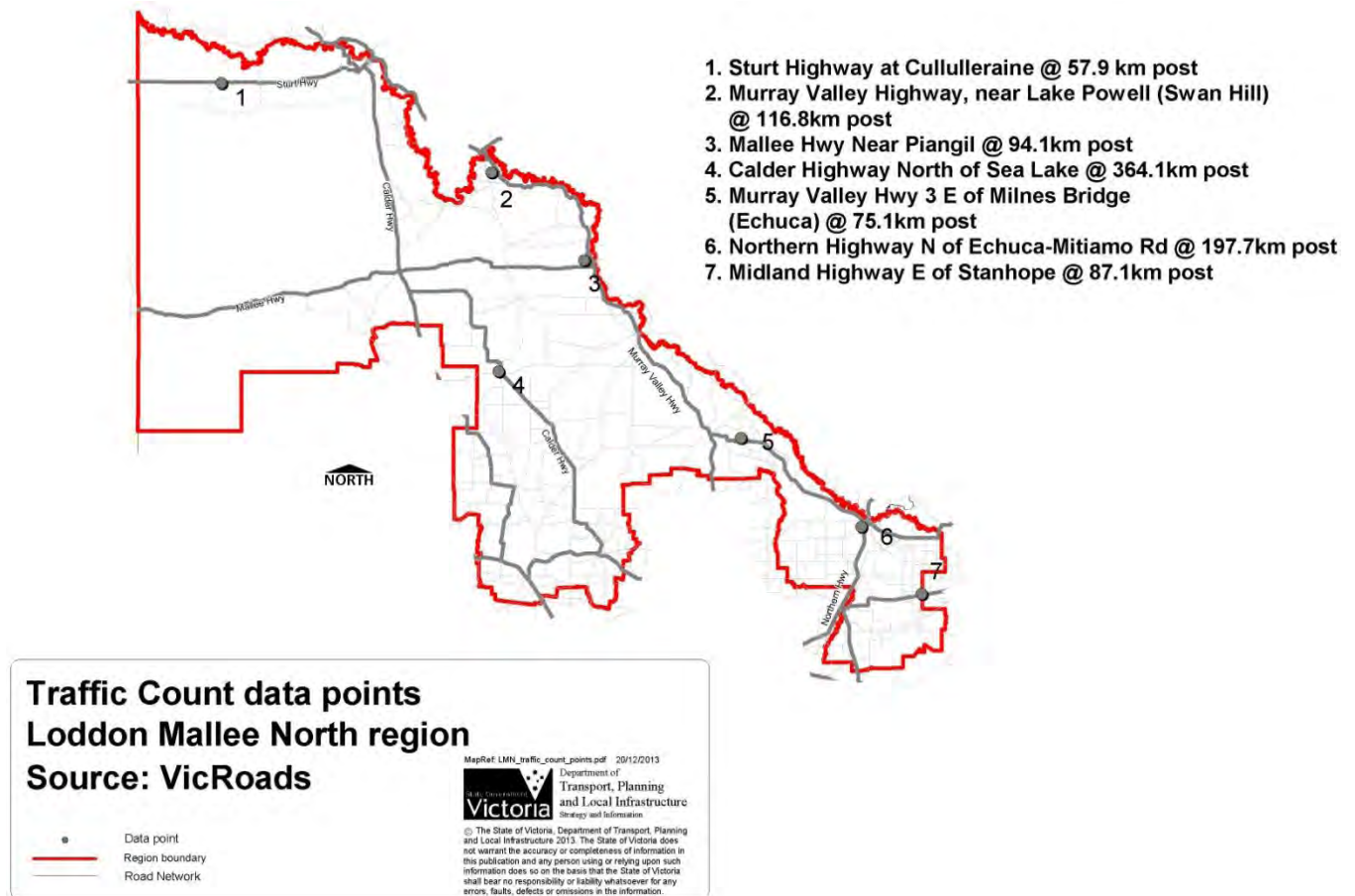
- Calder, Sunraysia, Murray Valley, Loddon Valley and Midland highways – main freight and private car transport routes connecting the region with southern and central Victoria
- Mallee, Northern and Sturt highways – main east-west links connecting the north-west of the region with South Australia and New South Wales.

These highways serve as the region's key links to neighbouring regions such as Loddon Mallee South, Wimmera Southern Mallee, Hume and border towns/local government areas in South Australia and New South Wales.

Key arterial routes and the traffic count data points used by VicRoads to assess traffic volumes are shown in Figure 21. Calder Highway (4) and Sturt Highway (1) had the highest annual traffic growth for all vehicles from 2006 to 2010. Calder Highway (4) had the highest annual traffic growth for trucks for the same period (Figure 22).

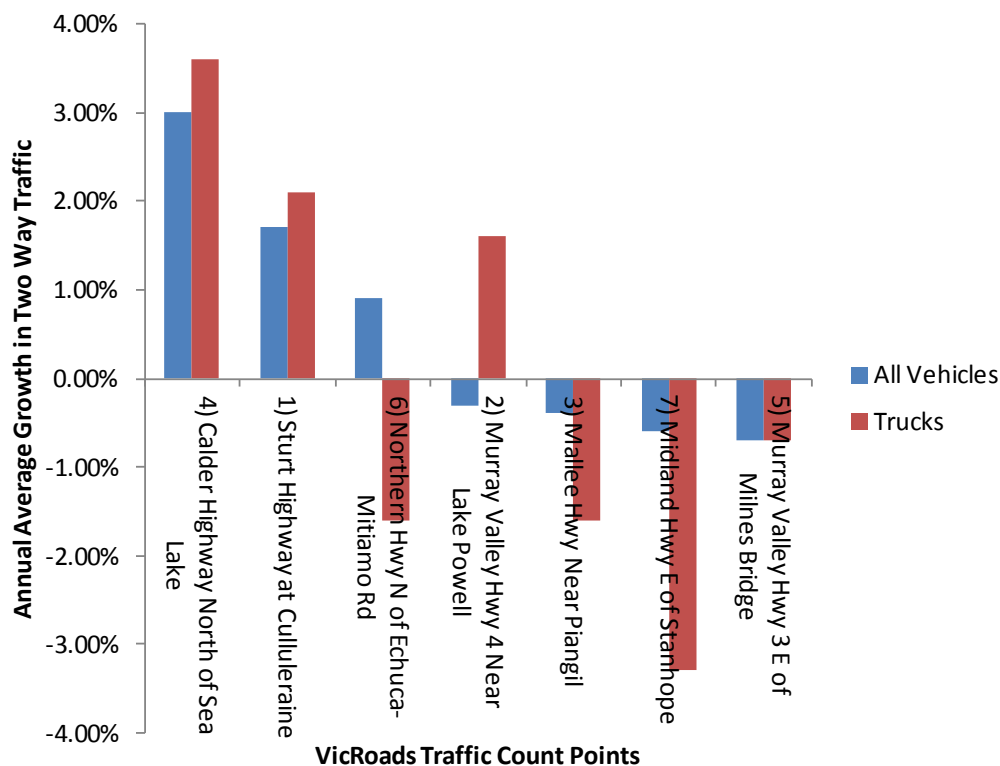
The raw traffic count data also indicated that the Northern Highway (6) is the busiest thoroughfare for all vehicles and trucks in the region. The annual average daily truck traffic on the Northern Highway (traffic count 6) is four times as much as that on the Mallee Highway (3). The data therefore illustrates the importance of both the Calder Highway and the Northern Highway as the region's key transport links and key freight routes.

Figure 21: Traffic count data points



Source: VicRoads

Figure 22: Compound growth rates, two-way, 2006 to 2010, traffic count data points



Source: VicRoads

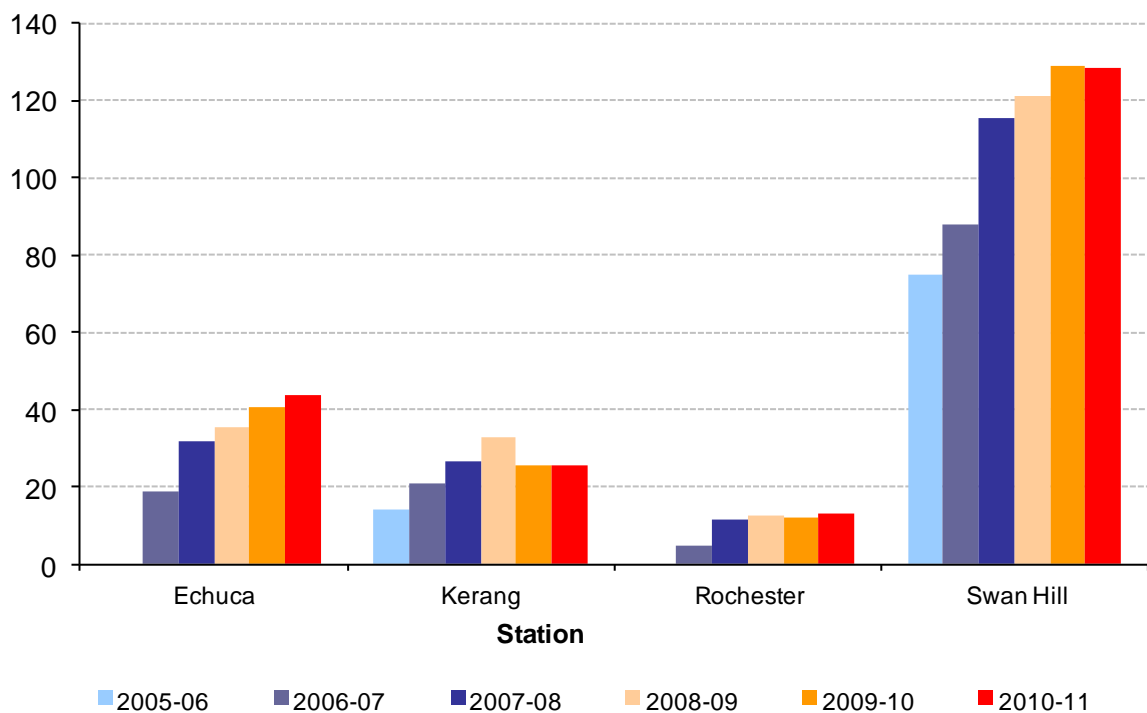
Passenger transport services

Passenger rail services connect Swan Hill and Echuca via Bendigo to Melbourne. Passenger rail enables daily or regular commuting to Melbourne for business or leisure. Loddon Mallee North has four railway stations, two of which are at Echuca and Rochester in Campaspe Shire. Swan Hill and Kerang (Gannawarra Shire) have one railway station each. At present Mildura's rail line is used, and suitable, for freight only. V/Line also operates bus services from the major towns and other smaller centres which connect to the Melbourne-Bendigo train service (Figure 24).

The bus network also connects Mildura with smaller towns in the region and beyond, including to Robinvale, Ouyen, Broken Hill and Horsham. Birchip and Donald have bus links to Horsham, and there are other local and community bus services within and between many towns in the region.

Figure 23 shows the estimated normal weekday rail patronage in Loddon Mallee North, by station. In 2010 – 11, 61 per cent of the estimated normal weekday patronage came from Swan Hill station, with 21 per cent from Echuca station

Figure 23



Source: Public Transport Victoria

Journey to work patterns

Aside from being a valuable input to model current and future transport planning and service provisions, journey-to-work data can also provide an indication of the economic flows and linkages within the region and with surrounding areas as well. All the local government areas in the region have a high journey to work containment, with more than 80 per cent of journeys to work within local government area boundaries (Figure 25).

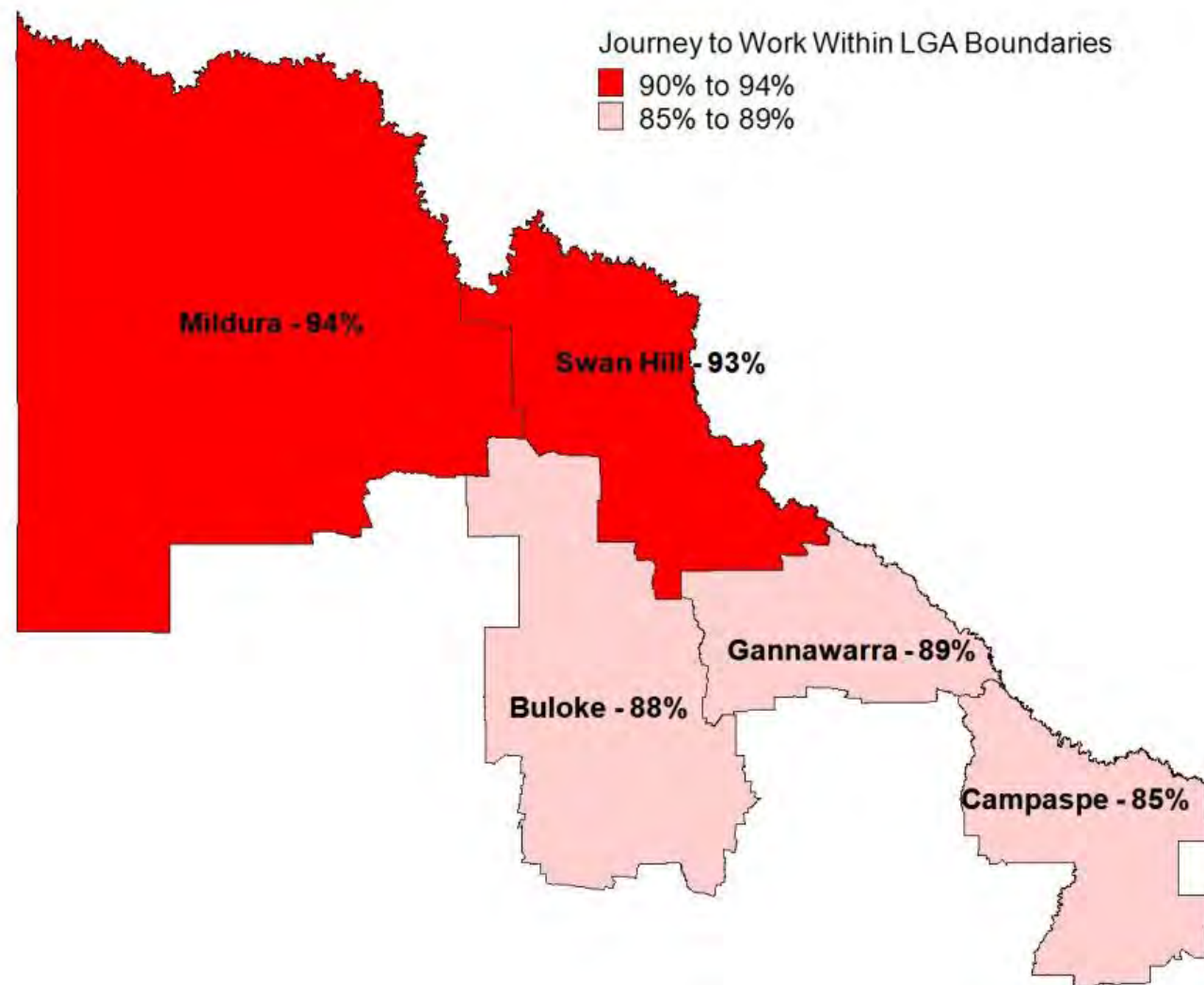
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Figure 24: Travelling with V/Line



Source: Public Transport Victoria

Figure 25: Journey to work within local government area boundaries



Source: Australian Bureau of Statistics *Based on place of usual residence, 2006

There are a number of other transport considerations that should be noted:

Local roads

Local roads in the region are part of the regional transport network which provides connectivity within and between settlements. Often they are used by freight vehicles in order to reach the arterial road network. With the advent of higher productivity freight vehicles this local road network may need to be reviewed to assess the suitability of the local road network for first and last mile carriage.

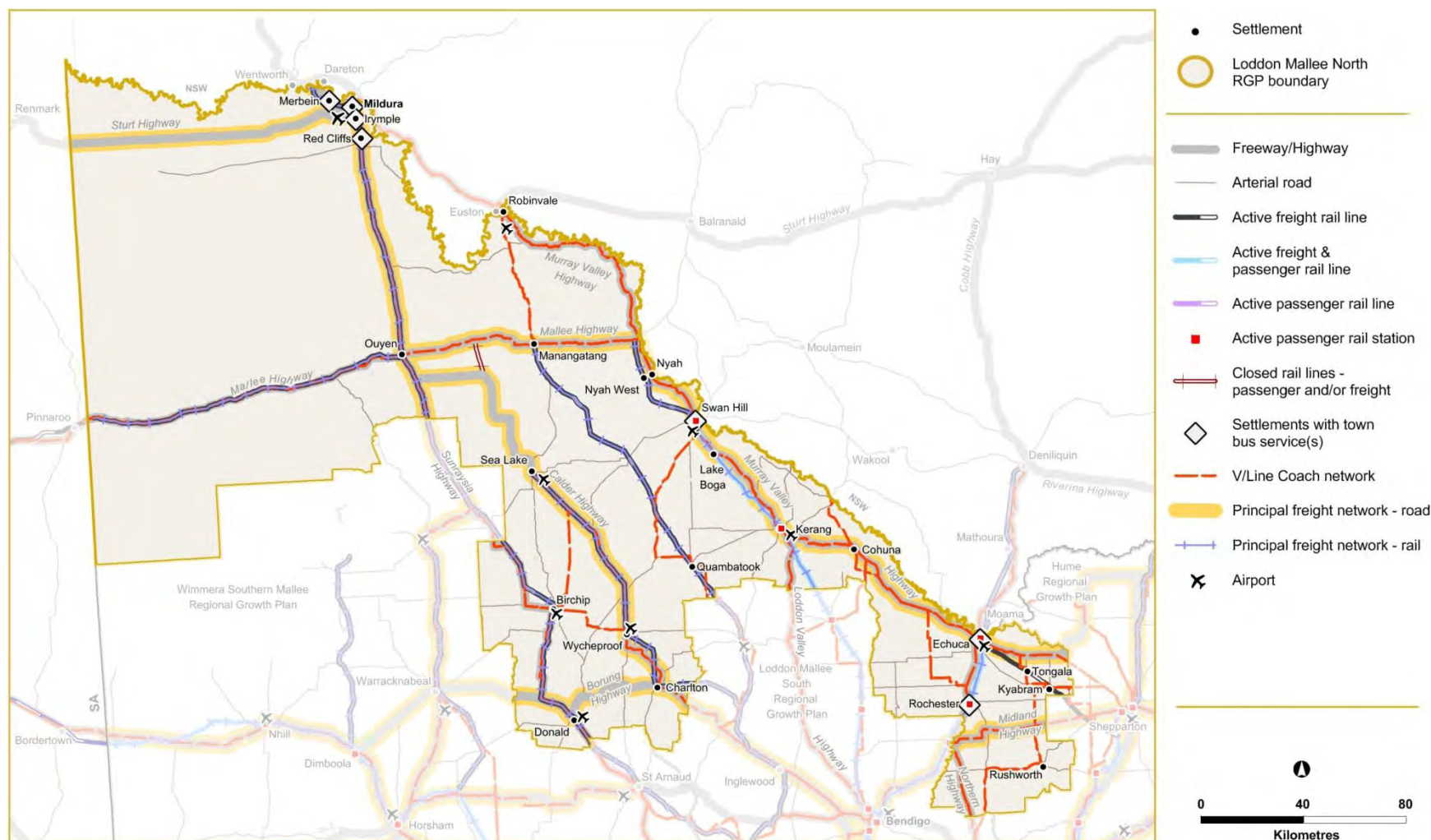
Airports

The region has a significant airport in Mildura that has regular passenger air services to Melbourne, Sydney, Adelaide and Broken Hill operated through Qantas, Rex and Virgin Australia. It is the busiest airport in regional Victoria, and is both a significant transport asset and economic driver for the region. It is the third largest passenger airport in Victoria, after Tullamarine and Avalon. Mildura Rural City Council has plans to grow and develop the airport and associated business and activities into one of the nation's major regional passenger and freight centres.

The region also has several smaller airports, such as Swan Hill that provide a variety of services including air ambulance and other medical air services. Airport locations are highlighted on the strategic transport assets map (see Figure 26).

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Figure 26: Strategic transport assets



Source: Department of Transport, Planning and Local Infrastructure, 2013

7.2.3 Guiding future transport opportunities

There are differing needs for freight and people movement. These require different solutions, and the future directions of the transport network need to be considered in this light. It will be important to enhance and build on existing infrastructure to ensure access and connectivity. Future directions form part of the plan. Issues that have been raised during consultation that support the inclusion of the future directions are included in this section.

People movement

Network capacity

As key settlements such as Mildura grow there may be a need to mitigate any negative impacts that traffic and/or congestion could cause. Good walking and cycling networks providing access to and from developments into key employment nodes could be considered as an alternative to private vehicle use. Equally, improved public transport access within urban centres could play a role and assist in mitigating any traffic impacts. There are a number of measures that can provide people with travel choices and contribute to improved liveability in towns and centres including park and ride facilities, parking restrictions, bus lanes and shared zones.

Access and connectivity

The region's transport network provides for accessible intra- and inter-regional travel. These connections will be crucial into the future as they will provide access to employment and a range of services and facilities such as health and education. Major road linkages, particularly between adjoining regions, need to be strengthened to allow for access to services and facilities such as between Echuca and Bendigo. Likewise, to the north of the region transport links may need to be strengthened between Mildura and Adelaide.

Improved and strategic crossing points over the Murray River into New South Wales will be required in many cases to facilitate access for New South Wales residents to services and facilities in Victoria and in so doing contributing to the regional economy.

The Loddon Mallee North region has a number of smaller, dispersed communities. Smaller towns provide services and facilities for rural communities. Larger urban centres such as Mildura, Swan Hill, Kerang and Echuca provide these smaller settlements with access to high order services and facilities including transport such as air and train services to Melbourne. A feasibility study is currently underway to look into returning passenger rail services to Mildura.

The presence of short-haul rail services has been shown by connectivity analysis to have a significant effect on population growth in a town, and within a broad geographical area beyond the town. Some smaller towns are not earmarked to receive major growth, from a regional perspective some may even decrease into the future. The region anticipates an increase in passenger movements within major urban centres and between urban centres. With an ageing population, increased use of public transport is anticipated to access higher order services.

The plan outlines a hierarchy of settlements, with smaller settlements encouraged to plan as a cluster to maintain critical mass and maximise opportunities for public transport and increased access to services.

A safe, reliable and resilient network

Economic development scenarios will be important to ensuring a vibrant economy, such as ease of access to allow for the development of the tourism industry. In order to achieve this, the transport network needs to offer reliability to both passenger and freight vehicles and be able to withstand disasters and emergencies such as bushfires and flooding. Access will be crucial due to the widely dispersed centres offering higher order services and facilities, such as medical services to a variety of smaller communities across the region.

Amenity and useability

The Loddon Mallee North transport network is used by a variety of people to access business and pleasure opportunities. Ensuring the network is well maintained will be important into the future. There is a need to consider facilities such as rest areas for tourists as they travel through the region. This will be necessary to support a more diverse economy and make best use of the tourism products and opportunities.

Freight movements

Freight and logistics precincts

The region is considered to be part of the nation's food bowl and this is likely to continue into the future. Provision may be needed to accommodate changes in freight logistics into the future; such as the use of high productivity freight vehicles. This is particularly important given the region's geographic location as a link between the two bordering states. Proposed projects, such as the Transcontinental Rail Link and the Mildura Truck Bypass on the Sturt Highway, may provide opportunities to create freight and logistics precincts in these areas. There are existing intermodal freight terminals at Donald and Merbein.

Network capacity

The region has a number of key corridors that provide not only north-south movements but east-west links. There are opportunities for improvements to both the road and rail network for freight particularly given future changes to the logistics industry and its operations not least of these being the use of larger vehicles. Vast distances need to be covered to many export locations such as ports and there is potential to build on the region's existing corridors to prioritise strategic freight routes for both rail and road.

Connectivity for freight

Ensuring freight access for the current commodities and new commodities will be important into the future. Proposed projects such as rail standardisation on the Mildura rail line, a truck bypass of Mildura as well as improved crossings over the Murray River at Swan Hill and Echuca, would enable improved access for freight.

A safe, reliable and resilient network

The Loddon Mallee North region has a number of rural areas with business-related activities such as those linked to horticulture that require freight access for their commodities using the local road network. This means that in many circumstances local roads are used by heavy trucks to collect and distribute commodities. This puts a strain on the maintenance of local roads. With the advent of larger and potentially heavier trucks and the consolidation of farming practices, a review of the local road network may be required to ascertain its suitability for future freight use.

Supply chains

It will be important into the future to understand the nature of the freight task to ensure connections to the region are protected and enhanced for maximum supply chain efficiency. Opportunities may exist to expand and use some regional airports to carry perishable freight products to markets. There may also be an increased number of in-region supply chains if value-adding industries, such as food processing, expand.

Implications for the plan

- Review transport and infrastructure provision in key urban areas to keep pace with growth.
- Plan for flexible and adaptable freight connectivity to the transport network to cater for changes in commodities being carried and freight logistics operations into the future.

- Integrated transport planning, across all modes of transport, considers and supports the most efficient means to transport freight. Therefore strategic upgrades to road and rail are planned to support economic growth and efficient freight networks.
- Incorporate the future directions into future local and regional planning reviews and structure planning to ensure infrastructure keeps pace with changes in demography, land use and with economic and social development.
- Set aside land to identify and protect corridors for future road and rail projects using appropriate zoning and overlays.
- Maximise the strategic position of the transport network to encourage settlement and economic growth along existing transport infrastructure.
- Support infrastructure projects into the future to assist growth.
- Small and declining population centres are encouraged to plan as a cluster to maintain critical mass and maximise opportunities for public transport and access to services.

7.3 Communications and other physical infrastructure

The National Broadband Network will have impacts on land use and settlements; and may strengthen opportunities to reinforce and diversify the region's economy.

Information and communications technology will improve into the future, with the roll out of the National Broadband Network providing access to faster and more reliable internet connections. The health and education sectors are leading the way for remote access to services and facilities normally provided in a fixed location. On-line educational courses and rehabilitation via remote health monitoring are two examples.

As the population ages (a population familiar with the technology) distance service provision will become critical particularly in rural and remote areas. Improved information communication technology may also mean people do not need or want to travel long distances or frequently. A mix and match communication style may evolve, whereby people access some services by train journeys on some days and use internet access for other days.

Improved information communication technology could also benefit existing businesses, primarily in smaller towns, as the internet becomes more viable for purchasing goods and services in remote and isolated locations.

Implications for the plan

- Potential for varied demand for local businesses and shopfronts, a different type of commercial land use with people working from home and purchasing online.
- Possible threat to local labour force if tasks can be outsourced.
- Increasing rate of service withdrawal from communities.
- The National Broadband Network will have implications for how people access services in the future, including retail, banking and government services.

7.4 Social infrastructure

Social infrastructure is vital for the sustainability and resilience of communities and enhances liveability and wellbeing. Planning for community and social infrastructure and subsequent provision is undertaken by relevant agencies, although land use planning can facilitate this process by providing the strategic policy and planning for complementary services, land uses and infrastructure, and promoting shared uses and locations to maximise efficiencies and reduce costs.

Education facilities

The Loddon Mallee North region has one university in Mildura and TAFE campuses in Mildura, Ouyen, Echuca, Robinvale, Kerang and Swan Hill. There are 31 secondary schools, including combined primary/secondary schools,

across 17 regional centres and towns (Planisphere, 2009). The region has low levels of education retention, with 23 per cent of students leaving school before years 10 to 12, compared with 15 per cent for metropolitan Melbourne (Change and Disadvantage in Regional Victoria, Department of Planning and Community Development 2011).

The Loddon Mallee North Connectivity Analysis identified that the presence of secondary schools has the greatest effect on population growth in a town, followed by Medicare offices, university campuses and general hospitals. This demonstrates that access to social infrastructure is vital for the sustainability of towns.

Community facilities

Most centres and towns in the region have a Country Fire Authority or integrated fire brigade. These facilities are not only critical for bushfire protection and mitigation, but also act as a hub for social activity and communication within communities.

There are rural hospitals with emergency departments in Mildura, Swan Hill and Echuca, and eight rural hospitals without emergency departments.

Other important community facilities include recreation and leisure facilities such as swimming pools, sports grounds and recreation centres, which enhance community health and wellbeing and provide opportunities for interaction and community gatherings. Amalgamations or loss of town and district sporting teams as populations decrease has been seen as a critical indicator of resilience for smaller settlements. Significant sporting and community events in the region include the Southern 80 Water-ski Race in Echuca, speedways and horse races, craft and farmers' markets, agricultural shows and field days, the Quambatook Tractor Pull, and festivals for food and wine, music and arts.

There are a range of arts and cultural facilities in the region. Mildura has a significant arts precinct with a performing arts centre and an art gallery that has recently been upgraded. There is also a regional art gallery and performing arts centre in Swan Hill, and a proposal for an arts space in Echuca-Moama.

There are libraries in Mildura, Irymple, Merbein, Red Cliffs, Swan Hill, Echuca, Rochester, Kyabram, Rushworth, Tongala, Kerang, Cohuna, Quambatook and Leitchville. Swan Hill Regional Library provides a mobile library service for Gannawarra and Buloke shires. Wimmera Regional Library and Goldfields Library also provide mobile services to Buloke communities, while the Mildura mobile library services towns including Ouyen, Murrayville and Underbool. Smaller communities in Campaspe have access to library services through depots.

Implications for the plan

- Transport links to regional universities within and external to the region need to be considered.
- The possibility of disadvantage intensifying due to low income earners being attracted by cheaper housing in the region will have implications for access to and demand for a range of social and community services, as well as public transport.
- The plan considers the alignment of population and economic growth with access to appropriate social infrastructure, and the impacts of population change on existing infrastructure and health and wellbeing.

PART C: DEVELOPING THE GROWTH PLAN

8. Settlement framework

Currently 53 per cent of the Loddon Mallee North region's population live in the three main centres of Mildura, Swan Hill and Echuca. By 2031 this ratio is projected to increase to 61 per cent. This will create pressure on these centres to accommodate the population and provide necessary services. However, it will also put pressure on the remaining towns and localities across the region which may face a reduction in services as the population shifts.

The plan identifies where these changes will take place and provides the necessary policy support to ensure urban growth is sustainable and complemented by necessary services and infrastructure. The plan also identifies where the impacts of population decrease need to be managed and that towns where this is occurring continue to be supported.

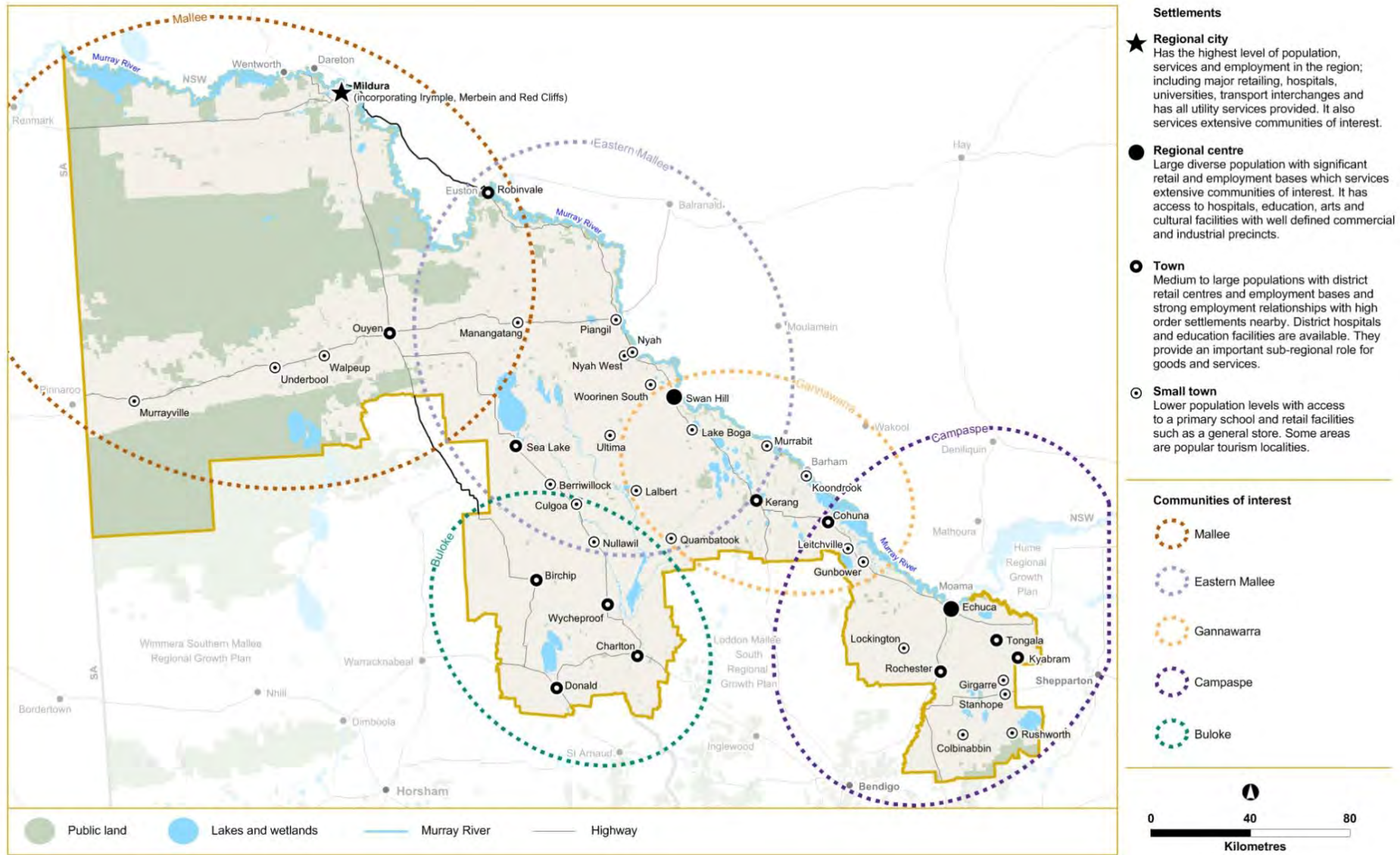
The region's proposed settlement framework is based on identifying and building on the existing communities of interest. A community of interest is a group of settlements with strong functional, social and economic interrelationships and/or share facilities and services. They are not strictly defined by geography. Residents will access services and jobs in nearby towns and some services and facilities may be shared between the towns in the community of interest.

A number of the land use strategies in the plan refer to the Loddon Mallee North's communities of interest. The plan identifies a number of higher level sub-regional groups of settlements in the region with strong interrelationships that provide services to a wider network of smaller towns and rural settlements. These are identified in the plan as Mallee, Eastern Mallee, Gannawarra, Buloke and Campaspe communities of interest (see Figure 27).

There are also more localised groupings of settlements between which residents regularly access services and jobs in nearby towns and some services and facilities may be shared between towns in the community of interest.

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Figure 27: Communities of interest



Source: Department of Transport, Planning and Local Infrastructure

Settlement typology

All cities, centres and towns in Victoria are identified based on a standard settlement typology, taking into account population size, level of services including medical facilities, education, commercial opportunities, social and cultural facilities, employment options, housing diversity, transport and access, and infrastructure provision (see Table 9).

Table 9: Settlement typology

Regional city (represented as a solid black star)

- Places: Mildura incorporating: Red Cliffs, Irymple, Merbein, Cabarita
- Function and role:
 - Highest level of population, services and employment in the region.
 - Urban areas encompass a variety of residential opportunities and housing densities with a clear commercial centre and smaller activity centres servicing suburbs.
 - Offers one of the highest level of goods and services in regional Victoria and has one major retailing centre and may include the head offices of major regionally-based firms, major retail firms, universities, regional hospitals and headquarters policing and fire services.
 - Services an extensive community of interest.
 - Provides major transport interchanges, for intra and interstate travel and is a significant freight destination.
 - Services a network of settlements on a regional scale and can influence the role of smaller settlements surrounding it from a lifestyle and commuter perspective.
 - All major utility services are provided for.

Regional centres (represented as a solid black circle)

- Places: Echuca, Swan Hill
- Function and role:
 - Services an extensive community of interest.
 - Large, diverse populations, housing at varying density, significant regional/district retail centres and employment bases.
 - Access to large hospitals (with emergency departments and acute and ancillary facilities) and provide a variety of general medical services and sometimes specialists.
 - All forms of education facilities can be found including major university and /or TAFE campus.
 - Well defined commercial and industrial precincts.
 - A wide range of arts and cultural facilities.
 - Act as the centre for access to specialised goods and services for a large rural hinterland and as staging points for the movement of freight and interchange points for rail, bus and air transport.
 - All major utility services are provided for, although no reticulated gas as yet in Swan Hill.

Towns (represented as a black circle with white dot in centre)

- Places: Kerang, Kyabram, Rochester, Robinvale, Ouyen, Cohuna, Wycheproof, Sea Lake, Birchip, Donald, Charlton and Tongala.
- Function and role:
 - Have medium to large, diverse populations, housing, district retail centres and employment bases.
 - Larger towns have access to district hospitals (may have emergency department and some acute and ancillary facilities) and provide a variety of general medical services.
 - Most levels of education can be found including TAFE campuses in the larger towns but not university.
 - Have well defined commercial and industrial precincts.
 - Some towns have strong employment relationships with larger high order settlements nearby.

- A range of arts and cultural facilities.
- All utility services provided for with some larger towns having access to reticulated gas.
- Provide an important sub-regional goods and service role, servicing smaller towns and rural area needs including local government, policing and ambulance services to a surrounding rural hinterland. Dedicated full-time policing and access to ambulance services are available in larger towns.
- In popular tourism localities, they can provide large-scale district accommodation and holiday home demand with significant seasonal variation in population and demand for services.
- Often closer to major regional cities and centres and their role may be more associated with lifestyle commuting or retirement living.

Small towns (represented as a small white circle with a black outline and a black dot in the centre)

- Places: Examples include Rushworth, Stanhope, Manangatang, Quambatook, Murrayville, Berriwillock, Lake Boga and Gunbower.
- Function and role:
 - Have low population levels.
 - Access to services such as a small primary school and general store with postal facilities may be found in a small retail area.
 - Connection to reticulated water is generally available, but access to sewer connection varies, generally dependant on geographic location and provided where environmental sensitivities are prevalent.
 - In popular tourism localities, their role may include a low level supply of visitor accommodation and holiday homes with seasonal variation in population.

Rural settlements (represented as a small black dot)

- Places: Examples include Lalbert, Piangil, Walpeup, Girgarre, Carwarp, Underbool, Lockington and Ultima.
- Function and role:
 - Small dispersed population with some small concentrations of housing and minimal services such as sole general store and primary school, reliant on adjoining towns for full range of services.
 - Connection to reticulated water may be available, but access to sewer connection varies, generally dependant on geographic location and provided where environmental sensitivities are prevalent.
 - In popular tourism localities, their role may include a low level supply of visitor accommodation and holiday homes with seasonal variation in population.

Growth support descriptors

The regional cities, centres and towns in the Loddon Mallee North region have a designated growth support descriptor in the plan. These descriptors identify the role each town plays, or is capable of playing, in accommodating and servicing future population growth in the region, and the intent of strategic planning for that settlement.

The categories and designations are based on an assessment of available and proposed services and facilities, infrastructure capacity, and considerations for growth. These constraints include natural hazards such as bushfire and flood risk as well as strategic economic, cultural heritage or environmental assets.

The role and function of the town is also an important determinant, where the resident population may be small but the town functions as an important service centre to a wider catchment. Table 10 summarises the growth descriptions for key cities and towns.

Table 10: Growth support descriptors

Promote growth (represented as a thick dark blue circle with an empty middle)

- Other terms in use: Targeted growth, focused growth, major growth
- Description: State Government and/or local councils will proactively encourage and facilitate opportunities for major scale private sector development in areas identified for significant growth in municipal strategic statements through development of framework plans, precinct structure plans, infrastructure planning and delivery, involving partnerships with private sector.
- Places:
 - Mildura (incorporating Irymple, Merbein and Red Cliffs)
 - Swan Hill
 - Echuca

Support growth (represented as a thin dark blue circle with a empty middle)

- Other terms in use: Managed growth, moderate growth
- Description: Proposals for medium scale growth consistent with municipal strategic statements will generally be initiated by private sector and sometimes local councils, with proposals favourably considered, providing usual development requirements are met.
- Places:
 - Robinvale
 - Kerang

Support sustainable change (represented as a thin, dark blue dashed line which forms a circle)

- Other terms in use: Reinforce role of existing settlement
- Description: Small-scale residential, commercial and industrial development and change can occur to provide services which would support more sustainable communities. Generally this would involve adding or extending township zone or urban zones.
- Places:
 - Kyabram
 - Ouyen
 - Cohuna
 - Birchip
 - Tongala
 - Donald
 - Rochester

Low growth (represented as a thin, dark blue dotted line which forms a circle)

- Other terms in use: Limited growth
- Description: Growth is constrained where:
 - severe risk, usually environmental, exists for the settlement
 - the impacts of the settlement on the local environment would be severe and difficult to manage
 - it is desired by local councils and communities to maintain township character, liveability and heritage values
- Places:
 - Charlton
 - Rushworth

8.1 Regional city

Mildura – Mallee community of interest

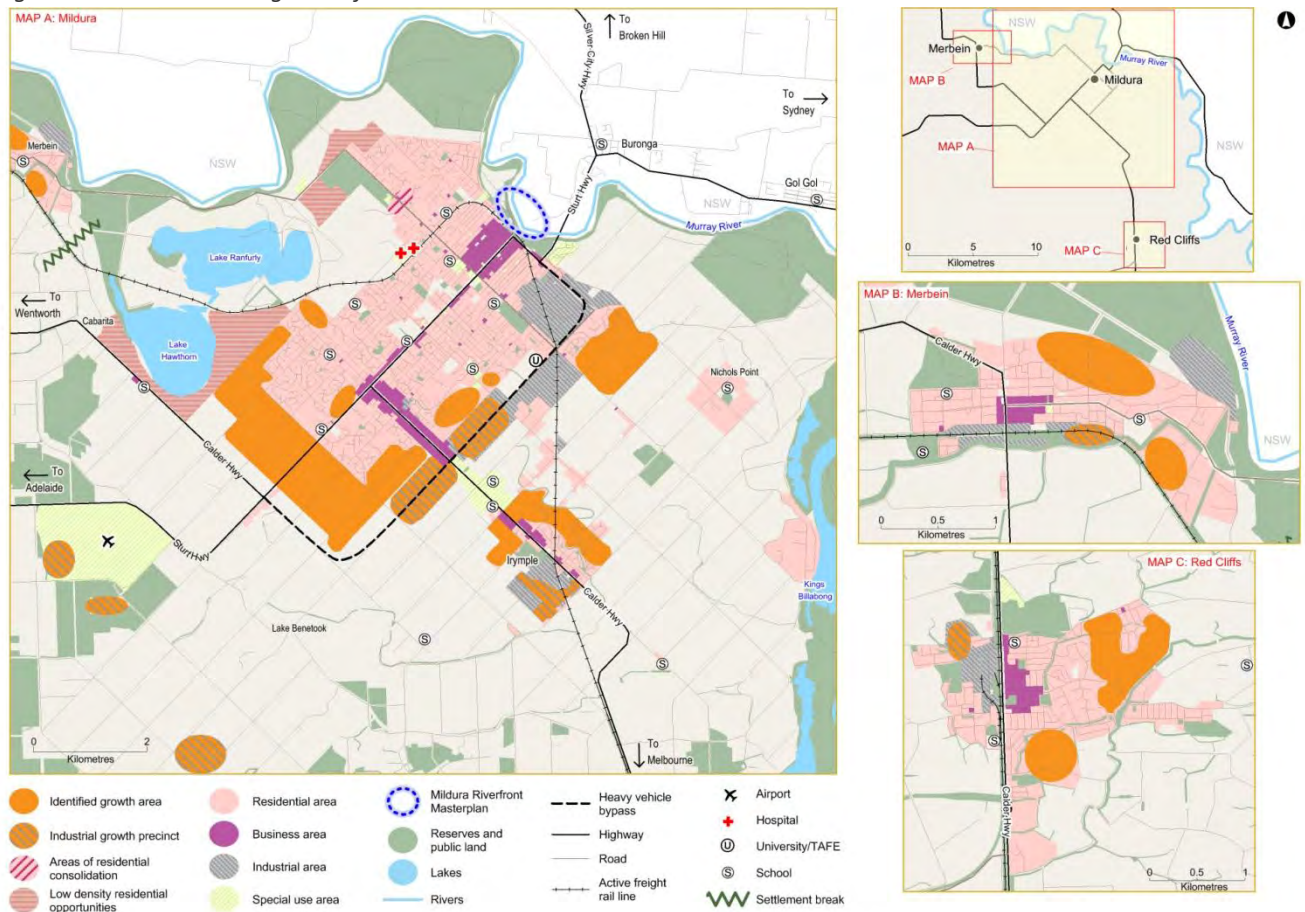
Mildura has a current population of 47,529 people (including Irymple, Red Cliffs and Merbein). The Department of Transport, Planning and Local Infrastructure has projected the urban population of Mildura in 2030 to be 60,000 people. However, according to Mildura's Municipal Strategic Statement, the population could be as high as 86,000 people by 2030. In order to meet this demand, an additional 500 dwellings per year would be required across the municipality.

Based on Victoria in Future 2012 figures (Table 7) the annual dwelling growth rate is more likely to average 334 per year. This equates to half of the total housing growth for Loddon Mallee North. It is anticipated 85 per cent of this growth will occur in existing urban areas of Mildura, Mildura South and Irymple. Within the suburb of Mildura there are 4322 residential zoned broad hectare lots, in Red Cliffs there are 972 lots, 679 lots in Irymple and 237 broad hectare lots in Merbein. This comprises the entire stock of zoned broad hectare land supply across the municipality.

Mildura's zoned residential land supply, including infill opportunities, provides in excess of 15 years' supply, although identified future investigation (currently unzoned for residential development) areas only provide six or seven years' supply. An additional 395 hectares of residential land will need to be rezoned to meet the projected high growth forecasts. Future growth directions for Mildura are shown in Figure 28.

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Figure 28: Mildura urban growth framework



Source: Department of Transport, Planning and Local Infrastructure

8.2 Regional centres

Echuca – Campaspe community of interest

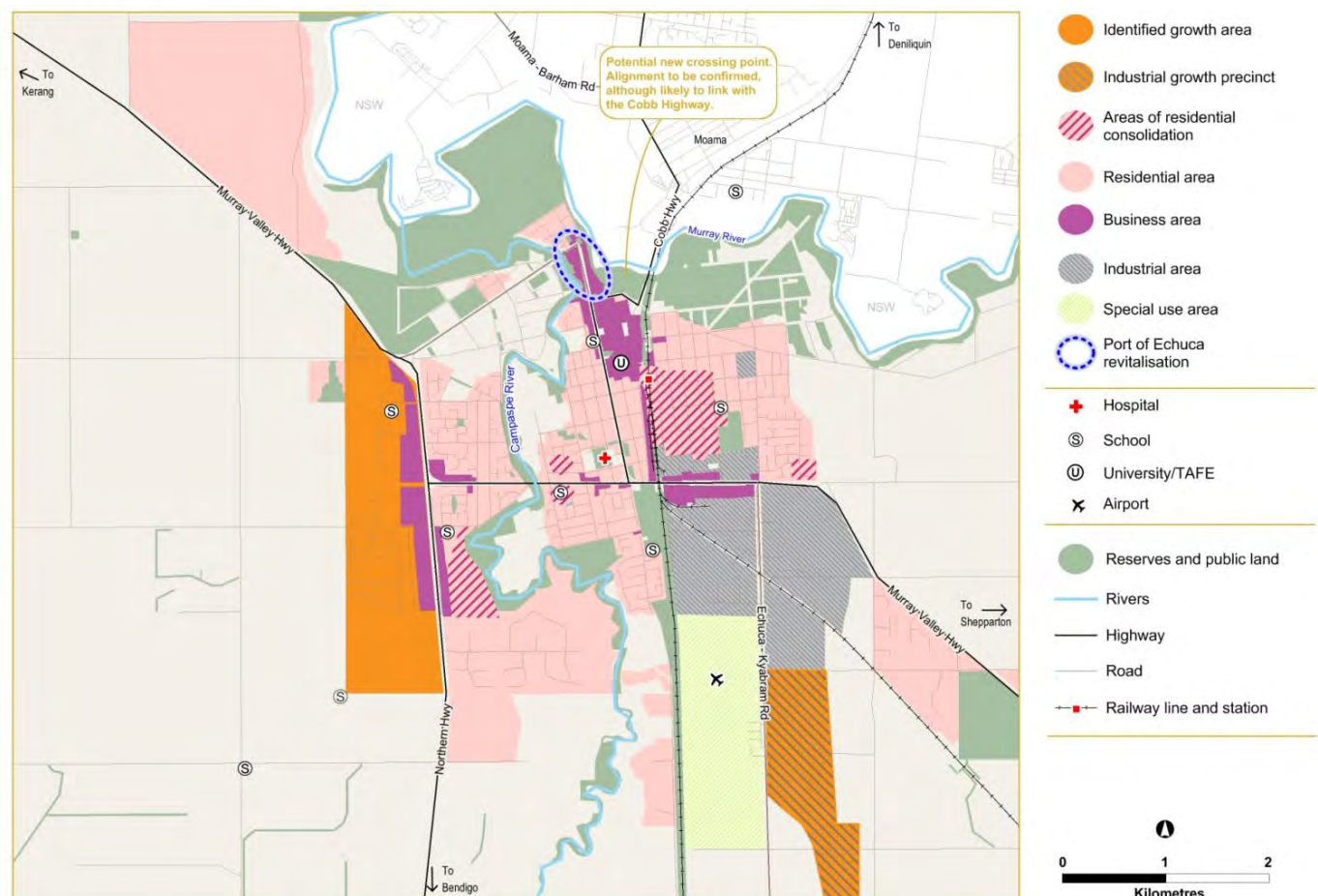
The current population of Echuca is 12,983 people¹⁵ and the projected population in 2030 is 18,000 people.

The Echuca Housing Strategy 2011 estimates new dwellings will be required at a rate of 111 dwellings per year until 2031 to meet projected demand. Key issues for housing supply and growth in Echuca are identified as a lack of diversity in the existing stock, lack of direction for growth fronts, lack of infrastructure, including sewage and drainage capacity, water availability, and lack of connectivity to transport.

Echuca has areas constrained by flood risks, which are identified by overlays, including the Land Subject to Inundation Overlay. It is located adjacent to significant environmental assets, including the Murray River.

Six growth precincts in Echuca West are anticipated to yield 5700 to 6700 lots and meet projected housing demand for at least 40 years. In addition, four infill precincts in the town were identified as having a potential yield of between 341 and 887 lots, and 12 brownfield opportunity sites had potential for 195 to 296 dwellings. The Campaspe Municipal Strategic Statement states there are existing infill opportunities for approx 190 lots over the next 10 years. Future growth directions for Echuca are shown in Figure 29.

Figure 29: Echuca urban growth framework



Source: Department of Transport, Planning and Local Infrastructure

¹⁵ Unless otherwise stated, the population figures for towns are based on the ABS Urban Centre and Locality classification

Swan Hill – Eastern Mallee community of interest

The current town population is 10,685 although Swan Hill Council Plan 2009-13 has as an objective to ‘actively seek to grow the regional population to 40,000 by 2040’.

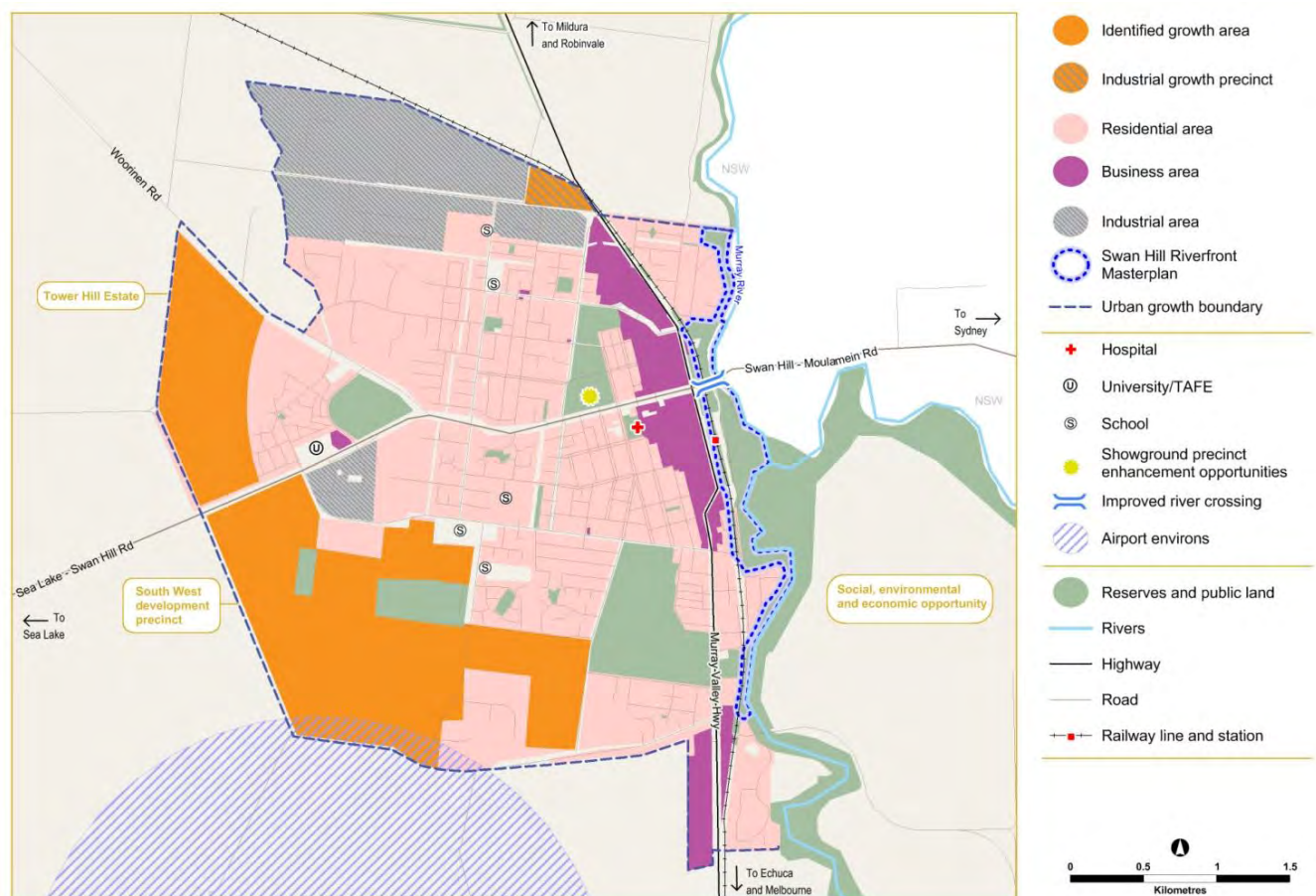
The Swan Hill Residential Strategy estimates 2277 new dwellings will be required by 2030, equating to 91 dwellings per year, and 323 hectares of additional residential zoned land. A total of 370 dwellings can be accommodated by infill in existing zoned land. This assumes 2.1 persons per household in Swan Hill, which is lower than the current average household size for the municipality of 2.53 and is also lower than the projected household size for 2031 of 2.37 persons per dwelling.

In 2006 there were 1783 residential zoned lots with notional residential development capacity, with a shortfall of the anticipated demand of 494 lots. Many of these lots are dispersed and fragmented in very small parcels, providing only limited infill opportunities. Residential growth will initially be focussed on the Tower Hill Estate, with the anticipated yield of 850 lots providing approximately 37 per cent of all new residential development in Swan Hill until 2030.

New residential development outside Tower Hill will be concentrated in the South West Development Precinct, which has potential for up to 1002 lots or 44 per cent of the required number of dwellings to 2030. This site requires further investigation and planning.

Swan Hill has areas constrained by flood risk, which is identified by overlays, including the Land Subject to Inundation Overlay. It is located adjacent to significant environmental assets, including the Murray River. Future growth directions for Swan Hill are shown in Figure 30.

Figure 30: Swan Hill urban growth framework



Source: Department of Transport, Planning and Local Infrastructure

8.3 Towns

8.3.1 Gannawarra community of interest

Kerang

Kerang has a current population of 3567 people. The population of both Kerang and Cohuna has been decreasing, although household numbers have been increasing, resulting in ongoing demand for housing at an average rate in each town of 12 dwellings/year between 2002 and 2007.

Future growth and development in Kerang is constrained by flood risk, with a flood levee circling the town, poor drainage and issues with effluent disposal. As a result, future growth will be encouraged within the existing township, and north and south of the existing urban area.

The Gannawarra Urban and Rural Strategy Plan anticipates demand for smaller, centrally located, dwellings to service an ageing population, as well as low density residential and rural dwellings. There are currently 41.5 hectares of vacant residential land, and 25 vacant Low Density Residential Zone lots in Kerang (Parsons Brinckerhoff, 2007).

There is pressure for rural residential developments to occur around the lakes north of Kerang and along the Gunbower Creek. The Gannawarra Shire is currently developing a Kerang Lakes Environs Study to help manage these pressures. The draft of this study was released in early June 2013 for public comment.

Cohuna

The population of Cohuna in 2011 was 1818 people, and while this figure has been decreasing, dwelling numbers have been increasing, at an average annual rate of 12 dwellings per year.

Cohuna is not as constrained as Kerang, although the land north-east of Gunbower Creek is subject to flooding and has areas of cultural heritage and environmental sensitivity associated with the creek and Gunbower State Forest and National Park, as well as significant areas of environmental assets on private land.

Cohuna has strong growth potential based on amenity qualities associated with its riverside location, commuting opportunities to Echuca and take-up of industrial land. The anticipated demand over the next 20 years is for 200 dwellings over 32.5 hectares. The current supply is 46.2 hectares of vacant Residential 1 Zone land, which is more than adequate.

Expansion of Cohuna towards the north west has the potential to decrease the distance between the settlement and significant areas of bushfire hazard. Expansion in this direction needs to be carefully considered.

8.3.2 Eastern Mallee community of interest

Robinvale

Robinvale had a population of 2134 people in 2011 and a hinterland population of 4330 people, with moderate growth expected over the next 30 years. The initial town plan of 1941 provided for a population of 8000 to 10,000 people. As a result of the wine and dry fruit industries the town is strongly multicultural, with many residents of Italian, Vietnamese and Tongan backgrounds. It also has a significant Aboriginal and Torres Strait Islander population who make up approximately 10 per cent of the population.

The Robinvale Land Use Strategy identified that under a moderate growth scenario there was 26 years of residential land supply already appropriately zoned, but to meet moderate or high growth demands to 2030, an additional 12 or 35 hectares (respectively) of residential zoned land would be required. Aside from population growth, Robinvale has housing issues with overcrowding of dwellings, lack of affordable and emergency housing and poor quality accommodation for seasonal horticultural workers.

Large areas of native vegetation are within close proximity to the settlement of Robinvale. These areas pose a risk to the settlement and expansion needs to be carefully considered in future structure planning.

Growth in the horticultural sector is likely to lead to demand for additional commercial and industrial zoned land. Some of the existing industrial zoned land is subject to flooding and is unlikely to be able to be developed.

Rural land to the east and west of the town is also subject to flooding and will require mitigation measures before it can be used for future urban zones.

Sea Lake

The population of Sea Lake was 615 people in the 2011 census. Buloke Shire considers Sea Lake to have potential to be promoted as a long-term viable economic centre. Lake Tyrell is a significant waterway for the region, and provides a high level of amenity through environmental values and recreation opportunities, as well as economic benefits from salt extraction.

Buloke Shire has proposed to establish an industrial estate in Sea Lake which would provide economic opportunities for the town and broader region. Agricultural producers are the primary employer in Sea Lake, followed by education facilities. Both these sectors are vulnerable to change.

8.3.3 Campaspe community of interest

Kyabram

Kyabram had a population of 5642 people in 2011. It has a primary role in the provision of essential services to its rural hinterland, although food processing is becoming increasingly important to its economy. Campaspe's Municipal Strategic Statement identifies that Kyabram is likely to have adequate land available for projected housing growth over the next 10 to 15 years, and proposes to accommodate growth primarily through infill of existing residential zoned land in the town.

Rochester

Rochester has a population of 2652 people and a significant milk processing and agricultural manufacturing industry. It is also a principal service centre for surrounding rural areas. Urban expansion of the town is constrained by the presence of high quality irrigated agricultural land around the town, as well as flood risk along the Campaspe River. The existing sewage treatment facility is a constraint due to the need for appropriate buffers.

Rushworth

The population of Rushworth is 981 people and the economy is focussed on tourism, heritage and essential services. Rushworth State Forest, the environmental asset that supports local tourism opportunities, is also a major constraint to urban expansion due to the risk of damage to environmentally sensitive areas and the bushfire risk associated with the forest. Rushworth has high amenity values due to its urban and streetscape character and heritage, although there are few employment and industrial growth opportunities.

Tongala

Tongala is a service centre for its local rural area and has a population of 1245 people. Agriculture, and in particular dairy, is the primary economic driver of the town. Food processing industries are also a significant contributor to the local economy. High quality agricultural land, including irrigation infrastructure, constrains opportunities for future urban expansion around the town.

8.3.4 Mallee community of interest

Ouyen

Ouyen is primarily a rural service town, located in the Mallee community of interest. It is a critical hub located on key transport routes for freight. The population declined by 1.6 per cent per year from 2001 to 2006, to a current population of 1082 people. Household sizes are shrinking yet the number of households is increasing. There is also a fluctuating population with a number of short term residents due to influxes of mining workers.

The Ouyen Structure Plan notes that there is a shortage of residential accommodation within Ouyen and identifies two potential future residential development sites within the existing township comprising 8.49 and 0.82 hectares. There are constraints related to contamination of the potential development sites, and other vacant land surrounding the township is constrained by distance from the town. There are numerous opportunities for infill development within the existing residential area, with 62 available lots.

Approximately 150 hectares of potential future industrial land has been identified.

8.3.5 Buloke community of interest

Birchip

Birchip had a population of 662 people in 2011. As with many other smaller towns in the region, Birchip has an important role as a rural service centre for local agricultural industries, particularly in the area of support for innovation and diversification in farming provided by the Birchip Cropping Group which plays a significant role in the community.

Charlton

Charlton has a population of 968 people. It has potential for economic growth through identified opportunities for small business development, increased tourism accommodation, and greater access to tertiary education. Any future residential or urban expansion is likely to be constrained by flood risk, unless additional mitigation measures are implemented. The Avoca River dissects the town and the majority of the town is covered by the Land Subject to Inundation Overlay, or the Flood Overlay.

Donald

In 2011 the population of Donald was 1355 people. The population decreased by 16 per cent between 1981 and 2011. One possible factor was the 1993 closure of the town's railway station. Despite this, Donald remains the largest centre in Buloke Shire. There is potential for economic growth through expansion of the industrial estate, and growth in the town's manufacturing industries. The nearby Astron Ltd Donald mineral sands mining operations, while not in the Loddon Mallee North region, present opportunities for employment and service delivery. The town also has heritage character and amenity.

Wycheproof

The population of Wycheproof in 2011 was 628 people. Wycheproof Saleyards are a significant contributor to the regional economy and community.

8.4 Small towns

8.4.1 Eastern Mallee community of interest

Nyah West

Nyah West has a population of approximately 566 people, a slight annual increase of 0.9 per cent since 2001. Dwelling numbers are increasing and average household size is shrinking.

Lake Boga

Lake Boga has had a steady population, with only an average annual increase of 0.5 per cent per year to 719 people in 2011.

8.4.2 Gannawarra community of interest

Koondrook

Koondrook has a current population of 769 people and household numbers have been steadily increasing. The average annual growth in dwellings was four dwellings per year from 2006 to 2011. Flood risk is a significant constraint for further growth, although the south and west of the town have reduced risk. The existing residential zone has capacity for 100 new residential lots, enough for 20 years supply. There is potential for low density residential development and rural living to the west where there is adequate sewage and little productive farming remains.

Quambatook

Quambatook is a rural support town, with a population of 232 people that is decreasing. It has available land for both residential and industrial development within the existing township zone, and has amenity and tourism strengths. It is identified as having an important role in the provision of services beyond the immediate population, and as such, has a higher level of services and facilities than would normally be expected for a town of its size.

9. Planning considerations for growth

A number of planning considerations have been identified for the region making some areas of the region impractical, impossible or undesirable for future residential or economic growth. This includes those areas subject to high risk of natural hazards, of significant amenity and tourism value, or lacking sufficient infrastructure to make growth feasible.

Many of these planning considerations can be mapped to show relative levels of planning considerations throughout the region (see Figure 31).

These considerations are assessed in more detail in the plan's growth frameworks for Mildura, Echuca and Swan Hill. Table 11 describes the levels of expected growth relative to role, function and size of key centres in the region.

Table 11: Growth plan categories

Significant growth (represented as a thick dark blue circle with a solid black star in the centre)

- Description: Most economic and population growth in the region will be focused here. Strong and sustained development of multiple or significant individual new housing areas on fringe or infill sites of cities.
- Settlements:
 - Mildura
 - Echuca
 - Swan Hill

Medium growth (represented as a thin dark blue circle encompassing a smaller black circle with white dot in centre)

- Description: Consistent annual rate of development of planned housing areas in cities, centres and towns, and some new areas of subdivision to supply moderate local or external demand. Existing infrastructure can generally be augmented to meet demand without constraining supply with some major works needed for some new areas.
- Settlements:
 - Kerang
 - Robinvale

Assets

Rural land across the region is critical for the economic, environmental and amenity values it provides. There are many areas of strategic significance where the quality, location or existing level of infrastructure are such that they require special consideration and planning protection to ensure their values are not compromised by incompatible uses or degradation. Key examples for Loddon Mallee North are irrigation systems with their extensive infrastructure and economic output.

The Murray River is a significant asset for the region, providing a sense of cultural identity, recreation and tourism opportunities, economic benefits and environmental and amenity values. Complementing the river itself is the reserve system that runs along its length. This adds to the amenity and recreation values, particularly for towns fronting the river and protects urban areas to some extent from flood risk.

The vast network of other waterways and lakes, including the Avoca, Loddon and Campaspe rivers, Gunbower Island and Gunbower Creek, the Kerang Lakes, Lake Boga, Waranga Basin, Hattah Kulkyne Lakes, Lindsay and Wallpolla Islands and Lake Tyrell, provides a range of benefits to the region, including water supply, tourism and recreation opportunities.

Constraints

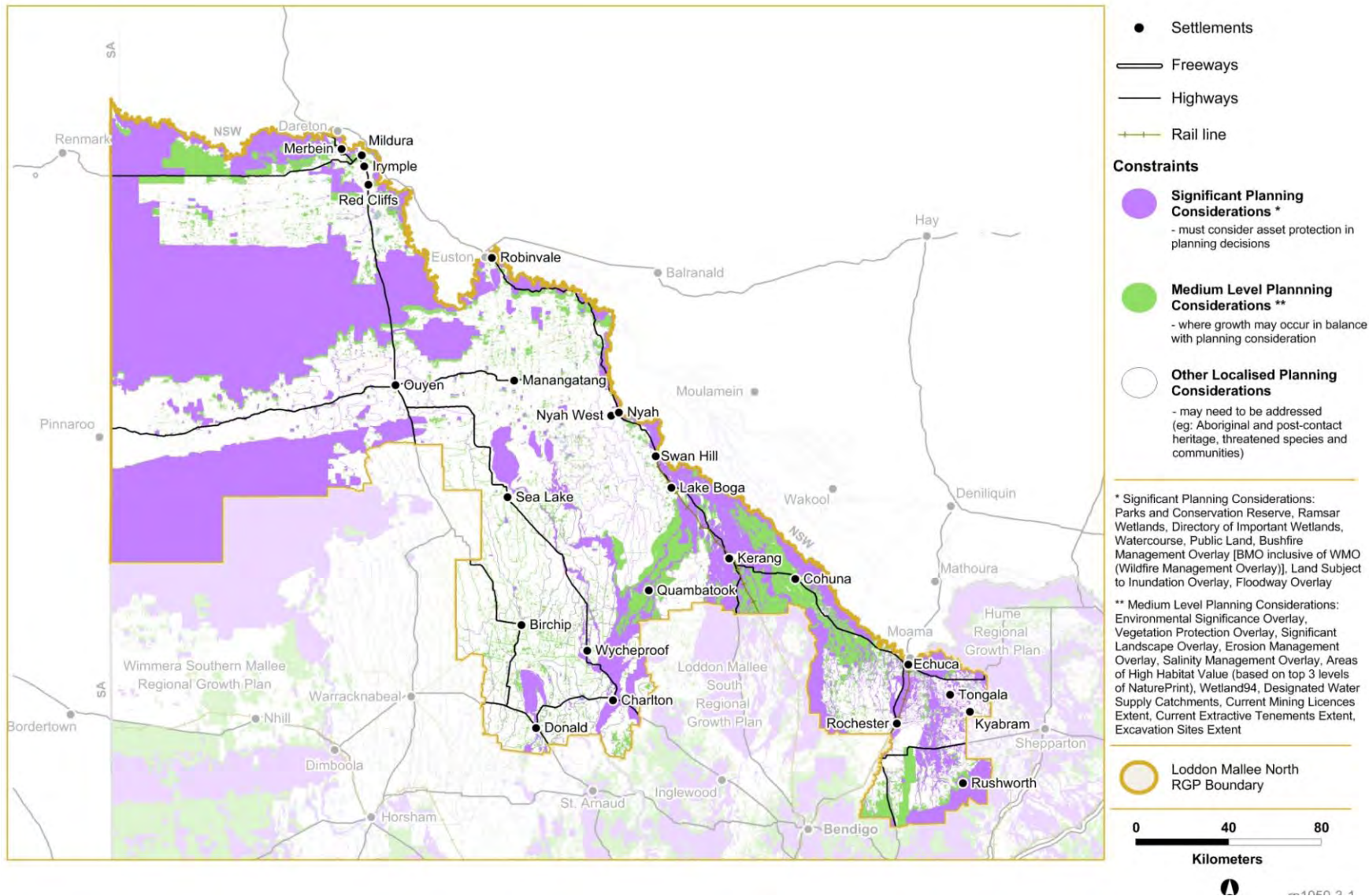
Key considerations in planning for growth in the region are intrinsically linked to key assets: the Murray, Avoca, Loddon and Campaspe rivers, Gunbower Creek and other waterways that contribute to the high level of flood and

inundation risk in many towns. Other considerations include bushfire risk associated with the extensive parks and reserve system, areas of cultural and heritage sensitivity, and the need to protect strategically significant rural land (see Figure 31).

The plan considers anticipated levels of growth across the region based on constraints, as well as on projected population and economic growth, the role and function of each town, and on the characteristics of each town identified above. Based on consideration of these factors the centres most suitable for accommodating growth have been identified (see Figure 31).

Loddon Mallee North Regional Growth Plan Background Report

Figure 31: Regional planning considerations



Source: Department of Transport, Planning and Local Infrastructure

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